

***University Senate Agendas, 2014-2015***

All meetings are from 3:00 - 5:00 pm in the Auditorium of W. T. Young Library  
unless otherwise noted.

**Monday, February 9, 2015**

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***Next Meeting: March 9, 2014***

University Senate  
December 8, 2014

The University Senate met in regular session at 3 pm on Monday, December 8, 2014 in the Auditorium of W. T. Young Library. Below is the record of what transpired. All votes were taken via electronic voting devices unless indicated otherwise; specific voting information can be requested from the Office of the Senate Council.

Senate Council Chair Andrew Hippisley called the University Senate (Senate) meeting to order at 3:02 pm. Quorum was met, with 79 voting members responding to the attendance slide. The Chair asked for a motion to waive *Senate Rules 1.2.3* to allow consideration of the agenda, because the agenda was not sent out six days in advance. Brion **moved** thusly and Mazur **seconded**. There being no discussion, a **vote** was taken and the motion **passed** with 75 in favor, three opposed and two abstaining.

#### 1. Minutes from November 10, 2014 and Announcements

No corrections to the minutes were received by 9am Friday. There being **no objection**, the Chair said that the minutes from November 10, 2014 stood **approved** as distributed, by **unanimous consent**. There were a few announcements.

- The Staff and University Senates' Stakes reception will take place on Tuesday, December 9, from 2:30-4:30 pm on the 18th floor of Patterson Office Tower.
- The Chair explained that the Senate's "Other Business" agenda item was intended to be used for senators to raise issues that may be of interest to the Senate. During the November meeting, a couple issues were raised. First, the comment about students submitting online teacher-course evaluations (TCE) was particularly helpful. The ad hoc Committee on Teacher-Course Evaluations was subsequently asked to consider this issue. The Chair encouraged senators to contact Ms. Brothers if they had good practices that worked to encourage students to submit online TCEs. The Chair commented that using TCEs as the sole evaluation of teaching effectiveness is a tangential issue, but the Senate Council (SC) has suggested the Chair talk to the Provost about exploring other instruments for evaluating teaching effectiveness, perhaps via a joint Provost-SC committee. The second comment offered at the November meeting pertained to administrative bloat at UK; the Chair said SC discussed this issue a great deal. In the SC's evaluation of President Eli Capilouto last year, the President's ratings improved in almost all categories over the previous year, except for the issue of administrative bloat. The Chair said that the Senate's Institutional Finance and Resource Allocation Committee (SIFRAC) could be a place to investigate the matter; he said he would also discuss it with the President.
- The SC met with the President at his home on December 1 and the topic of conversation was the recent retreat held by the Board of Trustees (Board) and their focus on research. During the discussion, the SC invited the President to come speak to the Senate on research during the spring semester. In addition to discussion on research, the 2014—2020 Strategic Plan was also mentioned. The President assured SC members that outside consultants were only being used to identify missing data and do legwork. A draft of the 2014-2020 Strategic Plan will be presented to the Senate for comment prior to the Board seeing it.

#### 2. Officer and Other Reports

##### a. Chair

The Chair noted a couple approvals made on behalf of the Senate: the SC approved non-standard calendars for NUR 900, 917, 918, 919, 925, 930, 520, and 752; and the SC approved a revision to the 2014-15 Pharmacy calendar.

The Chair approved an addition to the December 2014 degree list because the original omission was due to administrative error.

At the SC's request, the Provost's office is reviewing college and department rules. The Chair commented that all approved rules can be found on the Senate's website, but the rules were completely non-uniform in terms of being up to date, or even being there at all. The Provost has the responsibility for checking college and department rules for consistency with *Governing Regulations (GRs)*, *Administrative Regulations (ARs)*, and *Senate Rules (SRs)*; the Provost's office asked if the Senate was interested in participating some way in the review, specifically checking unit rules for consistency with the *SRs*. The Chair said it was possible that the charge of the Senate's Rules and Elections Committee (SREC) could be expanded to perform such a check.

The Chair was invited to attend a meeting of associate deans and took the opportunity to talk about two issues. First, the Senate Council office gets requests to add a student to a degree list due to administrative error. A couple colleges make such requests far more often than other colleges and such requests just do not look good. At the root of it, not being on an appropriate degree list is unfair to a student. The Chair encouraged associate deans to take more care in this area. The second issue he talked about pertained to the Senate committee structure. The Chair gave associate deans a list of Senate committees as well as the names of committee chairs. As a default, interactions between committees and colleges or individuals should be through the committee chair persons; at the very least a committee member must CC the committee chair when interacting with those outside the committee. The Chair suggested to senators that if their committee wished to express something to a college, it needed to be done through the committee chair.

b. Vice Chair

Vice Chair Christ had nothing to report.

c. Parliamentarian

Parliamentarian Kate Seago had nothing to report.

d. Trustees

Trustee John Wilson had no specific report, but said he was there to be sure senators had an opportunity to ask him questions. Wilson noted that the Board would meet the following day. He opined that now was a particularly critical time because of the limbo in the Provost's office, particularly with the onset of the new budget model and the strategic plan, as well as evaluations of colleges and deans. One big concern is what happens during an interim period and how UK can continue to move ahead in this critical time. Wilson said he was also in receipt of a number of complaints about parking transitions on campus; he has been assured that implementation without consultation will not happen again this year. There were no questions for Wilson.

3. Degree Recipients

a. Honorary Degree Nominees - Interim Graduate School Dean Susan Carvalho

Interim Graduate School Dean Susan Carvalho explained that the University Joint Committee on Honorary Degrees (UJCHD) made a special effort this year to request nominees; 16 were received, which was a larger number than in the past. In addition, the candidates were all very competitive. She offered thanks to all those who submitted nominations. Dean Carvalho then gave a presentation to senators on the three nominees for honorary degrees for May.

The Chair said that the motions for the honorary degree candidates came from the UJCHD, so no second was necessary. He noted that only elected faculty senators could vote on honorary degree candidates. The **motion** from the University Joint Committee on Honorary Degrees was that the elected faculty senators approve Les McCann, as the recipient of an Honorary Doctor of Arts, for submission through the President to the Board of Trustees, as the recommended recipient of an honorary degree to be conferred by the Board. There being no discussion, a **vote** was taken and the motion **passed** with 82 in favor and 1 opposed.

The next **motion** from the UJCHD was that the elected faculty senators approve Lillian Press, as the recipient of an Honorary Doctor of Humanities, for submission through the President to the Board of Trustees, as the recommended recipient of an honorary degree to be conferred by the Board. There being no discussion, a **vote** was taken and the motion **passed** with 76 in favor and 1 opposed.

The last **motion** from the UJCHD was that the elected faculty senators approve O. Leonard Press, as the recipient of an Honorary Doctor of Letters, for submission through the President to the Board of Trustees, as the recommended recipient of an honorary degree to be conferred by the Board. There being no discussion, a **vote** was taken and the motion **passed** with 79 in favor.

b. December 2014 *In Memoriam* Posthumous Degree Candidate

The Chair explained the background for the *In Memoriam* posthumous degree process, which was approved by the Senate in February 2014. College of Arts and Sciences Dean Kornbluh offered some background information on the deceased student for senators' benefit. He noted that the student was a member of Project Grad and had completed 150 credit hours. As would be done for any Project Grad student, the College of Arts and Sciences waived two units of 300-level credit, as well as the foreign language requirement; therefore, the student had essentially completed the requirements for the degree. Dean Kornbluh asked for approval, stating the posthumous degree was important to the student's family.

The recommendation from SC was that elected faculty senators approve a December 2014 *In memoriam* posthumous degree, for submission through the President to the Board of Trustees, as the recommended degree to be conferred on Robert Ernest Stith, Jr by the Board of Trustees. Ilahiane **moved** thusly and Lewis **seconded**. The Chair placed the motion on the floor to allow discussion.

Tagavi asked if the motion could be amended to indicate that the student had completed all degree requirements. Both Ilahiane and Lewis **accepted** the suggestion as a **friendly amendment**. There was additional discussion among senators because it appeared that the student should receive a regular, earned degree, posthumously, as opposed to an honorary *In Memoriam* degree. As discussion wound down, the Chair said on behalf of the Senate, he could add the student to the December 2014 degree list, after which time the student's degree would be treated as any other earned degree. Ilahiane said he wanted to **withdraw his motion**, and Lewis **agreed**. Via a show of hands, a **vote** was taken on withdrawing the motion and the motion **passed** with a vast majority in favor.

c. December 2014 Degree List

The Chair noted that as of Friday, there was one change to the degree list, to change a BS degree to a BA degree. The recommendation from SC was that the elected faculty senators approve the December 2014 degree list, for submission through the President to the Board of Trustees, as the recommended degrees to be conferred by the Board. Brion **moved** thusly and Wood **seconded**. After a brief comment, a **vote** was taken and the motion **passed** with 67 elected faculty senators in favor, one opposed, and two abstaining.

4. Committee Reports

a. Senate's Academic Planning and Priorities Committee (SAPPC) - Wally Ferrier, Chair

i. Update on Committee Activities

The chair of the Senate's Academic Planning and Priorities Committee (SAPPC), Wally Ferrier, gave senators an update on activities of the SAPPC. Ferrier said the committee had met a couple times and also with the Chair. One of the SAPPC's major activities is assisting in university-wide efforts to identify potentially new and interesting academic programs. The programs would be consistent with UK's new strategic plan when it becomes public and reflect existing programs at UK's peers and aspirational benchmarks that are missing from UK. One such type of program could be in the field of big data, specifically analytics-driven approaches. When the SAPPC is aware of a degree offering that UK might want to consider offering, the SAPPC plans to contact the relevant and appropriate faculty to determine if those faculty have any interest in making a degree proposal. In addition, the SAPPC is developing a survey to ask faculty about awareness of or ideas for new degree programs.

Ferrier went on to say that the SAPPC has also looked at the approval path for new degree programs, which is much like a maze. He added that if one has been a senator for any period of time, the senator has witnessed or been party to potentially uncomfortable discussions about one department proposing something and another department protesting the proposal based on not having been appropriately consulted, perhaps not consulted at all. After this, the discussion largely devolves into a turf battle. Ferrier said the SAPPC was willing to informally

assist in such discussions and at the earliest stages possible. He said that faculty who may worry about turf battles could benefit from the SAPPC's willingness to broker information and help a faculty member and/or unit improve collaboration with other units. Ferrier said that senators should check their inboxes in mid or late January for a campuswide survey from the SAPPC about new program development. There were a few comments from senators.

b. Senate's Admissions and Academic Standards Committee (SAASC) - Greg Graf, Chair

i. Masters Final Examination Enrollment Policy

Graf, chair of the SAASC, explained the proposal to change the master's student final examination policy. Because the **motion** to approve the proposed new master's final examination policy came from committee, no **second** was required.

Tagavi asked for clarification about master's degree students who disengage and then return. He said that as he read the proposal, thesis students and non-thesis students were treated differently – thesis students must enroll in a one-credit course in order to sit for the final examination but non-thesis students must enroll in a zero-credit course in order to sit for the final examination. Tagavi opined that both courses should each carry zero credit, or should carry one credit, but not be different. Graf clarified that a student will enroll in a zero-credit course, for zero cost, regardless of whether the student is thesis or non-thesis, and that continuous enrollment was required for both types.

Wood objected to the proposal's recommendation that an "XXX" 748 course will be created for non-thesis students. Wood explained that 748 courses are used for the purposes of loan deferment. She suggested editing the proposal so that it referred to a zero-credit hour master's thesis course and not a 748 course. Guest Cleo Price, assistant dean in the Graduate School, said such a course was in the process of being developed. Truszczynski spoke against the motion, saying the proposal cannot be implemented because an integral part, development of a new course, was not yet complete. Brion also spoke against the proposal – there were a sufficient number of typos and factual errors that the version as revised on the Senate floor may not meet the original intent of the Graduate School when it made the proposal.

Brion **moved** to table the proposal and return it to the SAASC for revisions. The Chair noted that he called on senators out of order – although a senator wanted to move a motion, the Chair said he should first allow another senator their turn to speak. Swanson offered a couple of suggestions for the SAASC, including removal of the specific course number because different master's students in different programs use different course numbers. In response to the Chair, Swanson said he had no objection to the proposal returning to the SAASC so long as his suggestion to simplify is considered.

Dietz **seconded** the motion to table. A **vote** was taken and the motion **passed** with 61 in favor, nine opposed, and three abstaining.

c. Senate's Academic Organization and Structure Committee (SAOSC) - Ernie Bailey, Chair

i. Proposed New Department of Integrated Strategic Communications (ISC) and Move of BA/BS in ISC to the Proposed New Department of ISC

Bailey, chair of the SAOSC, explained the proposal for a new Department of Integrated Strategic Communications (ISC) and the associated move of the BA and BS in ISC to the proposed new Department of ISC. Because the **motion** to approve the proposed new department and the move of the two degrees came from committee, no **second** was required. The Chair put the motion on the floor and invited discussion. Guest Beth Barnes, director of the School of Journalism and Telecommunications and proposer, commented that the correct name of the both the department and degrees was "Science" in its singular form, not "Sciences."

There being no comments from senators, a **vote** was taken on the motion that the Senate endorse the creation of the proposed new Department of Integrated Strategic Communication (ISC) within the College of Communication and Information and the associated move of BA/BS Integrated Strategic Communication to the proposed new

Department of Integrated Strategic Communication. The motion **passed** with 61 in favor, nine opposed, and 11 abstaining.

d. Senate's Academic Programs Committee (SAPC) - Margaret Schroeder, Chair

i. Proposed New Graduate Certificate in Inclusive Education

Schroeder, chair of the Senate's Academic Programs Committee (SAPC), explained the proposed new Graduate Certificate in Inclusive Education, in the Department of Early Childhood, Special Education, and Rehabilitation Counseling within the College of Education. Because the **motion** to approve the proposed new department and the move of the two degrees came from committee, no **second** was required. The Chair put the motion on the floor and invited discussion. There were a couple questions from senators. A **vote** was taken and the motion **passed** with 75 in favor, one opposed and one abstaining.

ii. Proposed Change to *Senate Rules 5.1.2.1.D* ("Limitation on Pass/fail Units Creditable for College of Law Students") and *Senate Rules 5.3.3.1.C* ("Limitation on Pass/fail Units Creditable for College of Law")

The Chair explained the proposed changes to *Senate Rules 5.1.2.1.D* and *Senate Rules 5.3.3.1.C*. There were no questions from senators. Anderson **moved** that the Senate approve the proposed revisions to *SR 5.1.2.1.D* and *SR 5.3.3.1.C* and Ilahiane **seconded**. A **vote** was taken and the motion **passed** with 67 in favor, seven opposed, and four abstaining.

5. University Calendars

(2015 - 2016 Calendar; 2017 - 2018 Calendar, Tentative; 2015 - 2016 Dentistry; 2017 - 2018 Dentistry, Tentative; 2015 - 2016 Law; 2016 Summer I (four-week) Law; 2016 Summer Law; 2017 - 2018 Law, Tentative; 2018 Summer I (four-week) Law, Tentative; 2018 Summer Law, Tentative; 2015 - 2016 Medicine; 2017 - 2018 Medicine, Tentative; 2015 - 2016 Pharmacy; 2017 - 2018 Pharmacy, Tentative; 2015 - 2016 Winter Intersession; and 2017 - 2018 Winter Intersession, Tentative)

The Chair solicited a motion for approval. Tagavi **moved** to approve the University Calendars as presented and Kennedy **seconded**. A **vote** was taken and the motion **passed** with 73 in favor, one opposed, and one abstaining.

6. Proposed Revision to *Governing Regulations X* ("Employment") & *Governing Regulations XIV* ("Ethical Principles and Code of Conduct") - Marcy Deaton, Associate General Counsel

Guest Marcy Deaton, associate general counsel, explained the proposed changes to *Governing Regulations X* and *Governing Regulations XIV*. There were a variety of comments from senators. Debski expressed concern that the revised language did not encompass promotion, training, and payment for employment. Deaton explained that the term "employment" encompassed the activities of promotion, training, and payment. A number of comments were made regarding the inclusion, or lack thereof, of "training, promotion, and pay." There were no concerns raised about the changes to the groups listed in the anti-discrimination statements. There was discussion about the next steps.

Swanson suggested taking the wording suggestions back and revising both *GRs*. Anderson suggested the revised *GRs* go to the SC, which could endorse the revised versions on behalf of the Senate. There was consensus on the wording to be sent back for revision.

7. University Appeals Board Report for 2011-12, 2012-13, 2013-14 and Trends - Joe Fink, UAB Chair

Guest Joe Fink (PH/Pharmacy Practice and Science), chair of the University Appeals Board (UAB), offered a report on the UAB's activities for 2011-12, 2012-13, and 2013-14. There were a variety of comments and questions from senators. The primary reason for granting appeals is that faculty members making the charge do not attend the hearing.

8. UK's Learning Management System (LMS) - Patsy Carruthers, Director of Academic Technologies (15 minutes)

Guest Patsy Carruthers, director of Academic Technologies, gave a presentation on the new learning management system, which will replace Blackboard.

9. Proposed Changes to the UK Retirement Plan - Joey Payne, Chief Benefits Officer (15 minutes)

Guest Joey Payne, director of Employee Benefits, gave a presentation on proposed changes to UK's retirement plans. There were a few questions from senators.

10. Other Business (Time Permitting)

The Chair used "Other Business" as an opportunity for an update on elections for SC officers and SC members.

McGillis **moved** to adjourn and Brion **seconded**. Senators voted with their feet and the meeting was adjourned at 5:11 pm.

Respectfully submitted by Alice Christ,  
University Senate Secretary

Invited guests present: Beth Barnes, Patsy Carruthers, Marcy Deaton, Joe Fink, Lee Ann Jung, Joey Payne, and Cleo Price.

Absences: Adams, I., Adams, M., Bailey, P., Bird-Pollan\* , Birdwhistell, M, Blackwell, Brennen, Butler, Campbell\*, Cassis, Clark, Cox, de Beer, Dickson, Doolen\*, Fox, Grace, Grossman\*, Ingram, Jackson, J., Jackson, N., Jong, Karan, Kornbluh, Lauersdorf\*, Lee, C\*, Martin, A, McCormick, McManus, Nash, Oberst, O'Hair, MJ\*, Osorio\*, Profitt\*, Rey-Barreau, Richey, Rompf, Royse, Royster, Schoenberg\*, Sekulic\*, Tick, Tracy, Turner, Vosevich, Walz, Watt, Williams, and Witt.

Prepared by Sheila Brothers on Monday, January 26, 2015.

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\* Denotes an explained absence.



Brothers, Sheila C<sup>9</sup>

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**From:** Schroeder, Margaret <m.mohr@uky.edu>  
**Sent:** Tuesday, February 03, 2015 9:08 AM  
**To:** Brothers, Sheila C  
**Subject:** Proposed New Graduate Certificate: Digital Mapping

**Proposed New Graduate Certificate: Digital Mapping**

This is a recommendation that the University Senate approve the establishment of a new Graduate Certificate: Digital Mapping, in the Department of Geography within the College of Arts & Sciences.

Best-

Margaret

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Margaret J. Mohr-Schroeder, PhD | Associate Professor of Mathematics Education | [STEM PLUS Program Co-Chair](#)  
| [Department of STEM Education](#) | [University of Kentucky](#) | [www.margaretmohrschroeder.com](#)



## Proposal for a Graduate Certificate in Digital Mapping

### 1. General Information

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**Certificate Home:** Department of Geography  
**Certificate Name:** Digital Mapping  
**Requested Effective Date:** 8/15/2015 or Fall 2015  
**CIP Code:** 45.0702, Geographic Information Science and Cartography

### 2. Proposal Contact

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Dr. Matthew Zook  
Professor  
859-218-0955  
[zook@uky.edu](mailto:zook@uky.edu)

### 3. Overview

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Note: the formal name for this proposal is a “Graduate Certificate in Digital Mapping”. The term NewMaps+ is also used in this proposal in reference to the larger initiative that has been ongoing in the Geography department since 2011 and includes both this graduate certificate as well as a Master’s degree.

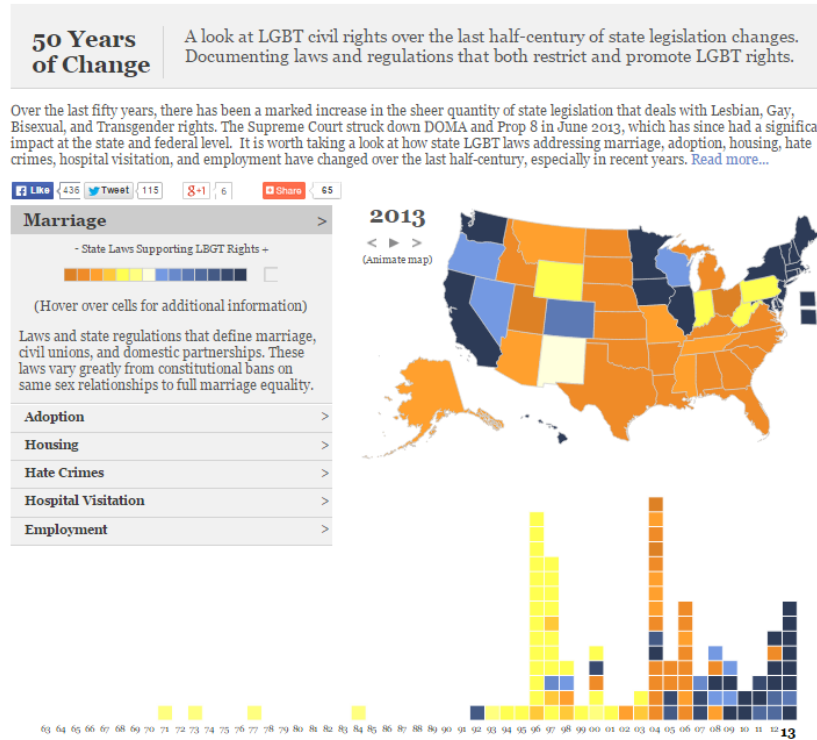
#### A. Description

The online graduate certificate in digital mapping (11 credits in three courses) trains students in a range of web-based systems for producing online geovisualizations and applications. Information about location and spatial analysis has become ubiquitous in everyday life and central to an array of disciplines ranging from soil science to public health to the digital humanities and demand for geospatial technology expertise is burgeoning. Location-aware devices (such as smart phones) have saturated everyday life and present enormous opportunities for online mapping tools and analysis in applications ranging from smart-city and civic development to human-environmental relations to increasing demands for “big data” analytics.

The graduate certificate in digital mapping is part of a larger initiative (referred to as NewMaps+) to provide a curriculum rich with technical training in Geographic Information Systems (GIS) and online mapping including the creation and use of geodata, cutting edge techniques for scraping geodata from social media and other web-based sources, as well as online spatial visualization tools such as TileMill and D3. The New Maps+ initiative challenges students to critically engage with potential pitfalls of online mapping such as locational privacy and changing technical standards. The University of Kentucky is well positioned with instructional assets in critical GIS and online mapping as well as strong ties to academic and industrial networks enabling the New Maps+ graduate certificate to serve an emerging market in online education in GIS and mapping amid an unfolding location-aware future.

To get a sense of the kind of mapping project that students will be able to produce as a result of the program, please see the following two maps. Both of these maps were created by students and are the result of similar course work as proposed for this certificate. We expect our students will be creating more advanced products than these relatively simply examples.

### 50 Years of Change: An Animated Map Looking at Changing Legislation Related to LGBT Rights at the State Level



Source: <http://50yearsofchange.com/>

### #Sandy: An Interactive Map of Tweets During Hurricane Sandy Visualized via WordClouds and Hex Maps



Source: <http://www.geo-odyssey.com/links/sandy/>

In order to establish the New Maps+ initiative in digital mapping, the Department of Geography is moving forward on several simultaneous fronts, including this graduate certificate. These include:

- This proposal to the UK Faculty Senate for a new graduate certificate (11 credits);
- A proposal to the UK Faculty Senate for a new Master's of Science degree (30 credits);
- Ten new graduate course proposals submitted to the UK Faculty Senate for classes taught within the graduate certificate and Master's degree; and
- A proposal to the Council of Post-Secondary Education for the Master's degree under a different but closely related CIP code (45.0702, Geographic Information Science and Cartography) to the currently existing CIP code (45.0701) associated with graduate studies in Geography.

All courses for the graduate certificate will be offered entirely online and take advantage of the latest online instruction technologies to provide video lectures, discussion and assignments.

These new courses and certificate will not replace existing offerings and all courses, certificates and degrees currently associated with Geography will remain.

All resources (faculty, courses, computer equipment, etc.) necessary for running the certificate is based in the Geography department. As this is an online graduate certificate, no classroom space resources are needed. We do have the necessary computer lab, server and infrastructural resources needed for NewMaps+.

#### B. Affiliation

This certificate is affiliated with the Department of Geography.

The Department of Geography has been focused on expanding its curriculum in geographic information systems (GIS) and digital mappings since 2010 when it conducted a nationwide search and hired two faculty members -- Dr. Jeremy Crampton (GIS, critical cartography) and Dr. Matthew Wilson (GIS, public participation) who joined the department in the Fall of 2011. They joined existing faculty members – Dr. Matthew Zook (online mapping, geosocial media), Dr. Daehyun Kim (spatial analysis) and Dr. Liang Liang (remote sensing) – and have established the department as a leading center for studies in critical GIS and public participatory cartography and analysis. In August 2014, Dr. Rich Donahue, an expert in online mapping pedagogy, joined the department in a post-doc position to work on the NewMaps+ initiative. As part of this effort the New Mappings Collaboratory (<http://newmaps.as.uky.edu/>) was established to jointly work on research and teaching efforts involving online mapping and critical GIS.

Towards this goal the Geography department and New Mappings Collaboratory hosted a workshop event during May 2013 in which a dozen of the leading educators in the field of digital mapping were brought to UK campus and engaged in a week-long intense curriculum development process. This initial curriculum building process was supported by funding from the Dean of the College of Arts and Sciences as well as the Department of Geography. Building upon this foundation Dr. Matthew Zook led a proposal writing process in response to a call for proposals from the University of Kentucky eLearning Innovation Initiative (eLII), a joint effort of the Office of the Provost, UK Analytics and Technologies (AT) and the Center for the Enhancement of Learning and Teaching (CELT). The proposal was awarded a grant of \$200,000 in January 2014 (see <http://www.uky.edu/elii/onlinedegreeprogram/awardees>) and course design efforts began in earnest.

### C. Demand

Geographic data and its analysis and visualization are increasingly prevalent in the global economy and the range and power of online mapping tools is expanding. The enormous range of commercial uses for geographical data means that geospatial technology market is growing at 35 percent per year overall while the commercial market is increasing by 100 percent annually.<sup>1</sup> The U.S. Department of Labor further notes that, “the widespread availability of advanced technologies offer great job opportunities for people with many different talents and educational backgrounds.”<sup>2</sup> Thus, the New Maps+ graduate certificate is positioned within a growth sector of the economy and we anticipate considerable demand for both the graduate certificate and the Master's degree.

Indeed a number of universities have also seen this demand and offer a range of initiatives. A survey by the Geography department and information from Geotechnologies expert Dr. Chris Lukinbeal (University of Arizona) identified benchmark initiatives at other universities offering certificates and Master's degrees in GIS: Penn State University (PSU), Denver, Northwest Missouri, USC, UW, American Sentinel (a for-profit in Denver), and Delta State in Mississippi. This review highlights the range of definitions of online programs. While some (such as PSU) are fully online,

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<sup>1</sup> US Department of Labor. (2012). High growth industry profile – Geospatial technology. Retrieved on December 15, 2012 from [http://www.doleta.gov/brg/indprof/geospatial\\_profile.cfm](http://www.doleta.gov/brg/indprof/geospatial_profile.cfm)

<sup>2</sup> US Department of Labor. (2012). High growth industry profile – Geospatial technology. Retrieved on December 15, 2012 from [http://www.doleta.gov/brg/indprof/geospatial\\_profile.cfm](http://www.doleta.gov/brg/indprof/geospatial_profile.cfm)

other initiative have an in person component (such as one week when students are expected to be on campus or some other location together). (2) Universities with certificate initiatives generally allow certificate credits to count for a Master's degree if the student chooses to continue. Our understanding is that much of the demand (and revenue) is generated via the certificate rather than Master's initiatives. (3) There is considerable demand for these initiatives. The largest online initiative, Penn State, has 800 students in the initiative at any given time, mostly enrolled in the certificate. USC has about 180 students in a cohort, while the smaller initiatives have cohorts of approximately 30 students.

#### D. Demographics of Target Student Population

The target population for graduate certificate is expected to be working adults who wish to pursue a course in digital mapping and value the flexibility that an online course provides. We anticipate students coming from the traditional backgrounds using mapping, *e.g.*, urban planning and transportation but also see great opportunities for students coming from business and marketing, journalism, design fields as well as the non-profit sector. As maps and spatial information become ever more integrated into daily life demand for digital mapping skillsets will increase in the commonwealth, nation and world. Given the online nature of the graduate certificate we expect enrolled students to come from every part of the country and world.

In addition we expect these courses to be of interest to current University of Kentucky graduate and postbac students. Our courses would be open to these traditional students although subject to the prerequisite requirements of each course and the guidelines of the student's home departments.

Given the background of our expected students (working adults) we have designed a course structure of ten weeks rather than the traditional semester system. This has a number of key advantages including the ability for students to start taking classes in the graduate certificate at four different times. We anticipate this to be very useful to students who lives are not organized around a two semester system and should better serve them. See below for a review of how this will be structured.

#### E. Projected Enrollment

The certificate is designed so that students can complete it within one year. Therefore our anticipated enrollment figures in the graduate certificate are only for new students that year rather than continuing ones.

Year 1	20 to 60 new students
Year 2	35 to 75 new students (50 to 135 total students)
Year 3	40 to 80 new students (90 to 215 total students)

#### F. Distance Learning

This certificate will be taught completely online. There are a total of three courses in the certificate and are detailed below in the curriculum section.

The New Maps+ Design Strategy aims for the highest quality student learning experience and is fundamentally predicated upon quality interaction with the instructor. We are concerned with the careful and best use of educational technologies requiring

instructors to embrace the disruptive promise of online teaching rather than simply mirroring offline approaches. Often this has meant a distilling of the substantive learning objectives of face-to-face interaction, as opposed to thinking through the transformative moment in the face-to-face classroom, which is part substance and part process. Many online courses only focus on the substance of learning, at the expense of the processual. The unfolding of a process of learning in face-to-face moments is not easily or directly transferable into the online course, and we see this as perhaps the most impactful challenge at the center of the proposal. To address this we outline specific steps to ensure that the quality of our online instruction is equal to or exceeds face-to-face interaction.

Since the Spring 2013 semester the Geography department has intensely reviewed instructional and online mapping technologies in order to build successful online mapping courses. A particularly central technology is the learning management system (LMS) and we have select Canvas for the New Maps+ graduate certificate. We choose Canvas as a LMS for a range of reasons. We also have experimented with feature set of Canvas, particularly assessment engines and grading, and are satisfied that they meet the needs of the New Maps+ certificate.

We anticipate using multiple technologies for direct communications with students but plan to primarily use Canvas given the advantages of a centralized LMS. This would include notifying students of course events via their preferred method of contact. We are still evaluating our preferred technologies for live meetings (such as synchronous final project charrettes). While U.K. offers Adobe Connect, we also value technologies more widely used by our potential students. In particular, the conferencing system offered by Google Hangout is versatile and has the advantage of being tied to the larger Google suite of software.

Another decision that remains unresolved is the technology for peer evaluation as the Canvas LMS seems limited in this arena. Our prior experience with online peer learning indicates that key issues are: (1) sharing materials among course participants and (2) collecting and aggregating peer feedback and evaluation. A unique challenge to the New Maps+ initiative is that project material is often in the form of visualizations rather than text or numeric answers to problem sets. We have found workable solutions by combining a shared blog (with each student sharing their map) with commenting (for general feedback and commentary) and free online survey systems (for collecting more sensitive, grade related evaluations).

Our strategy for ensuring instructional quality in the New Maps+ graduate certificate is closely tied to our strategic vision for high quality student learning environments and the specific steps we will take to ensure that the quality of our online instruction. We see flexibility in course design, openness in learning from previous experience, experimentation with both technologies and pedagogy and attentiveness to what works as fundamental aspects of high quality online instruction and instructors. We believe that the instructional quality of the New Maps+ graduate certificate will also draw upon the compelling and evocative nature of our learning content. To ensure this, we leverage our existing networks at the interface of design and mapping to draw professionals to interact with our instruction and our students. We believe that both the learning content and the pedagogical strategies associated with 'mapping' are shifting. Maintaining the pulse as well as the contours of these changes will allow us to adapt quickly and best serve our

learning audience, who we expect to be highly dynamic participants in our graduate certificate.

#### 4. Administration and Resources

---

##### A. Administration

All administrative functions will be done by the Department of Geography in concert with relevant UK departments, e.g., we will work with the Graduate School's admissions process.

##### B. Resources

All resources (faculty, courses, computer equipment, etc.) necessary for running this graduate certificate are based in the Geography department. As this is an online graduate certificate, no classroom space resources are needed. We do have the necessary computer lab, server and infrastructural resources needed for NewMaps+.

##### C. Faculty of Record / Graduate Certificate Associates or Affiliates

The faculty of record the Master's degree will be the graduate faculty of the Department of Geography. There are a number of internationally research active and world-renowned Geography department faculty whose teaching and research directly engage the focus of the New Maps+ initiative. In addition to topical expertise many faculty have experience in designing and delivering online and hybrid course design and there presently is a working group dedicated to those goals. The New Maps+ graduate certificate will draw upon the following Geography faculty:

Dr. Jeremy Crampton is a key figure in the GIS & Society movement as well as critical cartography. He is developing an open-mapping research program at UK and has begun working with hybrid models of GIS courses to provide more flexibility for students.

Dr. Daehyun Kim is a biogeographer researching the spatial patterns of vegetation and landform via simulation models, geographic information systems and spatial/multivariate statistics in order to analyze and visualize dynamics of complex biogeographic systems.

Dr. Liang Liang researches bioclimatology and explores the timing of life cycle events such as bud burst and flower bloom via remote sensing and geographic information systems.

Dr. Matthew Wilson is an expert on public participation GIS and has designed a number of new U.K. courses including GEO109: Digital Mapping and the GEO509 Workshop on collaborative mapping using online technologies. He is also a key figure in disciplinary discussions on the transitioning of traditional GIS courses to online environments.

Dr. Matthew Zook won U.K. Provost Teaching Award in 2013 and researches geographically referenced social media data to study the spatial patterns of society. He founded the popular geovisualization blog, FloatingSheep (featured in the Economist, CNN, BBC World Service, and WIRED Magazine) and has developed new course on web scraping and visualization.

The Geography Department Working Group for online and hybrid courses presently is working with HIVE and CELT to transition key Geography courses to more on-line



based content and instruction, and includes faculty with experience and expertise in on-line teaching as well as substantive research expertise which might be utilized for course modules empirically dedicated to specific topics; including political ecology, urban studies, social theory and cultural landscapes. The working group includes Dr. Lynn Phillips, Dr. Tad Mutersbaugh, Dr. Richard Schein and Dr. Alice Turkington.

D. Graduate Certificate Director

The proposed graduate certificate director is Dr. Matthew Zook who is heading this certificate proposal.

## 5. Support and Impact

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A. Faculty Governance

Please see the attached letter from Dr. Richard Schein, Chair of Geography verifying that 1) the NewMaps+ graduate certificate has received faculty approval through faculty governance procedures and 2) the department has the resources to support the certificate without impacting core program resources.

B. Other Related programs

There are no other UK programs officially involved in this graduate certificate. But the Geography department also has strong collaborative relationships with a range of other departments and colleges at U.K. engaged in GIS and mapping which could take advantage of this graduate certificate. These include Agriculture, Civil Engineering, Digital Humanities, Earth and Environmental Systems, Historic Preservation, Fine Arts, History, the Kentucky Transportation Center and Landscape Architecture.

C. External Course Utilization

There are no external courses used in the graduate certificate.

## 6. Admissions Criteria and Curriculum Structure

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A. Admissions Criteria

The NewMaps+ graduate certificate will follow standard Graduate School requirements for admission to a graduate certificate.

There are no requirements that students need to be enrolled in a UK Master's or Ph.D. degree and award of the NewMaps+ graduate certificate does not guarantee admission to the Master's in digital mapping also proposed by the Geography department or any other degree at the University of Kentucky.

Students seeking to be admitted to the NewMaps+ graduate certificate must contact the certificate Director.

In order to receive the certificate, students must have a minimum GPA of 3.0 in the three courses that form the certificate.

B. Curricular Structure

This course will not use existing course but consists of three new courses using the MAP<sup>3</sup> prefix.

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<sup>3</sup> The Department of Geography is seeking the MAP prefix as part of a its proposed online graduate certificate. The MAP prefix would provide a couple of key advantages – emphasis and differentiation -- as we move forward with

The graduate certificate component consists of three courses (11 credits). These courses are required to be taken in order and are designed to provide students with the necessary technical skills in GIS, programming and design to succeed in digital mapping.

Prefix	Number	Title	Prereq	Credits
MAP	671	Introduction to New Mapping	-	3
MAP	672	Programming for Web Mapping	671	4
MAP	673	Design for Interactive Web Mapping	672	4

### C. Course structures

The NewMaps+ graduate certificate is designed around a length of ten weeks rather than the traditional 16 week semester and given the compressed time schedule the course work (both in class time and assignments) is much more intensive in order to provide the same level of instruction. For example, a course is three credits and will consist of a total of 4 hours of in class time (via the Canvas LMS) and assignment work that will take an average student about 12 hours to complete (see table below).

In class time could consist of video lectures (approximately 1.5 to 2.5 hours per week), written instructions/lectures and exercises (approximately 1.5 to 2 hours per week) and class discussion/group troubleshooting around specific topics (approximately 1 to 1.5 hours per week). The exact distribution depends upon the topic and learning objectives for the course.

### **Comparison of ten week course structure to 16-week semester courses**

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this NewMaps+ initiative. First, the MAP prefix emphasizes a mapping focus of the courses vis-à-vis other fields of study within Geography. Second, the MAP prefix will provide a useful means of differentiating between this new graduate certificate (which will be entirely online) and our existing graduate degrees. Moreover as part of the new initiative and MAP prefix we are also seeking a new CIP code (45.0702, Geographic Information Science and Cartography) which contrasts with the existing CIP code (45.0701) associated with Geography. We will have different sets of admissions criteria and learning objectives for the NewMaps+ initiative and the MAP prefix will help us organized this. We have received confirmation from David Timoney, Associate Registrar for Communications at the University of Kentucky that the MAP prefix is currently available.

	<b>3-Credit Semester Course</b>	<b>4-Credit Semester Course</b>	<b>2-Credit Intensive 10 Week Course</b>	<b>3-Credit Intensive 10 Week Course</b>	<b>4-Credit Intensive 10 Week Course</b>
Credits	3	4	2	3	4
Weeks	16	16	10	10	10
<b>IN CLASS TIME</b>					
Total in class time (hours)	40.00	53.33	26.67	40.00	53.33
Total in class time per week (hrs/wk)	2.50	3.33	2.67	4.00	5.33
<b>OUT of CLASS TIME (Estimated 3 hours for every in class hour)</b>					
Total out of class time (hours)	120.00	160.00	80.00	120.00	160.00
Total out of class time per week (hrs/wk)	7.50	10.00	8.00	12.00	16.00
<b>TOTAL CLASS TIME</b>					
Total class time (hours)	160.00	213.33	106.67	160.00	213.33
Total class time per week (hrs/wk)	10.00	13.33	10.67	16.00	21.33

Note: This table uses the metric of 800 minutes (13.33 hours) of in class time per credit per semester. Thus, a three credit semester long course meets for 150 mins per week.

#### D. Yearly Schedule

In order to design an initiative around ten week courses we have devised an alternative yearly schedule consisting of four ten week course periods and four breaks of two to six weeks. This ensures that courses can be regularly offered and also provides time for revising and updating course material during the break periods. It also provides the means to construct a steady and controlled roll-out of courses so that prerequisites are offered on an ongoing and regular basis. The graduate certificate will follow the graduate school rule (when applicable) regarding student enrollment in consecutive semesters, leaves of absences and readmission.

The schedule also overlaps at key moments with the existing academic calendar, most notably, our proposed Fall session is complete within the Fall semester and our proposed Winter session is within the Spring semester. This would make it possible for regular University of Kentucky graduate students to enroll in courses.

The start time of courses depends up the approval process but we have outlined a proposed calendar below based on approval for a start in the Fall 2015 semester. This will be amended as necessary but will adhere to the following scheduling rules.

- The exact dates of the four course periods and four breaks will be fixed to the yearly schedule of the University of Kentucky.
- More specifically, the start of the ten week Winter session will be the Monday following the start of the official Spring semester of the University of Kentucky.
- The starting dates for the remaining three course periods (each ten weeks long) will be adjusted by varying the length of the break periods (between two and six weeks) as necessary to conform to UK registrar requirements.
- Credit for courses will be assigned (e.g., appear on transcripts) to regular UK semesters and summer sessions as determined by the registrar.

We have met with David Timoney of the Registrar's Office and he has confirmed that this calendar can work with UK systems.

		Wks	671 Intro	672 Program ming	673 Design	674 Spatial Analysis	675 Collabor ative GeoViz	701 History	719 Seminar	698 Final Proj Prep.	699 Final Proj. Implem.
Fall Session	10/4/2015 to 12/12/2015	10	Week 1   Week 10								
Winter Break	12/13/2015 to 1/16/2016	5									
Winter Session	1/17/2016 to 3/26/2016	10	Week 1   Week 10	Week 1   Week 10				Week 1   Week 10			
Spring Break	3/27/2016 to 4/9/2016	2									
Spring Session	4/10/2016 to 6/18/2016	10	Week 1   Week 10	Week 1   Week 10	Week 1   Week 10				Week 1   Week 10		
Summer Break	6/19/2016 to 7/9/2016	3									
Summer Session	7/10/2016 to 9/17/2016	10	Week 1   Week 10	Week 1   Week 10	Week 1   Week 10	Week 1   Week 10		Week 1   Week 10			
Fall Break	9/18/2016 to 10/1/2016	2									
Fall Session	10/2/2016 to 12/10/2016	10	Week 1   Week 10	Week 1   Week 10			Week 1   Week 10		Week 1   Week 10		
Winter Break	12/11/2016 to 1/21/2017	6									
Winter Session	1/21/2017 to 4/1/2017	10	Week 1   Week 10	Week 1   Week 10	Week 1   Week 10	Week 1   Week 10		Week 1   Week 10		Students begin final projects after completing all required courses.	

## 7. Assessment

### A. Student Learning Outcomes

These learning objectives for the graduate certificate are:

- Identify the appropriate applications of different forms of geospatial data, analytical techniques and mapping software platforms.
- Gather, integrate, transform and analyze geospatial data from multiple sources.
- Create static and interactive maps and visualizations in accordance with prevailing and rigorous cartographic standards.

- Develop basic web-based programs and scripts utilizing web standards to enhance user interaction with maps.
- Identify and implement appropriate applications of design components to maximize the usability of maps.
- Construct a publicly-available online portfolio of data, code, maps and accompanying explanations on an online sharing platform such as Github.

#### B. Student Learning Outcome Assessment

Our plan is to develop and integrate assessments instruments throughout the courses to provide students with ongoing feedback and to provide faculty with metrics on student comprehension to target specific interventions into course content and instructional technology improvement. For example, we will mandate that 2-3 short assessments/quizzes (primarily evaluated algorithmically) be included throughout the course of each of 15 to 20 teaching modules that make up a course to provide regular checks on learning and feedback for students. We will also integrate longer labs/tests (evaluated both algorithmically and by instructors/TAs using rubrics) at the completion of each module with a final project at the end of each course (primarily evaluated by instructors/TAs using rubrics).

A key part of the certificate is having students construct a public portfolio of maps, data, code and accompanying text that will be housed on a public website (GitHub). These portfolios will be used to assess student learning and as a means of professionalization. These portfolios will help students in seeking employment, serve to showcase the New Maps+ certificate, and also provide a public system to assess the technical skills gained by our students.

#### C. Certificate Outcome Assessment

In addition to the specific assessments built into each course, we will also develop certificate evaluation and assessment. The assessment will be built around the learning objectives for the graduate certificate as outlined in this proposal. The specific ways of measuring these objectives will be decided during the development and operation of the courses. Our plan is prepare two basic type of deliverables for the certificate assessment including (1) quantitative data for selected assignments in courses that reflect certificate goals and (2) artifact collection from courses, likely final projects that will be most reflective of certificate objectives. Both types of deliverables will be drawn from the LMS Canvas which we will be using for this graduate certificate.

In addition to the two deliverables outlined above we also plan to assess the career outcomes of certificate earners through regular contact with our alumni. Logistically this will be done via online social network systems (e.g., LinkedIn, Twitter) but also through in-house databases of basic contact information (email, phone, twitter handles) that will be used to formally and informally survey alumni about 1) their current career and salaries; 2) the ties between courses and subsequent work tasks; and 3) input on additions or changes to the course material. This alumni networking should also prove useful for helping more recent graduates establish themselves in the field.



College of Arts and Sciences

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202 Patterson Office Tower  
Lexington, KY 40506-0027

859 257-8354  
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www.uky.edu

RECEIVED

NOV 26 2014

OFFICE OF THE  
SENATE COUNCIL

November 11, 2014

Richard Schein, Chair  
Department of Geography  
University of Kentucky  
Lexington, KY

Dear Rich,

I am writing to express my enthusiastic support for the new, fully on-line M.S. Degree and Graduate Certificate in New Maps Plus that you and the New Maps advisory board and Geography department faculty have been working to develop over the past 18 months. The College of Arts and Sciences is very excited to sponsor this pioneering degree that will give practicing professionals the opportunity to extend their skills in the analysis and visualization of geographic data through an innovative online curriculum. The College fully intends to provide the resources needed to make this degree program, and the affiliated graduate certificate, successful.

The College of Arts & Sciences is well equipped to satisfy this need with a faculty who have achieved a superb record in research and publication, and in designing and teaching courses in digital mapping at the graduate and undergraduate level. Master's degree candidates will benefit from instruction by a nationally-prominent faculty. Their study will be well-rounded as well as focused, and candidates will receive a wide range of academic and professional training through this online curriculum. The curriculum provides extensive experience with technical training in Geographic Information Systems (GIS) and online mapping, including the creation and use of geodata, as well as online spatial visualization tools.

The proposed Master's degree and Graduate Certificate in New Maps Plus will afford interested individuals from across the nation the opportunity to pursue advanced study in complex mapping projects, and will train working professionals in a range of web-based systems for producing online geovisualizations and applications - areas in which our faculty have established national reputations. The University of Kentucky Geography department is a leading center for studies in critical GIS and public participatory cartography and analysis. Having a graduate program in digital mapping will position UK as an innovator in this area,

**UK**  
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providing an educational opportunity for citizens of the Commonwealth of Kentucky and elsewhere.

No additional faculty are needed to implement the certificate and Master's degree in New Maps Plus. Nonetheless, the College is open to the future possibility of additional hires in this general area, if enrollments so demand. In other ways, the resources required to run the program are already in place. The faculty needed to run the program and to teach its courses already exist, and the courses have been developed and are under review by university committees. Recruitment and publicity for these new programs will be handled centrally by Hive.

I appreciate the diligence and effort that you and the Program Faculty expended to achieve the goal of an innovative, fully online graduate certificate and Master's degree for the College. I look forward to seeing this important program established at the University of Kentucky.

Sincerely,



Mark Lawrence Kornbluh  
Dean

cc: Ted Schatzki, Associate Dean of Faculty  
Betty Lorch, Associate Dean of Research and Graduate Studies  
Anna Bosch, Associate Dean of Undergraduate Programs  
Kirsten Turner, Chief Financial Officer/Chief of Staff

**Department of Geography**

*College of Arts & Sciences  
817 Patterson Office Tower  
Lexington, KY 40506-0027  
(859) 257-2931  
Fax: (859) 323-1969  
<http://geography.as.uky.edu>*

October 6, 2014

Educational Policy Committee  
College of Arts and Sciences  
University of Kentucky

Dear Colleagues,

Please be assured that the New Maps+ Certificate proposal submitted by Professor Matthew Zook and now before you has received full Geography Department faculty approval according to our department bylaws and the Geography Department has the resources to support the Certificate without impacting core program resources.

Sincerely Yours,

A handwritten signature in blue ink, appearing to read 'RHS', written over a light blue horizontal line.

Richard H. Schein  
Professor and Chair



**Ellis, Janie**

---

**From:** Nikou, Roshan  
**Sent:** Wednesday, November 26, 2014 10:23 AM  
**To:** Brothers, Sheila C; Carvalho, Susan E; Ellis, Janie; Ett, Joanie M; Hippisley, Andrew R; Jackson, Brian A; Lindsay, Jim D.; Nikou, Roshan; Price, Cleo; Timoney, David M  
**Cc:** Schein, Richard H; Zook, Matthew A; Vaillancourt, Lisa J; Lauersdorf, Mark R; Tanaka, Keiko; Perkins, Andrea L; Erwin, Heather; Badurdeen, Fazleena F; Buntin, William J; Huber, Jeffrey T  
**Subject:** GC Transmittals  
**Attachments:** MS in MAP-signed.pdf; GC in MAP-signed.pdf; Plant Pathology Dual Degree-signed.pdf

TO: Andrew Hippisley, Chair and Sheila Brothers, Coordinator  
 Senate Council

FROM: Brian Jackson, Chair and Roshan Nikou, Coordinator  
 Graduate Council

Graduate Council approved the following proposals and is now forwarding them to the Senate Council to approve. All the courses listed below have been forwarded to the Senate Council via e-Cats.

**Programs and Certificates (attached)**

Plant Pathology Dual Doctoral Degree (**this is not a new program and does not involve modifications to requirements for an existing degree**)

Masters in Digital Mapping (**There are 10 MAP courses related to the Masters in Digital Mapping; I am sending 5 of them with this transmittal and will send the remaining 5 as soon as they get the GC's approval**)

Graduate Certificate in Digital Mapping

**Courses (on e-Cats)**

LIN 629 Advanced Historical Linguistics

LIN 695 Directed Studies in Linguistics

SOC 781 Quantitative Data Analysis II

ME 799 Mechanical Engineering Graduate Seminar

CPH 763 Ethics for Public Health

MAP 674 Spatial Data Analysis and Visualization

MAP 675 Collaborative Geovizualization

MAP 695 Special Topics in Mapping

MAP 701 History of Critical Cartography

MAP 719 Social Impacts in New Mapping

KHP 601 Teaching Effectiveness and Leadership in KHP

KHP 602 Promoting Physical Activity for Youth

MFS 606 Seminar and Project in Manufacturing System

ICT 600 Information in Society

*Roshan Nikou*

The Graduate School

The University of Kentucky

101 Gillis Building - 0033

Phone: (859) 257-1457

Fax: (859) 323-1928

[Roshan.Nikou@uky.edu](mailto:Roshan.Nikou@uky.edu)

**From:** Schroeder, Margaret <m.mohr@uky.edu>  
**Sent:** Tuesday, February 03, 2015 9:08 AM  
**To:** Brothers, Sheila C  
**Subject:** Proposed New MS: Digital Mapping

**Proposed New MS: Digital Mapping**

This is a recommendation that the University Senate approve, for submission to the Board of Trustees, the establishment of a new MS: Digital Mapping, in the Department of Geography within the College of Arts & Sciences.

Best-

Margaret

-----  
Margaret J. Mohr-Schroeder, PhD | Associate Professor of Mathematics Education | [STEM PLUS Program Co-Chair](#)  
| [Department of STEM Education](#) | [University of Kentucky](#) | [www.margaretmohrschroeder.com](#)



**NEW MASTERS DEGREE PROGRAM FORM**  
 (Attach completed "Application to Classify Proposed Program"<sup>1</sup>)

**RECEIVED**

**GENERAL INFORMATION**

College:	Arts & Science	Department:	Geography	NOV 26 2014
Major Name:	Digital Mapping	Degree Title:	Masters (MS)	OFFICE OF THE SENATE COUNCIL
Formal Option(s):	N/A	Specialty Fields w/in Formal Option:	N/A	
Date of Contact with Associate Provost for Academic Administration <sup>1</sup> :		8/22/2014		
Bulletin (yr & pgs):	New degree	CIP Code <sup>1</sup> :	45.0702	Today's Date:
Accrediting Agency (if applicable):		N/A		
Requested Effective Date:	<input type="checkbox"/> Semester following approval.	OR	<input checked="" type="checkbox"/> Specific Date <sup>2</sup> :	8/1/2015
Dept. Contact Person:	Matthew Zook	Phone:	218-0955	Email: zook@uky.edu

**CHANGE(S) IN PROGRAM REQUIREMENTS**

1.	Number of transfer credits allowed (Maximum is Graduate School limit of 9 hours or 25% of course work)	4
2.	Residence requirement (if applicable)	The current residency requirements of the Graduate School will be followed.
3.	Language(s) and/or skill(s) required	This program has no language or specific undergraduate degree requirements. The first three courses of the Masters program are required to be taken in order and are designed to provide students with the necessary technical skills in GIS, programming and design for successful completion of the Masters program in digital mapping.
4.	Termination criteria	The current termination criteria of the Graduate School will be followed.
5.	Plan A Degree Plan requirements <sup>3</sup> (thesis)	There will not be a thesis option with this degree program.
6.	Plan B Degree Plan requirements <sup>3</sup> (non-thesis)	After taking 24 hours of course work each student will complete a six credit final project via the MAP698 (3 credits) and MAP 699 (3 credits) courses that produces a final mapping product distributed publically via an online portfolio. This course will require students to submit a project proposal that is reviewed by a full-time faculty member of the the NewMapPlus program. The final mapping project will require implementing the full range of technical skills acquired in the program as well as a paper in which the student reviews and analyzes the data, methods, findings, conclusions and possible critiques of the project. Each student will present and defend their project to a

<sup>1</sup> Prior to filling out this form, you MUST contact the Associate Provost for Academic Administration (APAA). If you do not know the CIP code, the APAA can provide you with that during the contact.

<sup>2</sup> Programs are typically made effective for the semester following approval. No changes will be made effective until all approvals are received.

<sup>3</sup> If there is only one plan for the degree, plans involving a thesis (or the equivalent in studio work, etc.) should be discussed under Plan A and those not involving a thesis should be discussed under Plan B.

## NEW MASTERS DEGREE PROGRAM FORM

		committee made up of three fulltime faculty members of the NewMapsPlus program. Please see the new course proposal for MAP 699 for a full explanation of how this course will be structured.
7.	Distribution of course levels required	Three 3-credit course at the 600 level Four 4-credit courses at the 600 level One 2-credit course at the 700 level One 3-credit course at the 700 level
	(At least one-half must be at 600+ level & two-thirds must be in organized courses.)	
8.	Required courses (if applicable)	<p>We are proposing to use the MAP prefix for these course and have confirmed its availability with the registrar. Please see question 12 for more details.</p> <p>MAP671: Introduction to New Mapping ... 3  MAP672: Programming for Web Mapping ... 4  MAP673: Design for Interactive Web Mapping ... 4  MAP674: Spatial Data Analysis and Visualization ... 4  MAP675: Collaborative Geovisualization ... 4  MAP701: History of Critical Cartography ... 2  MAP719: Social Impacts of New Mapping ... 3  MAP 698 Final Project Preparation ... 3  MAP 699 Final Project Implementation ... 3</p> <p>Up to four credits of "MAP695: Special Topics in Digital Mapping" may be substituted for the required courses listed above with permission of the Digital Mapping faculty. However, MAP 701, MAP 719, MAP698 and MAP699 cannot be substituted.</p>
9.	Required distribution of courses within program (if applicable)	N/A
10.	Final examination requirements	The final examination will consist of a realtime online oral defense (using the video conference technologies, e.g., Google Hangout or Skype, that has been utilized throughout the courses in the program) of the student's final project for a committee of three faculty members associated with the program.
11.	Explain whether the proposed new program (as described in numbers 1 through 10) involve courses offered by another department/program. Routing Signature Log must include approval by faculty of additional department(s).	All the courses for this program will be offered by the Geography department.
12.	What is the rationale for the proposed new program?	

Please see the attached document (15 pages) for our response to this question. The formatting restrictions of this form prevent the inclusion of key diagrams and tables necessary to this answer.

## NEW MASTERS DEGREE PROGRAM FORM

## Signature Routing Log

**General Information:**Program Name: Masters in Digital Mapping

Proposal Contact Person Name: Matthew Zook Phone: 218-0955 Email: zook@uky.edu

## INSTRUCTIONS:

Identify the groups or individuals reviewing the proposal; note the date of approval; offer a contact person for each entry; and obtain signature of person authorized to report approval.

**Internal College Approvals and Course Cross-listing Approvals:**

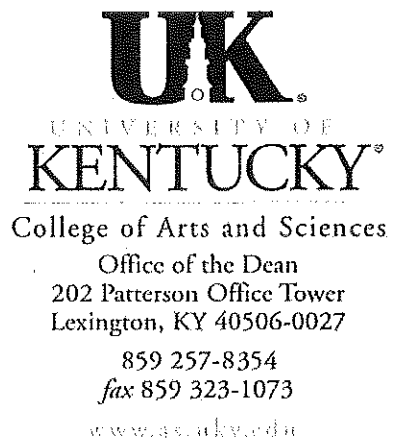
Reviewing Group	Date Approved	Contact Person (name/phone/email)	Signature
Geography, DGS		Patricia Ehrkamp / 7-6952 / p.ehrkamp@uky.edu	
Geography, Chair		Rich Schein / 7-2119 / schein@uky.edu	
A&S Dean's Office		Anna Bosch / 7-6689 / bosch@uky.edu	
		/ /	
		/ /	

**External-to-College Approvals:**

Council	Date Approved	Signature	Approval of Revision <sup>4</sup>
Undergraduate Council			
Graduate Council	11/26/14	<i>Roshan Nikou</i>	
Health Care Colleges Council			
Senate Council Approval		University Senate Approval	

Comments:

<sup>4</sup> Councils use this space to indicate approval of revisions made subsequent to that council's approval, if deemed necessary by the revising council.  
Rev 8/09



November 11, 2014

Richard Schein, Chair  
Department of Geography  
University of Kentucky  
Lexington, KY

Dear Rich,

I am writing to express my enthusiastic support for the new, fully on-line M.S. Degree and Graduate Certificate in New Maps Plus that you and the New Maps advisory board and Geography department faculty have been working to develop over the past 18 months. The College of Arts and Sciences is very excited to sponsor this pioneering degree that will give practicing professionals the opportunity to extend their skills in the analysis and visualization of geographic data through an innovative online curriculum. The College fully intends to provide the resources needed to make this degree program, and the affiliated graduate certificate, successful.

The College of Arts & Sciences is well equipped to satisfy this need with a faculty who have achieved a superb record in research and publication, and in designing and teaching courses in digital mapping at the graduate and undergraduate level. Master's degree candidates will benefit from instruction by a nationally-prominent faculty. Their study will be well-rounded as well as focused, and candidates will receive a wide range of academic and professional training through this online curriculum. The curriculum provides extensive experience with technical training in Geographic Information Systems (GIS) and online mapping, including the creation and use of geodata, as well as online spatial visualization tools.

The proposed Master's degree and Graduate Certificate in New Maps Plus will afford interested individuals from across the nation the opportunity to pursue advanced study in complex mapping projects, and will train working professionals in a range of web-based systems for producing online geovisualizations and applications - areas in which our faculty have established national reputations. The University of Kentucky Geography department is a leading center for studies in critical GIS and public participatory cartography and analysis. Having a graduate program in digital mapping will position UK as an innovator in this area,

**UK**  
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providing an educational opportunity for citizens of the Commonwealth of Kentucky and elsewhere.

No additional faculty are needed to implement the certificate and Master's degree in New Maps Plus. Nonetheless, the College is open to the future possibility of additional hires in this general area, if enrollments so demand. In other ways, the resources required to run the program are already in place. The faculty needed to run the program and to teach its courses already exist, and the courses have been developed and are under review by university committees. Recruitment and publicity for these new programs will be handled centrally by Hive.

I appreciate the diligence and effort that you and the Program Faculty expended to achieve the goal of an innovative, fully online graduate certificate and Master's degree for the College. I look forward to seeing this important program established at the University of Kentucky.

Sincerely,



Mark Lawrence Kornbluh  
Dean

cc: Ted Schatzki, Associate Dean of Faculty  
Betty Lorch, Associate Dean of Research and Graduate Studies  
Anna Bosch, Associate Dean of Undergraduate Programs  
Kirsten Turner, Chief Financial Officer/Chief of Staff



**Department of Geography**

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October 6, 2014

Educational Policy Committee  
College of Arts and Sciences  
University of Kentucky

Dear Colleagues,

Please be assured that the New Maps+ Certificate proposal submitted by Professor Matthew Zook and now before you has received full Geography Department faculty approval according to our department bylaws and the Geography Department has the resources to support the Certificate without impacting core program resources.

Sincerely Yours,

A handwritten signature in blue ink, appearing to read 'RHS', written over a light blue horizontal line.

Richard H. Schein  
Professor and Chair

## **Rationale for the New Maps+ Master's Degree (response to question 12 of New Master's Program Form)**

### **A. Background and History for this Proposal**

---

The lead faculty member for this proposal is Prof. Matthew Zook who can be reached at [zook@uky.edu](mailto:zook@uky.edu) or 859-218-0955.

Note: the formal name for this proposal is a “Master’s Degree in Digital Mapping”. The term NewMaps+ is also used in this proposal in reference to the larger initiative that has been ongoing in the Geography department since 2011 and includes both this Master’s degree as well as a graduate certificate.

#### *A1. Overall plan*

This proposal for a Master's degree is part of a larger initiative (referred to as NewMaps+) to create an online *graduate certificate* and a *master's degree in digital mapping* degree to train students in a range of web-based systems for producing online geovisualizations and applications. Information about location and spatial analysis has become ubiquitous in everyday life and central to an array of disciplines ranging from soil science to public health to the digital humanities and demand for geospatial technology expertise is burgeoning. Location-aware devices (such as smart phones) have saturated everyday life and present enormous opportunities for online mapping tools and analysis in applications ranging from smart-city and civic development to human-environmental relations to increasing demands for “big data” analytics. Our proposed tuition costs of \$6,358 (11-credit graduate certificate) and \$17,340 (30-credit Master's degree) based on current tuition costs for distance learning courses compare favorably to benchmark institutions.

The New Maps+ initiative provides a curriculum rich with technical training in Geographic Information Systems (GIS) and online mapping including the creation and use of geodata, cutting edge techniques for scraping geodata from social media and other web-based sources, as well as online spatial visualization tools such as TileMill and D3. Moreover the New Maps+ initiative challenges students to critically engage with potential pitfalls of online mapping such as locational privacy and changing technical standards. The University of Kentucky is well positioned with instructional assets in critical GIS and online mapping as well as strong ties to academic and industrial networks enabling the New Maps+ initiative to serve a largely untapped market in online degrees in GIS and mapping amid an unfolding location-aware future.

In order to establish the New Maps+ initiative in digital mapping, the Department of Geography is moving forward on several simultaneous fronts. These include:

- Ten new graduate course proposals submitted to the UK Faculty Senate for classes taught within the graduate certificate and Master's degree;
- A proposal to the UK Faculty Senate for a new graduate certificate (11 credits);
- A proposal to the UK Faculty Senate for a new Master's of Science degree (30 credits); and
- A proposal to the Council of Post-Secondary Education for the Master's degree under a different but closely related CIP code (45.0702, Geographic Information Science

and Cartography) to the currently existing CIP code (45.0701) associated with graduate studies in Geography.

All courses will be offered entirely online and take advantage of the latest online instruction technologies to provide video lectures, discussion and assignments.

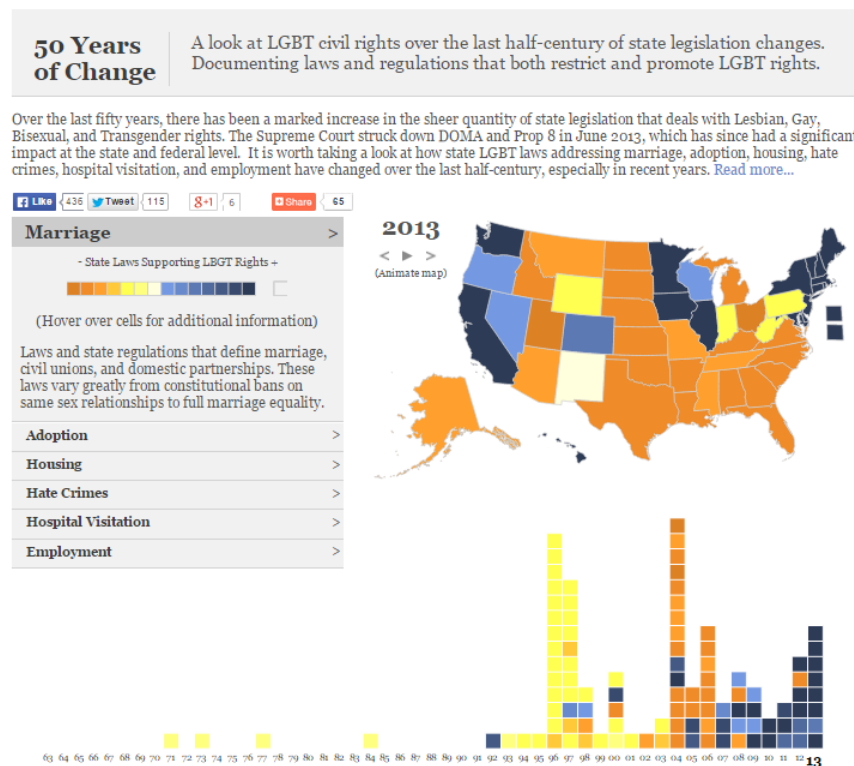
These new courses, certificate and Master's degree will not replace existing offerings. All courses, certificates and degrees currently associated with Geography will remain.

All resources (faculty, courses, computer equipment, etc.) necessary for running NewMaps+ are based in the Geography department. As this is an online degree, no classroom space resources are needed. We do have the necessary computer lab, server and infrastructural resources needed for NewMaps+.

### A2. Examples of Likely Student Work

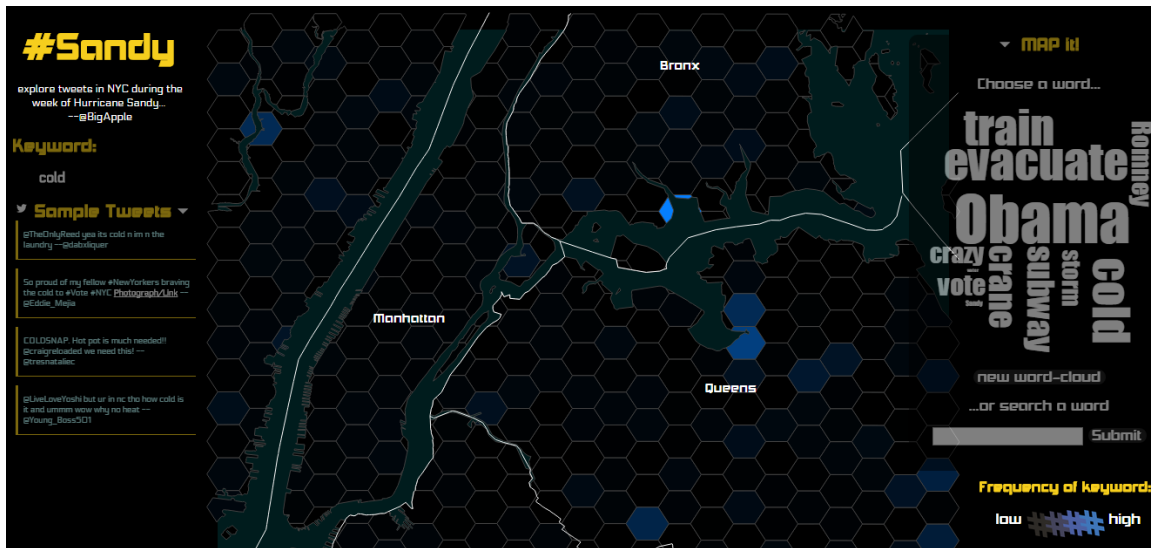
To get a sense of the kind of mapping project that students will be able to produce as a result of the program, please see the following two maps. Both of these maps were created by students and are the result of similar course work as proposed for this Master's degree. We expect our students will be working on much more complex mapping projects and implementing them in more sophisticated ways than these relatively simply examples.

## 50 Years of Change: An Animated Map Looking at Changing Legislation Related to LGBT Rights at the State Level



Source: <http://50yearsofchange.com/>

## #Sandy: An Interactive Map of Tweets During Hurricane Sandy Visualized via WordClouds and Hex Maps



Source: <http://www.geo-odyssey.com/links/sandy/>

### A3. Development and Funding History

The Department of Geography has been focused on expanding its curriculum in geographic information systems (GIS) and digital mappings since 2010 when it conducted a nationwide search and hired two faculty members -- Dr. Jeremy Crampton (GIS, critical cartography) and Dr. Matthew Wilson (GIS, public participation) who joined the department in the Fall of 2011. They joined existing faculty members – Dr. Matthew Zook (online mapping, geosocial media), Dr. Daehyun Kim (spatial analysis) and Dr. Liang Liang (remote sensing) – and have established the department as a leading center for studies in critical GIS and public participatory cartography and analysis. In August 2014, Dr. Rich Donahue, an expert in online mapping pedagogy, joined the department in a post-doc position to work on the NewMaps+ initiative. As part of this effort the New Mappings Collaboratory (<http://newmaps.as.uky.edu/>) was established to jointly work on research and teaching efforts involving online mapping and critical GIS.

Towards this goal the Geography department and New Mappings Collaboratory hosted a workshop event during May 2013 in which a dozen of the leading educators in the field of digital mapping were brought to UK campus and engaged in a week-long intense curriculum development process. This initial curriculum building process was supported by funding from the Dean of the College of Arts and Sciences as well as the Department of Geography. Building upon this foundation Dr. Matthew Zook led a proposal writing process in response to a call for proposals from the University of Kentucky eLearning Innovation Initiative (eLII), a joint effort of the Office of the Provost, UK Analytics and Technologies (AT) and the Center for the Enhancement of Learning and Teaching (CELT). The proposal was awarded a grant of \$200,000 in January 2014 (see <http://www.uky.edu/elii/onlinedegreeinitiative/awardees>) and degree and course design efforts began in earnest.

Curriculum development for all courses in the graduate certificate and Master's degree is taking place throughout the 2014-15 academic year with the bulk of work completed by May

2015 when the eLII grant ends. In addition to curriculum, the grant also provides funding for promoting NewMaps+ nationally to attract students.

#### *A4. Using the MAP Prefix*

The Department of Geography is seeking the MAP prefix as part of a its proposed online graduate certificate and Master's degree in digital mapping that has been funded by the eLearning Innovation Initiative (eLII) at UK (see <http://www.uky.edu/elii/>). This new initiative grow out of existing work in the department but also represents a new focus within in the department, particularly an expansion to our work within the fields of GIS, digital mapping and critical cartography. The initiative will train students in a range of web-based systems for producing online geovisualizations and applications and provides a curriculum rich with technical training in Geographic Information Systems (GIS) and online mapping including the creation and use of geodata, cutting edge techniques for scraping geodata from social media and other web-based sources, as well as online spatial visualization tools such as TileMill and D3. Moreover the New Maps+ initiative challenges students to critically engage with potential pitfalls of online mapping such as locational privacy and changing technical standards.

The MAP prefix would provide two key advantages – emphasis and differentiation -- as we move forward. First, the MAP prefix emphasizes the mapping focus of the initiative vis-à-vis other fields of study within Geography. Maps have long been a key part of our discipline and this prefix will be useful in highlighting this within our new set of classes. Second, the MAP prefix will provide a useful means of differentiating between this new initiative (which will be entirely online) and our existing graduate degrees. Moreover as part of the new initiative and MAP prefix we are also seeking a different but closely related CIP code (45.0702, Geographic Information Science and Cartography) and degree (MS) which contrasts with the existing CIP code (45.0701) and graduate degrees associated with Geography, MA and PhD. We will have different sets of admissions criteria and learning objectives for this new initiative and the MAP prefix will help us organized this.

We have received confirmation from David Timoney, Associate Registrar for Communications at the University of Kentucky that the MAP prefix is currently available.

#### **B. Demand for digital mapping education**

Geographic data and its analysis and visualization are increasingly prevalent in the global economy and the range and power of online mapping tools is expanding. The enormous range of commercial uses for geographical data means that geospatial technology market is growing at 35 percent per year overall while the commercial market is increasing by 100 percent annually.<sup>1</sup> The U.S. Department of Labor further notes that, “the widespread availability of advanced technologies offer great job opportunities for people with many different talents and educational backgrounds.”<sup>2</sup> Thus, the New Maps+ initiative is positioned within a growth sector of the economy and we anticipate considerable demand for both the graduate certificate and the Master's degree.

<sup>1</sup> US Department of Labor. (2012). High growth industry profile – Geospatial technology. Retrieved on December 15, 2012 from [http://www.doleta.gov/brg/indprof/geospatial\\_profile.cfm](http://www.doleta.gov/brg/indprof/geospatial_profile.cfm)

<sup>2</sup> US Department of Labor. (2012). High growth industry profile – Geospatial technology. Retrieved on December 15, 2012 from [http://www.doleta.gov/brg/indprof/geospatial\\_profile.cfm](http://www.doleta.gov/brg/indprof/geospatial_profile.cfm)

Indeed a number of universities have also seen this demand and offer a range of initiatives. A survey by the Geography department and information from Geotechnologies expert Dr. Chris Lukinbeal (University of Arizona) identified benchmark initiatives at other universities offering certificates and Master's degrees in GIS: Penn State University (PSU), Denver, Northwest Missouri, USC, UW, American Sentinel (a for-profit in Denver), and Delta State in Mississippi(see Figure 1). This review highlights the range of definitions of online programs. While some (such as PSU) are fully online, other initiative have an in person component (such as one week when students are expected to be on campus or some other location together). (2) Universities with certificate initiatives generally allow certificate credits to count for a Master's degree if the student chooses to continue. Our understanding is that much of the demand (and revenue) is generated via the certificate rather than Master's initiatives. (3) There is considerable demand for these initiatives. The largest online initiative, Penn State, has 800 students in the initiative at any given time, mostly enrolled in the certificate. USC has about 180 students in a cohort, while the smaller initiatives have cohorts of approximately 30 students. A summary of our survey including number of credit hours and cost is provided in Figure 1.

Lukinbeal's research shows demand for these initiatives is intense and many initiatives are relatively expensive compared to New Maps+. Our cost of \$8,670 for a 15 credit graduate certificate and \$17,340 for a 30 credit Master's degree is extremely favorably compared to the average cost of \$28,000 for a Master's. Lukinbeal's research also shows online initiatives tend to draw from a regional pool of students, putting us most directly in competition with Northwest Missouri, Delta State and WKU, initiatives that we are confident we can outperform in high quality online education.

**Figure 1: Benchmark GIS Certificates and Master's Initiatives**

	Focus	Certificate	MA	Credit Hours	Time to Finish	On Line	In person	Cost per credit hour	Total cost*
<b>PSU -1</b>	Post-BA (prep for MA)	X		11	1 year	X		\$736	\$8K
<b>PSU -2</b>			X	35	2 years	X		\$736	\$25.7K
<b>AU</b>			X	30	3 sems.		X	In/out state \$422/\$936	In/out state \$12.6K/ \$28K
<b>ASU</b>			X	30	11 mths		X		In/out state \$24.9K/ \$42.4K
<b>UW-1</b>	Sustain. Mgmt.		X	45	9 mths	X	X	\$595	\$26.7K
<b>UW-2</b>	Requires a BA or 2 yrs college + work	X		18	9 mths		X		\$4.3K
<b>USC -1</b>	Can feed into to MA	X		16	1 year	X		\$1473	\$23.6K

<b>USC-2</b>	Includes one week in field		X	28	16-20 mths	X		\$1473	\$41.2K
<b>West. KY Univ. (WKU)</b>	WKU students, limited online	X		13-16	1 year		X	\$445	\$7.1K

\* All initiatives also have fees which add 1-2K to the price of the degrees listed in the table.

Finally, and arguably most important, is that while New Maps+ shares a general goal of providing students with workplace skills in mapping, the graduate certificate and Master's degree initiative focuses exclusively on open source (i.e., free) mapping software. This helps distinguish NewMaps+ from other online offerings and expands the appeal of digital mapping education to new fields, such as marketing and web design as well as traditional users of GIS (e.g. city government and environmental management workers). In short, the New Maps+ initiative targets a fast growing industry and provides a distinctive training strategy that positions it extremely well to tap unmet market demand.

### **C. Design of NewMaps+**

This section presents: an overview of the New Maps+ initiative, targeted population, course structures and schedules and the faculty of record.

#### *C1. Overview of the NewMaps+*

The Geography Department of the College of Arts and Sciences is proposing an entirely online initiative called New Maps+ that offers both a *graduate certificate in digital mapping* and a *master's degree in digital mapping*. The graduate certificate component consists of three courses (11 credits) and the Master's degree extends the certificate with an additional 19 credits, including a final project. The proposed timetable is to first enroll students in the graduate certificate in September 2015 and students in the Master's degree by January 2016. However, the exact dates depend upon the Faculty Senate review process.

The courses for the *master's in digital mapping* are based on previous experience with existing face-to-face courses at U.K. but also incorporate new material specifically tied to digital mapping tools and services. Therefore we have proposed a series of new courses using the MAP prefix. The degree targets students with a bachelor's degree in any field although experience with cartography, GIS or web programming would be useful. The first three courses in Master's degree are required to be taken in order and are specifically designed to provide students with the necessary technical skills in GIS, programming and design for successful completion of the Master's degree in digital mapping.

The proposed courses of Master's degree are below and arranged in the order in which a student would take them. Students would first complete 11 credits of foundational courses, followed by 13 credits of courses that would expand their skills, insights and engagement with mapping. Upon completing these 24 credits students would take two courses for three credits each to prepare and implement their final Master's project.

Prefix	Number	Title	Prereq	Credits
<b>Foundational Courses (11 credits, take all in order)</b>				
MAP	671	Introduction to New Mapping	-	3
MAP	672	Programming for Web Mapping	671	4
MAP	673	Design for Interactive Web Mapping	672	4
<b>Expansion Courses (need 13 credits total, any order)</b>				
MAP	701	History of Critical Cartography	-	2
MAP	719	Social Impacts of New Mapping	671	3
MAP	674	Spatial Data Analysis and Visualization	672	4
MAP	675	Collaborative Geovisualization	673	4
MAP	695	Special Topics in Digital Mapping		variable, 1-4
<b>Final Project Courses (6 credits total, in order)</b>				
MAP	698	Final Project Preparation	674&675	3
MAP	699	Final Project Implementation	674&675	3
<b>Total</b>				<b>30</b>

A guiding principle of course design is distinguishing between 1) fundamental concepts 2) methodologies and research design and 3) specific techniques and technologies. The reason behind this is to organize course materials in ways that will optimize continual program evaluation and up-to-date content. For example, much of the material on fundamental concepts and idea will remain valid and will likely have a longer refresh cycle than modules focused on specific techniques and technologies. We anticipate the some parts of the latter will be updated every year (as technology changes) while the former will only be reviewed and updated on a three to four year cycle.

## *C2. Learning Objectives*

The overall learning objectives for the proposed Master's degree consist of basic and advanced learning objectives. The basic learning objectives will be achieved via the first three courses (MAP671, MAP672 and MAP673) although later classes will provide further opportunities to meet these objectives as well. These basic objectives are:

- Identify the appropriate applications of different forms of geospatial data, analytical techniques and mapping software platforms.
- Gather, integrate, transform and analyze geospatial data from multiple sources.
- Create static and interactive maps and visualizations in accordance with prevailing and rigorous cartographic standards.
- Develop basic web-based initiatives and scripts utilizing web standards to enhance user interaction with maps.
- Identify and implement appropriate applications of design components to maximize the usability of maps.
- Construct a publicly-available online portfolio of data, code, maps and accompanying explanations on an online sharing platform such as Github.

In addition to these basic objectives, the degree has a number of advanced objectives that will be met via the remaining courses. These advanced objectives are:



- Analyze a geographic problem using advanced techniques of quantitative spatial analysis.
- Build online visualizations that integrate spatial analysis, web programming and advanced design techniques.
- Discuss the relationship between contemporary cartographic practice and historical developments in cartographic thought and methodology.
- Explain the social context and implications of digital mapping, big data, crowdsourcing, and integrate this understanding in mapping projects.
- Produce professional-quality, collaborative, interactive mapping projects, using advanced web-based geospatial techniques, that improves understanding of a given geographic issue.

### *C3. Target Population and Admissions*

The target population for the Master's degree is expected to be working adults who wish to pursue a course in digital mapping and value the flexibility that an online course provides. We anticipate students coming from the traditional backgrounds using mapping, *e.g.*, urban planning and transportation but also see great opportunities for students coming from business and marketing, journalism, design fields as well as the non-profit sector. As maps and spatial information become ever more integrated into daily life demand for digital mapping skillsets will increase in the commonwealth, nation and world. Given the online nature of the courses we expect enrolled students to come from every part of the country and world. In addition we expect these courses to be of interest to current University of Kentucky graduate and postbac students. Our courses would be open to these traditional students although subject to the prerequisite requirements and the guidelines of their departments.

Given the background of our expected students (working adults) we have designed a course structure of ten weeks rather than the traditional semester system. This has a number of key advantages including the ability for students to start taking classes at four different times in the course of the year. We anticipate this to be very useful to working students who lives are not organized around a two semester system and should better serve them. See below for a review of how this will be structured.

Admission into the Master's degree will be done through the Graduate School of the University of Kentucky with standard admission dates and criteria.

### *C4. Course structures*

NewMaps+ courses are designed around a length of ten weeks rather than the traditional 16 week semester and given the compressed time schedule the course work (both in class time and assignments) is much more intensive in order to provide the same level of instruction. For example, a course is three credits and will consist of a total of 4 hours of in class time (via the Canvas LMS) and assignment work that will take an average student about 12 hours to complete (see table below).

In class time could consist of video lectures (approximately 1.5 to 2.5 hours per week), written instructions/lectures and exercises (approximately 1.5 to 2 hours per week) and class discussion/group troubleshooting around specific topics (approximately 1 to 1.5 hours per week). The exact distribution depends upon the topic and learning objectives for the course.

### Comparison of ten week course structure to 16-week semester courses

	3-Credit Semester Course	4-Credit Semester Course	2-Credit Intensive 10 Week Course	3-Credit Intensive 10 Week Course	4-Credit Intensive 10 Week Course
Credits	3	4	2	3	4
Weeks	16	16	10	10	10
<b>IN CLASS TIME</b>					
Total in class time (hours)	40.00	53.33	26.67	40.00	53.33
Total in class time per week (hrs/wk)	2.50	3.33	2.67	4.00	5.33
<b>OUT of CLASS TIME (Estimated 3 hours for every in class hour)</b>					
Total out of class time (hours)	120.00	160.00	80.00	120.00	160.00
Total out of class time per week (hrs/wk)	7.50	10.00	8.00	12.00	16.00
<b>TOTAL CLASS TIME</b>					
Total class time (hours)	160.00	213.33	106.67	160.00	213.33
Total class time per week (hrs/wk)	10.00	13.33	10.67	16.00	21.33

Note: This table uses the metric of 800 minutes (13.33 hours) of in class time per credit per semester. Thus, a three credit semester long course meets for 150 mins per week.

#### C5. Yearly Schedule

In order to design an initiative around ten week courses we have devised an alternative yearly schedule consisting of four ten week course periods and four breaks of two to six weeks. This ensures that courses can be regularly offered and also provides time for revising and updating course material during the break periods. It also provides the means to construct a steady and controlled roll-out of courses so that prerequisites are offered on an ongoing and regular basis. The Master's degree will follow the graduate school rule regarding student enrollment in consecutive semesters, leaves of absences and readmission.

The schedule also overlaps at key moments with the existing academic calendar, most notably, our proposed Fall session is complete within the Fall semester and our proposed Winter session is within the Spring semester. This would make it possible for regular University of Kentucky graduate students to enroll in courses.

The start time of courses depends up the approval process but we have outlined a proposed calendar below based on approval for a start in the Fall 2015 semester. This will be amended as necessary but will adhere to the following scheduling rules.

- The exact dates of the four course periods and four breaks will be fixed to the yearly schedule of the University of Kentucky.
- More specifically, the start of the ten week Winter session will be the Monday following the start of the official Spring semester of the University of Kentucky.

- The starting dates for the remaining three course periods (each ten weeks long) will be adjusted by varying the length of the break periods (between two and six weeks) as necessary to conform to UK registrar requirements.
- Credit for courses will be assigned (e.g., appear on transcripts) to regular UK semesters and summer sessions as determined by the registrar.

We have met with David Timoney of the Registrar's Office and he has confirmed that this calendar can work with UK systems.

		Wks	671 Intro	672 Program ming	673 Design	674 Spatial Analysis	675 Collabor ative GeoViz	701 History	719 Seminar	698 Final Proj Prep.	699 Final Proj. Implem.
Fall Session	10/4/2015 to 12/12/2015	10	Week1   Week10								
Winter Break	12/13/2015 to 1/16/2016	5									
Winter Session	1/17/2016 to 3/26/2016	10	Week1   Week10	Week1   Week10				Week1   Week10			
Spring Break	3/27/2016 to 4/9/2016	2									
Spring Session	4/10/2016 to 6/18/2016	10	Week1   Week10	Week1   Week10	Week1   Week10				Week1   Week10		
Summer Break	6/19/2016 to 7/9/2016	3									
Summer Session	7/10/2016 to 9/17/2016	10	Week1   Week10	Week1   Week10	Week1   Week10	Week1   Week10		Week1   Week10			
Fall Break	9/18/2016 to 10/1/2016	2									
Fall Session	10/2/2016 to 12/10/2016	10	Week1   Week10	Week1   Week10			Week1   Week10		Week1   Week10		
Winter Break	12/11/2016 to 1/21/2017	6									
Winter Session	1/21/2017 to 4/1/2017	10	Week1   Week10	Week1   Week10	Week1   Week10	Week1   Week10		Week1   Week10		Students begin final projects after completing all required courses.	

### C6. Faculty of Record

The faculty of record the Master's degree will be the graduate faculty of the Department of Geography. There are a number of internationally research active and world-renowned

Geography department faculty whose teaching and research directly engage the focus of the New Maps+ initiative. In addition to topical expertise many faculty have experience in designing and delivering online and hybrid course design and there presently is a working group dedicated to those goals. The New Maps+ initiative will draw upon the following Geography faculty:

Dr. Jeremy Crampton is a key figure in the GIS & Society movement as well as critical cartography. He is developing an open-mapping research initiative at UK and has begun working with hybrid models of GIS courses to provide more flexibility for students.

Dr. Daehyun Kim is a biogeographer researching the spatial patterns of vegetation and landform via simulation models, geographic information systems and spatial/multivariate statistics in order to analyze and visualize dynamics of complex biogeographic systems.

Dr. Liang Liang researches bioclimatology and explores the timing of life cycle events such as bud burst and flower bloom via remote sensing and geographic information systems.

Dr. Matthew Wilson is an expert on public participation GIS and has designed a number of new U.K. courses including *GEO109: Digital Mapping* and the *GEO509 Workshop* on collaborative mapping using online technologies. He is also a key figure in disciplinary discussions on the transitioning of traditional GIS courses to online environments.

Dr. Matthew Zook won U.K. Provost Teaching Award in 2013 and researches geographically referenced social media data to study the spatial patterns of society. He founded the popular geovisualization blog, FloatingSheep (featured in the *Economist*, *CNN*, *BBC World Service*, and *WIRED Magazine*) and has developed new course on web scraping and visualization.

The Geography Department Working Group for online and hybrid courses presently is working with HIVE and CELT to transition key Geography courses to more on-line based content and instruction, and includes faculty with experience and expertise in on-line teaching as well as substantive research expertise which might be utilized for course modules empirically dedicated to specific topics; including political ecology, urban studies, social theory and cultural landscapes. The working group includes Dr. Lynn Phillips, Dr. Tad Mutersbaugh, Dr. Richard Schein and Dr. Alice Turkington.

The Geography department also has strong collaborative relationships with a range of other departments and colleges at U.K. engaged in GIS and mapping. These include Agriculture, Civil Engineering, Digital Humanities, Earth and Environmental Systems, Historic Preservation, Fine Arts, History, the Kentucky Transportation Center and Landscape Architecture. This collaborative work is organized via the New Mappings Collaboratory (<http://newmaps.as.uky.edu/>) which comprises scholarship at U.K. focused on public engagement, “big data” and user-generated Internet content.

## **D. Online Teaching Strategies**

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This section reviews strategies of ensuring quality learning, a review of the technologies entailed and strategies to ensure high instructional quality.

### *D1. Strategies for ensuring quality online learning*

The New Maps+ Design Strategy aims for the highest quality student learning experience and is fundamentally predicated upon quality interaction with the instructor. We are concerned with the careful and best use of educational technologies requiring instructors to embrace the disruptive promise of online teaching rather than simply mirroring offline approaches. This

strategy requires instructors to be: (1) flexible in adjusting course learning objectives; (2) open to experience of other online projects; (3) willing to experiment both with technologies and pedagogy; (4) constantly attentive to assessing what works and what falls short. Too many online learning efforts have stalled because the transition from the classroom to the computer sought solely to replicate the face to face experience rather than take full advantage of online interaction possibilities.

Often this has meant a distilling of the substantive learning objectives of face-to-face interaction, as opposed to thinking through the transformative moment in the face-to-face classroom, which is part substance and part process. Many online courses only focus on the substance of learning, at the expense of the processual. The unfolding of a process of learning in face-to-face moments is not easily or directly transferable into the online course, and we see this as perhaps the most impactful challenge at the center of the proposal. To address this we outline specific steps to ensure that the quality of our online instruction is equal to or exceeds face-to-face interaction.

## *D2. Reviewing the technologies used in New Maps+*

Since the Spring 2013 semester the Geography department has intensely reviewed instructional and online mapping technologies in order to build successful online mapping courses. A particularly central technology is the learning management system (LMS) and we have select Canvas for the New Maps+ initiative. We choose Canvas as a LMS for a range of reasons. The Canvas system architecture (built on Ruby on Rails) and open source code are philosophically appealing for the New Maps+ initiative, which includes training in Ruby programming and primarily focuses on open source mapping services. More importantly, the Canvas user and instructor interfaces provide an uncluttered and modern interaction. This complements the sensibility and design of the New Maps+ initiative and the interface (including the Canvas API) also translates into easier course design and implementation. Other strengths of the Canvas system include the smooth incorporation of many Web 2.0 technologies that we anticipate will be key resources for our students. Simple things such as easy integration of Google documents, Facebook, and Twitter means that Canvas facilitates the use technologies that already familiar to our students. We also have experimented with feature set of Canvas, particularly assessment engines and grading, and are satisfied that they meet the needs of the New Maps+ initiative.

Camtasia is a second instructional technology that we have evaluated and begun to use for content production. The nature of the material covered in the graduate certificate and Master's degree – online and computer based mapping – means that the ability to capture on screen video and audio narration is essential. Our experiments with script-writing and rehearsal have taught us to create smooth and concise video instructions that minimize time length and yet convey key information. We have also experimented with Echo360 to capture classroom lectures and talks by distinguished visitors but at this time do not expect to use it extensively. This is largely because of the challenges associated with adapting offline class structures with our plan for online courses.

We anticipate using multiple technologies for direct communications with students but plan to primarily use Canvas given the advantages of a centralized LMS. This would include notifying students of course events via their preferred method of contact. We are still evaluating our preferred technologies for live meetings (such as synchronous final project charrettes). While

U.K. offers Adobe Connect, we also value technologies more widely used by our potential students. In particular, the conferencing system offered by Google Hangout is versatile and has the advantage of being tied to the larger Google suite of software.

The Canvas LMS seems to fall short regarding peer learning and discussion, and here we remain undecided on a specific technology for standard online functions such as newsgroups and chat. In particular, we are interested in archiving one-to-one interactions about common issues for future use, both within a current course but also for future semesters. We are evaluating software solutions such as Piazza (<https://piazza.com/>) that channels common instructor-student interaction about assignments or due dates into a FAQ-styled interface that can be more widely shared. At the course's end, topics in the FAQ could be archived into a more permanent format such as a course Wiki. We are still evaluating and experimenting with specific software systems and we will want to consult extensively with the UK eLearning staff before adopting any.

Another decision that remains unresolved is the technology for peer evaluation as the Canvas LMS seems limited in this arena. Our prior experience with online peer learning indicates that key issues are: (1) sharing materials among course participants and (2) collecting and aggregating peer feedback and evaluation. A unique challenge to the New Maps+ initiative is that project material is often in the form of visualizations rather than text or numeric answers to problem sets. Although we look forward to feedback from eLearning staff we have found workable solutions by combining a shared blog (with each student sharing their map) with commenting (for general feedback and commentary) and free online survey systems (for collecting more sensitive, grade related evaluations).

Outside video services strategically inserted into New Maps+ courses constitute the final area of online technology. For example, our courses require students to be familiar with basic computer functionality but in face to face settings we regularly encounter students unfamiliar with navigating directory structures or unzipping compressed files. Rather than devote our energies to providing answers we plan on using services such as Lynda (<http://www.lynda.com/>) which offer short video clips on basic computer skills. The modest \$25 per month fee would be something that students would pay in addition to tuition for the courses with specific video incorporated into the course FAQs and Wikis. Likewise, we see that many of the videos offered via Ted Talks (<http://ed.ted.com/>) or The Open Video Project (<http://www.open-video.org>) could be usefully incorporated into New Map+ courses.

New Maps+ initiative will also use a number of online mapping technologies. These include (1) Google Maps, Google Earth and the Google Maps Engine; (2) mobile phone based applications such as EpiCollect and Fulcrum for collecting and sharing user generated field data; (3) GeoCommons, TileMill and CartoCSS for designing online, interactive maps; (4) the JavaScript scripting language to be used for scraping online geographic data; and (5) the D3 JavaScript library used for creating online interactive visualizations (including but not limited to maps). In addition to leveraging the pre-existing free tutorials that come with many of these mapping technologies we will create our own videos (via Camtasia) to demonstrate specific course related tasks.

### *D3. Strategies for ensuring instructional quality*

Our strategy for ensuring instructional quality in the New Maps+ initiative is closely tied to our strategic vision for high quality student learning environments and the specific steps we will take to ensure that the quality of our online instruction. We see flexibility in course design,

openness in learning from previous experience, experimentation with both technologies and pedagogy and attentiveness to what works as fundamental aspects of high quality online instruction and instructors.

We have a number of specific strategies designed to ensure that these attributes are front and center during the development of New Maps+. First, and most importantly, is the active and enthusiastic participation of key faculty members under the leadership of Dr. Matthew Zook, Director of GIS Programs for Geography. We have been working on the NewMaps+ initiative for years and are committed to it as a key outcome of the catalyzing energies of the New Mappings Collaboratory. Second, is the strong support of the entire Geography department and the College of Arts and Sciences to provide the necessary backing to make this initiative happen. This includes seed financing from the Dean of A&S to work on initial course content development and the commitment of key personnel by the Geography Department Chair.

Third is the involvement of Dr. Rich Donahue as full-time postdoc working with faculty to convert content originally designed for face to face interaction to an online course format. This entails ongoing consultation with the U.K. eLearning team on course design using standards from the Quality Matters rubric. Faculty members will still be the primary source of content, but Dr. Donahue is an expert in online mapping pedagogy and the supervision and collaboration with Dr. Zook ensures a uniform set of high standards and continuity of design across all modules and courses.

Fourth, the instructional quality of the New Maps+ initiative will also draw upon the compelling and evocative nature of our learning content. To ensure this, we leverage our existing networks at the interface of design and mapping to draw professionals to interact with our instruction and our students. We believe that both the learning content and the pedagogical strategies associated with ‘mapping’ are shifting. Maintaining the pulse as well as the contours of these changes will allow us to adapt quickly and best serve our learning audience, who we expect to be highly dynamic participants in our degree initiative.

#### *D4. Ensuring quality relative to F2F instruction*

To ensure high educational quality and student success that is equal to or exceeding face-to-face interaction we build from the premise that a simplistic translation of course material designed for face-to-face instruction is not the solution. Instead, we recognize the need to first distill the learning objectives from our conventional face-to-face instruction and then iteratively design online experiences to reach those objectives. Our working approach is detailed here.

Ensuring high quality online experience requires the successful use of a learning management system (LMS). We have adopted the Canvas LMS for this program which is consistent with the larger University of Kentucky policy to switch from Blackboard to Canvas. Our own evaluation of Canvas indicates that it provides good flexibility for giving detailed and incisive feedback to students at multiple stages (quizzes, labs, projects) of their learning process. This ability to provide a steady stream of feedback to students is key to our vision of quality online learning.

While faculty in the Geography department have considerable experience with online classes we also will be drawing upon the expertise of others. For example, we are in discussions with the U.K. eLearning team on a number of topics including strategies for matching our learning outcomes to appropriate assessment metrics, converting existing content (developed for face to

face interaction) to the online environment and adapting established standards from national benchmarks for online education to NewMaps+.

We are also experimenting with various formats both for online content delivery as well as assessment of student learning. For example, as much of the content for both the graduate certificate and Master's degree is project oriented, we envision a course design in which students iterate first through a number of online labs to build skills and then hone these skills via a series of online mapping projects. We anticipate spending considerable time designing the feedback on these skill-building labs and projects. For example, simple multiple choice quizzes graded automatically can be useful in alerting students to comprehension issues and/or allow us to re-emphasize key parts. More open-ended assignments or outputs such as maps that are assessed in visual terms require much more nuanced evaluation and feedback. For such projects we will experiment with a range of synchronous and asynchronous feedback from instructors and fellow students. We will pilot test these systems during course development (including our Curriculum Camp) to select the best mechanisms for online charrettes of final student projects. Ultimately these reviews for final Master's projects will include guest design critics from industry although the awarding of the degree remains the decision of the Faculty of Record.

### **E. Assessment & Evaluation Plan**

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We are developing and integrating assessments instruments throughout the courses to provide students with ongoing feedback and to provide faculty with metrics on student comprehension to target specific interventions into course content and instructional technology improvement. For example, we plan that 2-3 short assessments/quizzes (primarily evaluated algorithmically) will be included throughout the course of each of 15 to 20 teaching modules that make up a course to provide regular checks on learning and feedback for students. We will also integrate longer labs/tests (evaluated both algorithmically and by instructors using rubrics) at the completion of each module with a final project at the end of each course (primarily evaluated by instructors using rubrics).

In addition to the specific assessments built into each course, we will also develop programmatic evaluation and assessment. The programmatic assessment will be built around the learning objectives for the Master's degree as outlined in this proposal. The specific ways of measuring these objectives will be decided during the development and operation of the courses. Our plan is prepare two basic types of deliverables for the programmatic assessment including (1) quantitative data for selected assignments in courses that reflect programmatic goals and (2) artifact collection from courses, likely final projects that will be most reflective of programmatic objectives. Both types of deliverables will be drawn from the LMS Canvas which we will be using for this initiative.

A key part of the initiative is training students to build and maintain portfolio websites (via GitHub) to publicly share their completed work as a means of professionalization. These portfolios will help students in seeking employment, serve to showcase the New Maps+ initiative, and also provide a public system to assess the technical skills gained by our students.

We also plan to assess the career outcomes of certificate earners through regular contact with our alumni. Logistically this will be done via online social network systems (e.g., LinkedIn, Twitter) but also through in-house databases of basic contact information (email, phone, twitter handles) that will be used to formally and informally survey alumni about 1) their current career and salaries; 2) the ties between courses and subsequent work tasks; and 3) input on additions or



changes to the course material. This alumni networking should also prove useful for helping more recent graduates establish themselves in the field.

Finally we will create an outreach council composed of academic and industrial leaders whose opinions will be sought to help in the assessment of the overall value and structure of the degree. Towards that end the council will be regularly surveyed (both formally and informally) to provide input on: the content of the degree and post-degree employment. All decisions about the degree, however, remain the responsibility of the Faculty of Record for the Master's degree. The Faculty of Record and the Geography Department's Chair and Director of GIS Programs will serve as in-house *ex officio* board members to ensure institutional accountability.

We have identified an initial target list of outside people based on strong faculty contacts. Furthermore the vast majority of those listed below have already visited Lexington to give a talk or collaborate with U.K. faculty. This list includes, Dr. Mike Batty (Professor and Director of the Centre for Advanced Spatial Analysis, University College, London); Ms. Shannon Dosemagen (Director of Community Engagement, Education and Outreach, Public Labs); Dr. Sarah Elwood (Professor, University of Washington); Dr. Michael Goodchild, (Professor Emeritus, UCSB); Dr. Sean Gorman (Founder of GeoCommons); Dr. Mark Graham (Director of Research, Oxford Internet Institute); Ms. Lize Mogel (Director of Atlas of Radical Cartography); Mr. Eric Rodenbeck (Founder of Stamen Design); Dr. Daniel Sui (Professor and Chair, Geography, Ohio State University); Mr. Andrew Turner (author of *NeoGeography*); and Mr. Derek Watkins (graphics editor at the New York Times).

**Ellis, Janie**

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**From:** Nikou, Roshan  
**Sent:** Wednesday, November 26, 2014 10:23 AM  
**To:** Brothers, Sheila C; Carvalho, Susan E; Ellis, Janie; Ett, Joanie M; Hippisley, Andrew R; Jackson, Brian A; Lindsay, Jim D.; Nikou, Roshan; Price, Cleo; Timoney, David M  
**Cc:** Schein, Richard H; Zook, Matthew A; Vaillancourt, Lisa J; Lauersdorf, Mark R; Tanaka, Keiko; Perkins, Andrea L; Erwin, Heather; Badurdeen, Fazleena F; Buntin, William J; Huber, Jeffrey T  
**Subject:** GC Transmittals  
**Attachments:** MS in MAP-signed.pdf; GC in MAP-signed.pdf; Plant Pathology Dual Degree-signed.pdf

TO: Andrew Hippisley, Chair and Sheila Brothers, Coordinator  
 Senate Council

FROM: Brian Jackson, Chair and Roshan Nikou, Coordinator  
 Graduate Council

Graduate Council approved the following proposals and is now forwarding them to the Senate Council to approve. All the courses listed below have been forwarded to the Senate Council via e-Cats.

**Programs and Certificates (attached)**

Plant Pathology Dual Doctoral Degree (this is not a new program and does not involve modifications to requirements for an existing degree)

Masters in Digital Mapping (There are 10 MAP courses related to the Masters in Digital Mapping; I am sending 5 of them with this transmittal and will send the remaining 5 as soon as they get the GC's approval)

Graduate Certificate in Digital Mapping

**Courses (on e-Cats)**

LIN 629 Advanced Historical Linguistics

LIN 695 Directed Studies in Linguistics

SOC 781 Quantitative Data Analysis II

ME 799 Mechanical Engineering Graduate Seminar

CPH 763 Ethics for Public Health

**Brothers, Sheila C**

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**From:** Schroeder, Margaret <m.mohr@uky.edu>  
**Sent:** Wednesday, January 28, 2015 11:42 AM  
**To:** Brothers, Sheila C; Hippisley, Andrew R  
**Subject:** ABT-MSMS University Scholars Program  
**Attachments:** ABT-MSMS University Scholars\_Final.pdf

**Agriculture Biotechnology and Master of Science in Medical Sciences (ABT-MSMS) University Scholars Program**

This is a recommendation that the University Senate approve the establishment of a new University Scholars Program in Agriculture Biotechnology and Master of Science Medical Sciences (ABT-MSMS) within the College of Agriculture, Food, and Environment, and the College of Medicine.

Please find the updated version of the proposal attached here.

Please let me know if you need anything else.

Best-  
Margaret

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Margaret J. Mohr-Schroeder, PhD | Associate Professor of Mathematics Education | [STEM PLUS Program Co-Chair](#)  
| [Department of STEM Education](#) | [University of Kentucky](#) | [www.margaretmohrschroeder.com](#)



**Joint Proposal for a University Scholars Program  
With the Master of Science in Medical Sciences for Agriculture Biotechnology Undergraduates**

**Introduction**

The overall objective of this proposal is to develop a University Scholars Program in which students in the undergraduate Agriculture Biotechnology (ABT) program are able to seek a Master of Science degree in the Medical Sciences (MSMS) program. At the present time, there is no direct undergraduate degree associated with the MSMS program.

The MSMS is a broad interdisciplinary degree program housed in the College of Medicine. Participating Departments and Centers include Anatomy and Neurobiology; Behavioral Sciences; Graduate Center for Nutritional Sciences; Graduate Center for Toxicology; Microbiology, Immunology and Molecular Genetics; Molecular and Biomedical Pharmacology; Molecular and Cellular Biochemistry; and Physiology. The MSMS may be used as a stand-alone degree by post-baccalaureate and graduate students seeking career enhancement in fields such as basic biomedical research, the pharmaceutical industry, or the health science professions; by students seeking academic credentials in the biomedical sciences prior to applying for medical school or other health related professional degree programs; or by students seeking to enhance their knowledge base prior to choosing a career direction. The current structure of the MSMS program allows for development of an individualized and flexible curriculum that enhances the academic credentials of our students.

The interdisciplinary undergraduate Agriculture Biotechnology program in the College of Agriculture, Food and Environment is one of most well-known and successful undergraduate programs at the University of Kentucky, both in terms of the quality of its students as well as their placement in professional and graduate schools. Many ABT students when near the completion of their BS degree enroll in upper level courses that can count as graduate credits.

Both the MSMS program and the ABT program would benefit by providing an opportunity for ABT students to enroll in a University Scholars program, and with an additional year of study obtain an MSMS degree. The MSMS program would benefit from an increase in enrollment of highly motivated and talented students that are already engaged in basic research. The ABT program would benefit by providing our best undergraduates the opportunity to strengthen their academic position by obtaining an advanced second degree, and making them more competitive for entrance into professional schools, graduate schools, or industry.

**Program Structure**

ABT students interested in admission to the MSMS University Scholars Program must meet the following requirements.

1. Students must be an undergraduate pursuing a BS in ABT and apply for the University Scholars Program at the end of their junior year. Additionally applicants should have completed

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at least 90 credit hours of work toward the bachelor's degree, or be eligible for senior standing in the semester they are admitted to the program.

2. The applicant must be on track to complete a Bachelor's degree in ABT during the first year of the University Scholars Program.

3. The applicant must have an overall grade-point of 3.2 or above on a scale of 4.0 and must have a grade-point average of 3.5 in ABT (including cross-listed) courses.

4. At the time of application, the applicant must have three of the core ABT courses ABT 301, ABT 360, ABT 361, ABT 460, ABT 461, ABT 495, completed or in progress and have completed ABT 495 or in progress.

5. The applicant must follow the current application procedures for and meet the admission standards of the Graduate School and the MSMS program.

### **Program of Study**

Students who are admitted to the University Scholars Program will be able to follow the course of study available to first-year MSMS graduate students. Students may take up to 12 hours that may be counted towards the ABT Bachelor's and MSMS degree requirements. This program does not change any undergraduate degree requirement. At least 50% of the graduate level coursework must be at the 600 level or above and two-thirds must be in formally organized graduate level courses. Students must also satisfy the core course requirement in the MSMS program.

The Director of Graduate Studies for the MSMS program or a faculty advisor and the student's undergraduate advisor will work together to identify a jointly planned program of study for each individual student. The student's undergraduate advisor will continue to provide advice on the student's undergraduate program. Students will be advised about the two MSMS options, Plan A or Plan B, in accordance with their career goals. Students who elect to follow the Plan A option are required to write a formal master's thesis according to the guidelines established by the Graduate School. Plan A students will work with their mentor and committee to develop a thesis project that is consistent with their area of interest, and may be a logical extension of ongoing work provided it is deemed as being a new project. Plan B does not require a formal written thesis, but does require a final master's exam that involves defense of a relatively short written document covering a student's research project or, if no formal research is conducted, a research paper (e.g., literature review) based on their area of interest and/or specialization.

If a student pursues the Plan A option, (s)he may take up to 12 hours in the first year that will count towards both degrees, and then 12 hours (8 of which are MSMS required core courses) and 6 of XXX 768 Residence Credit for Masters Degree. If a student pursues the Plan B option, (s)he may take up to 12 hours in the first year that will count towards both degrees, and will then need to complete 18 hours of graduate credit in their "graduate" year including 8 hours of

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MSMS required core coursework. This would require students to complete 9 hours per semester during their "graduate" year.

Students in the ABT/MSMS University Scholars Program will be required to complete the core course requirements of the MSMS program, and these graduate courses may count towards the undergraduate degree. The core courses in the MSMS program include IBS 602 Molecular Biology and Genetics, IBS 606 Physiological Communications, TOX 600 Ethics in Scientific Research, and a seminar course in an area of interest. Students would be able to complete the required coursework and add a three credit hour graduate elective that would count towards the 12-hour first year curriculum. Additional graduate coursework available to students in the University Scholars Program includes, but is not limited to:

**Anatomy:**

ANA 417G Functional Human Neuroanatomy (proposed start date of Spring 2016)

ANA 600 Seminar in Anatomy

ANA 605 Neurobiology of CNS Injury and Repair (alternate years only)

ANA 611 Regional Human Anatomy

ANA 612 Biology of Aging

ANA 631 Advanced Human Anatomy

ANA 638 Developmental Neurobiology (cross listed with BIO/PGY/PSY)

ANA 780 Special Topics in Neurobiology

ANA 790 Research in Anatomy

**Biochemistry:**

BCH 401G Fundamentals of Biochemistry

BCH 419G Molecular Basis of Human Disease

BCH 604 Structural Biology

BCH 607 Biomolecules and Metabolism

BCH 608 Biomolecules and Molecular Biology

BCH 610 Biochemistry of Lipids and Membranes

BCH 612 Structure and Function of Proteins/Enzyme

BCH 618 Seminar in Biochemistry

BCH 619 Seminar in Biochemistry

BCH 625 Scientific Communications

BCH 640 Research in Biochemistry

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Behavioral Sciences:

BSC 773 Psychosocial Oncology

BSC 778 Behavioral Factors Selected Diseases

BSC 788 Drug Abuse: Contemporary Theories and Issues

BSC 790 Research in Medical Behavioral Sciences

Integrated Biomedical Sciences:

IBS 603 Cell Biology and Signaling

Microbiology:

MI 494G Immunobiology

MI 772 Seminar in Microbiology

MI 798 Research in Microbiology

Pharmacology:

PHA 422G Pharmacology of Treating Human Disease

PHA 621 Principles of Drug Action

PHA 622 Molecular Drug Targets and Therapeutics (4 sections)

Section 001-Cardiovascular Pharmacology

Section 002-Neuropharmacology

Section 003-Chemotherapeutic Agents

Section 004-Autacoids and Endocrine Pharmacology and Toxicology

PHA 750 Research in Pharmacology

PHA 770 Seminar in Pharmacology

Physiology:

PGY 412G Principles of Human Physiology

PGY 502 Principles of Systems Cellular/Molecular Physiology

PGY 512 Evolutionary Medicine

PGY 535 Comparative Neurobiology and Behavior

PGY 612 Biology of Aging

PGY 604 Advanced Cardiovascular Physiology

PGY 638 Developmental Neurobiology (cross listed with ANA/BIO/PSY)

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MSMS required core coursework. This would require students to complete 9 hours per semester during their "graduate" year.

Students in the ABT/MSMS University Scholars Program will be required to complete the core course requirements of the MSMS program, and these graduate courses may count towards the undergraduate degree. The core courses in the MSMS program include IBS 602 Molecular Biology and Genetics, IBS 606 Physiological Communications, TOX 600 Ethics in Scientific Research, and a seminar course in an area of interest. Students would be able to complete the required coursework and add a three credit hour graduate elective that would count towards the 12-hour first year curriculum. Additional graduate coursework available to students in the University Scholars Program includes, but is not limited to:

#### Anatomy:

- ✓ ANA 417G Functional Human Neuroanatomy (proposed start date of Spring 2016)
- ✓ ANA 600 Seminar in Anatomy
- ✓ ANA 605 Neurobiology of CNS Injury and Repair (alternate years only)
- ✓ ANA 611 Regional Human Anatomy
- ✓ ANA 612 Biology of Aging
- ✓ ANA 631 Advanced Human Anatomy
- ✓ ANA 638 Developmental Neurobiology (cross listed with PGY) *B 10 / P 54*
- ✓ ANA 780 Special Topics in Neurobiology
- ✓ ANA 790 Research in Anatomy

#### Biochemistry:

- ✓ BCH 401G Fundamentals of Biochemistry
- ✓ BCH 419G Molecular Basis of Human Disease
- ✓ BCH 604 Structural Biology
- ✓ BCH 607 Biomolecules and Metabolism
- BCH 608 Nucleic Acids ✓
- BCH 610 Structure and Function of Biomembranes ✓
- ✓ BCH 612 Structure and Function of Proteins/Enzyme
- BCH 618 Student Seminar ✓
- BCH 619 Student Seminar ✓
- ✓ BCH 625 Scientific Communications
- ✓ BCH 640 Research in Biochemistry



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## Behavioral Sciences:

- ✓ BSC 773 Psychosocial Oncology
- ✓ BSC 778 Behavioral Factors Selected Diseases
- ✓ BSC 788 Drug Abuse: Contemporary Theories and Issues
- ✓ BSC 790 Research in Medical Behavioral Sciences

## Integrated Biomedical Sciences:

- ✓ IBS 603 Cell Biology and Signaling

## Microbiology:

- ✓ MI 494G Immunobiology
- ✓ MI 772 Seminar in Microbiology
- ✓ MI 798 Research in Microbiology

## Pharmacology:

- ✓ PHA 422G Pharmacology of Treating Human Disease
- ✓ PHA 621 Principles of Drug Action
- ✓ PHA 622 Molecular Drug Targets and Therapeutics (4 sections)
  - ✓ Section 001-Cardiovascular Pharmacology
  - ✓ Section 002-Neuropharmacology
  - ✓ Section 003-Chemotherapeutic Agents
  - ✓ Section 004-Autacoids and Endocrine Pharmacology and Toxicology
- ✓ PHA 750 Research in Pharmacology
- ✓ PHA 770 Seminar in Pharmacology

## Physiology:

- ✓ PGY 412G Principles of Human Physiology
- ✓ PGY 502 Principles of Systems Cellular/Molecular Physiology
- ✓ PGY 512 Evolutionary Medicine
- ✓ PGY 535 Comparative Neurobiology and Behavior
- ✓ PGY 612 Biology of Aging
- ✓ PGY 604 Advanced Cardiovascular Physiology
- ✓ PGY 638 Developmental Neurobiology (cross listed with ANA) *Bio/psy*

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- ✓ PGY 774 Seminar in Physiology
- ✓ PGY 791 Research in Physiology

Toxicology:

- ✓ TOX 663 Drug Metabolism and Disposition
- ✓ TOX 680 Molecular Mechanisms in Toxicology
- ✓ TOX 770 Toxicology Seminar
- ✓ TOX 780 Special Problems in Toxicology
- ✓ TOX 790 Research in Toxicology

Approved by a vote of ABT faculty and the Coordinating Committee (Dr. Daniel Howe, Chair, from Veterinary Sciences, Dr. Michael Goodin, Co-Director of undergraduate studies, from Plant Pathology, Dr. Sharyn Perry, Co-Director of undergraduate studies, from Plant and Soil Sciences, Dr. James Harwood from Entomology, Dr. Robert Houtz from Horticulture, Dr. Luke Moe from Plant and Soil Sciences, Dr. Craig Vander Kooi from Biochemistry, Dr. Xuguo Zhou from Entomology) on 10/03/2014.

Approved by the MSMS program Advisory Committee and administrative contacts for Biomedical Education (Dr. Rebecca E. Dutch, Professor, Associate Dean for Biomedical Education, Dr. Joe Springer, Professor, Director of Graduate Study, Master in Medical Science Program, and the MSMS Advisory Committee members) on 09/29/2014.

## Faculty of Record for the ABT-MSMS University Scholars Program

The ABT-MSMS University Scholars Program is an interdisciplinary program consisting of faculty of record with the following appointment affiliations:

College of Medicine: Anatomy and Neurobiology, Behavioral Sciences, Microbiology, Immunology, and Molecular Genetics, Molecular and Cellular Biochemistry, Pharmacology and Nutritional Sciences, Physiology, and Toxicology and Cancer Biology.

College of Agriculture, Food, and Environment: Entomology, Horticulture, Plant Pathology, Plant and Soil Sciences, and Veterinary Sciences.

## Student Learning Objectives and Assessment Plan

Upon completion of the ABT-MSMS program, students will have achieved the following learning outcomes:

- *Objective 1: Students will have acquired skills in critical and analytical thinking and in communication that may be applied to career opportunities related to the biomedical field.*

### Student Presentation Learning Outcomes:

LO1 - Demonstrate the ability to use technical tools.

LO2 - Able to speak effectively.

LO3 - Able to construct an effective oral presentation with a clear introduction, middle, and conclusion.

LO4 - Able to field questions effectively.

LO5 - Overall evaluation of presentation.

- *Objective 2: Students will have acquired extensive knowledge of the scientific literature and principles related to training and education in the biomedical sciences.*

### Final Exam Learning Outcomes:

LO1 - Able to critically analyze literature related to the project and think intellectually about the direction of the project.

LO2 - Able to formulate relevant and testable hypotheses, devise clear experiments for addressing the hypotheses, and analyze and interpret data appropriately.

LO3 - Able to orally communicate data and interpretation effectively with scientific peers, answers questions, and communicates ideas.

LO4 - Able to communicate effectively through scientific writing.

- *Objective 3: Students will have obtained a level of professionalism essential for successful advancement towards entering a health-related professional degree program or furthering career opportunities in the biomedical field.*

### Program Completion Learning Outcomes:

LO1 – Demonstrates an appreciation of the biomedical sciences that extends beyond a student's area of specialization.

LO2 – Demonstrates an appreciation of ethical issues and follows ethical responsibilities related to biomedical studies and research.

LO3 – Demonstrates interpersonal skills as reflected by an ability to interact well and contribute to group dynamics as necessary.

LO4 – Demonstrates a positive attitude.

LO5 – Demonstrates a strong work ethic by committing effort required to complete the necessary tasks.

LO6 – Demonstrates the capacity to coordinate group activities and supervise others.

LO7 – Demonstrates a level of responsibility as reflected by the ability to perform essential tasks with minimal supervision.

The progress of each student will be assessed at three time points by the student's advisory committee: at the time of the seminar presentation (Student Presentation rubric), during the final exam (Final Exam rubric), and following completion of the program (Program Completion rubric). The DGS will collect and summarize each assessment to generate an overall measure of student progress. The summary will be included in the annual review of the program. The rubrics for each objective are included below.

**Masters of Science in Medical Sciences  
Graduate Student Presentation Review Form**

Student Speaker:  
Reviewer:

Date:

Learning outcomes	Excellent 4	Good 3	Average 2	Deficient 1	Score
Demonstrate the ability to use technical tools	Familiar with the A/V equipment, slides easy to read and not overcrowded, heard audibly from every seat in the room, all crucial slides presented long enough for viewing, projected images easily viewable, no typos or slides out of order	Mostly excellent elements with some deficient elements	More excellent elements than deficient elements	Technical bugs not worked out in advance, projection of color choices and slide layouts difficult to read, speaker didn't project well enough to be heard all over the room, went through some slides too fast, overcrowded slides, multiple typos	
Able to speak effectively	Speaker spoke clearly and with an appropriate tempo, there were no distractive movements or gestures by the speaker, the speaker maintained audience attention with eye contact, voice inflection, facial expression, avoided jargon and used simple language, talk was targeted appropriately to the audience	Mostly excellent elements with some deficient elements	More excellent elements than deficient elements	Tempo was either too fast or too slow, speaker had a distractive movement, speaker didn't engage with the audience, speech was full of jargon and not targeted appropriately to the audience	
Able to construct an effective oral presentation with a clear introduction, middle, and conclusion	There was a distinct introduction making it clear what the talk would be about and providing rationale for the work. The middle section was distinct with clear explanation of the techniques and main results, complex ideas simply explained, crucial technical terms clearly defined. The conclusion section was distinct with a summary of the important results and ideas, a clear take home message, applications to future work were clearly defined.	Mostly excellent elements with some deficient elements	More excellent elements than deficient elements	Important background information and rationale for the work was not clearly articulated in the introduction. The middle section was technically difficult to follow and not appropriately targeted to the audience. The conclusions section was just a summary without the speaker putting the work into a larger context including how the results contribute to the scientific knowledge in the field and what future directions to take.	
Able to field questions effectively	The talk stimulated interesting questions, not just clarification of the technical aspects of the work. The speaker repeated questions or paraphrased to clarify and strived to understand questions that were unclear. Questions were answered appropriately. The speaker demonstrated a depth of knowledge about the field and was able to critically apply this knowledge to his/her own work.	Mostly excellent elements with some deficient elements	More excellent elements than deficient elements	There were few questions generated about the content, just clarification of technical aspects that were not clearly presented. The speaker answered questions inappropriately due to failure to understand the question or a failure to understand the larger context of the field. The speaker became flustered or frustrated during the questioning.	
Overall evaluation of presentation	All of the elements of this talk were excellent.	Mostly excellent elements with some deficient elements	More excellent elements than deficient elements	Most of the elements of this talk were deficient.	

**Comments:**

**Suggestions for improvement:**

### Masters of Science in Medical Sciences Final Exam Assessment

Student:

Date of Exam:

Exam Committee Member:

Learning outcomes	Excellent 4	Competent 3	Marginal 2	Deficient 1	Score
Able to critically analyze literature related to the project and think intellectually about the direction of the project.	Demonstrates a thorough understanding of knowledge in the project area and the ability to consistently discern meaning and relative validity of data in scientific publications. Clear demonstration of independent intellectual contribution, creativity, and original thinking.	Demonstrates an adequate understanding of knowledge in the project area and displays many examples of the ability to discern meaning and relative validity of data in scientific publications. Demonstrates some insight and creativity.	Demonstrates some understanding of knowledge in the project area and some ability to discern meaning and relative validity of data in scientific publications. Minimal evidence of original thinking.	Demonstrates minimal understanding of knowledge in the project area and is unable in most cases to discern meaning and relative validity of data in scientific publications. Lack of creativity or original thinking.	
Able to formulate relevant and testable hypotheses, devise clear experiments for addressing the hypotheses, and, if appropriate, analyze and interpret data appropriately.	Demonstrates a thorough understanding of the scientific method, clear ability to generate hypotheses, understand and design complex experimental protocols, and analyze data with a clear and proper interpretation.	Demonstrates a good understanding of scientific method, generating hypotheses, designing experiments appropriate for addressing hypotheses, and presenting data in an appropriate context.	Demonstrates some understanding of scientific method, needs assistance with complex experimental design and analyzing data, can present and interpret data with some guidance from the PI.	Demonstrates minimal understanding of scientific method, limited ability to conceive of experimental designs to address hypotheses, needs significant faculty input for data analysis and interpretation.	
Able to orally communicate data and interpretation effectively, answer questions, and communicate ideas.	Articulates detailed understanding of project, is able to orally communicate and defend new ideas, thinks effectively on his/her feet, is consistently able to integrate knowledge from multiple disciplines and experience to answer questions or solve problems.	Has appropriate understanding of project, is able to articulate ideas but lacks creativity, can think through basic problems when questioned, and in many cases can integrate knowledge appropriately to answer questions or solve problems.	Has a basic understanding of project but lacks depth, answers basic questions but has difficulty thinking on his/her feet, and is sometimes able to integrate knowledge to answer questions or solve problems.	Lacks understanding of project and is not able to communicate rationale for interpretation of data or direction of the project, and is unable to draw from different areas or experiences to answer questions or solve problems.	
Able to communicate effectively through scientific writing.	Demonstrates a thorough understanding of context, audience, and purpose of the scientific work; uses appropriate, relevant, and compelling content to convey the contribution to the scientific discipline; pays detailed attention to and successfully uses conventions particular to manuscript and grant writing including organization, content presentation, formatting, and style; uses relevant and credible references appropriately, uses appropriate language that skillfully communicates meaning to readers with clarity and fluency, and is nearly error free.	Demonstrates adequate consideration of context, audience and purpose of the scientific work; uses many examples of appropriate, relevant and compelling content to convey the contribution to the scientific discipline; consistently uses manuscript and grant writing conventions including organization, content, presentation, and style; consistently uses appropriate references to support ideas; uses clear language that generally conveys meaning to readers, with few errors.	Demonstrates awareness of context, audience, and purpose of the scientific work; uses some examples of appropriate, relevant and compelling content; follows expectations appropriate to manuscript and grant writing for basic organization, content, and presentation; attempts to use credible and/or relevant references to support ideas; uses language that generally conveys meaning with clarity, though with errors	Demonstrates minimal attention to context, audience, purpose of the scientific work; uses appropriate and relevant content to develop simple ideas in parts of the work; attempts to use a consistent system for basic organization and presentation; attempts to use sources to support ideas; uses language that sometimes impedes meaning because of errors in usage.	

**Comments:**

## Masters of Science in Medical Sciences Program Completion Assessment

Student:  
Committee Member:

Date of Assessment:

Learning outcomes	Excellent 4	Competent 3	Marginal 2	Deficient 1	Score
<b>Basic interest in biomedical science.</b> Does the student demonstrate an appreciation of biomedical sciences that extends beyond their area of specialization?	Interested in broad area of biomedical sciences	Interested in sciences that support area of specialization	Limited interest in biomedical science	No interest in biomedical science	
<b>Ethical considerations.</b> Does the student appreciate and follow established norms of ethical responsibility in biomedical studies and research?	Highly ethical	Ethical	Inconsistent ethical behavior	Some question of ethical behavior	
<b>Interpersonal skills.</b> Does the student interact well and contribute to groups as necessary?	Team player, collegial	Potential for collegiality as maturity develops	Somewhat collegial, but no evidence for further development	Not a team player, inappropriate behavior	
<b>Attitude.</b> Is the student personable and interactive?	Makes a positive impression on first contact that is sustained	Has potential and indicators suggest improvement with maturity	Some potential for improvement exists	Negative interactions and no indication for improvement	
<b>Work habits.</b> Does the student commit the effort required to complete assigned tasks?	Dedicated and takes initiative to be productive	Productive	Not very productive	No initiative to be productive	
<b>Leadership.</b> Does the student demonstrate the capacity to coordinate group activities and supervise others?	Evidence of exceptional leadership	Acceptable level of leadership and potential with maturity	Some leadership potential with less clear potential for future development	No leadership capability or potential	
<b>Responsibility.</b> Can the student be counted on to perform required tasks with minimal supervision?	Highly responsible	Appropriate level of responsibility	Limited level of responsibility with some evidence for improvement	Minimal responsibility with no evidence for improvement	

**Comments:**



## Admission to the University Scholars Program

The University Scholars Program offers particularly gifted and highly motivated students the opportunity of integrating their undergraduate and graduate courses of study in a single continuous program culminating in both a baccalaureate and a master's or doctoral degree. The total number of hours for the combined program may be as many as 12 less than the total required for the bachelor's and the master's or doctoral degrees separately. The requirements for the bachelor's degree are unaffected.

Application to the program should be submitted at the end of the student's junior year. Applicants should have completed at least 90 credit hours of work toward the bachelor's degree, or be eligible for senior standing in the semester they are admitted to the program. The master's program should be in the field of the undergraduate major (there are some exceptions made), and the undergraduate grade point average must be at least a 3.50 in the applicant's major field and 3.20 overall. Applicants to a University Scholars program must submit both a Graduate School application and a University Scholars form with all requested signatures.

University Scholars Program Application form

Baccalaureate/masters University Scholars programs are currently offered in:

Accounting	German
Agricultural Engineering	History
Anthropology	Information Communication Technology
Biomedical Engineering	Manufacturing Systems Engineering
Biosystems and Agricultural Engineering	Materials Science and Engineering
Chemical Engineering	Mathematics
Chemistry	Mechanical Engineering
Civil Engineering	Mining Engineering
Classics	Music
Communication	Nutrition and Food Science
Computer Science	Philosophy
Diplomacy and International Commerce	Physics
Electrical Engineering	Public Administration
Family Studies	Rehabilitation Counseling
Forestry	Sociology
French	Spanish
Geography	Statistics

The University Scholars Program allows students to apply up to 12 hours of graduate coursework toward both the undergraduate and master's degrees. To be eligible students must 1) have completed a minimum of 90 hours 2) have senior standing 3) have completed all University Studies requirements and 4) have a GPA of 3.50 or better in their major and an overall GPA of at least 3.20. University Scholars students admitted for fall 2007 and beyond will be classified as undergraduates until they have completed the credit hours required for their undergraduate degree. Undergraduate tuition rates will be applied to the 12 hours (or less) of graduate level coursework designated for dual credit in this program. Students should submit this form, GRE scores and an on-line application to the Graduate School in their junior year.

 NAME: \_\_\_\_\_ U.K.I.D.: \_\_\_\_\_  
                                 Last                                First                                M.I.

CURRENT ADDRESS: \_\_\_\_\_

E-MAIL ADDRESS: \_\_\_\_\_ TELEPHONE #: \_\_\_\_\_

COLLEGE: \_\_\_\_\_ DATE SENIOR STATUS ACHIEVED: \_\_\_\_\_

TOTAL UNDERGRADUATE CREDITS COMPLETED: \_\_\_\_\_ CREDIT HOURS REMAINING FOR DEGREE: \_\_\_\_\_

UNDERGRADUATE MAJOR: \_\_\_\_\_

OVERALL UGPA: \_\_\_\_\_ UGPA IN MAJOR: \_\_\_\_\_

 ENROLLMENT REQUESTED FOR: YEAR \_\_\_\_\_  FALL  SPRING  1<sup>ST</sup> SUMMER SESSION  2<sup>ND</sup> SUMMER SESSION

COURSES NEEDED TO COMPLETE UNDERGRADUATE DEGREE (INCLUDE COURSES IN PROGRESS):

COURSE PREFIX-NUMBER	CREDIT HR	SEMESTER/YR	COURSE PREFIX-NUMBER	CREDIT HR	SEMESTER/YR

 SIGNATURES: \_\_\_\_\_ DATE: \_\_\_\_\_  
                                 Student

 \_\_\_\_\_ DATE: \_\_\_\_\_  
                                 Director of Graduate Studies

 \_\_\_\_\_ DATE: \_\_\_\_\_  
                                 Undergraduate Dean

 \_\_\_\_\_ DATE: \_\_\_\_\_  
                                 Graduate Dean

## UNIVERSITY SCHOLARS PROGRAM PLAN SHEET

NAME: \_\_\_\_\_  
Last
First
M.I.

SOCIAL SECURITY #: \_\_\_\_/\_\_\_\_/\_\_\_\_

GRADUATE LEVEL COURSES USED FOR UNDERGRADUATE CREDIT ONLY		GRADUATE LEVEL COURSES TO BE COUNTED TOWARD BOTH DEGREES (maximum of 12 hours)		GRADUATE LEVEL COURSES USED FOR GRADUATE CREDIT ONLY	
COURSE PREFIX-NUMBER	CREDIT HR	COURSE PREFIX-NUMBER	CREDIT HR	COURSE PREFIX-NUMBER	CREDIT HR
TOTAL CREDITS: _____		TOTAL CREDITS: _____		TOTAL CREDITS: _____	

PLAN A MASTERS

PLAN B MASTERS

I APPROVE THIS UNIVERSITY SCHOLARS PROGRAM PLAN:

\_\_\_\_\_ DATE: \_\_\_\_\_  
 Director of Graduate Studies

FORMULA FOR DEGREE:

TOTAL NUMBER OF HOURS REQUIRED FOR BACHELOR'S DEGREE: \_\_\_\_\_

PLUS TOTAL NUMBER OF HOURS REQUIRED FOR MASTER'S DEGREE: \_\_\_\_\_

SUB-TOTAL: \_\_\_\_\_

MINUS NUMBER OF HOURS ALLOWED AS CROSSOVERS (12 MAXIMUM): \_\_\_\_\_

SUB-TOTAL: \_\_\_\_\_

MINUS TOTAL NUMBER OF HOURS REQUIRED FOR BACHELOR'S DEGREE: \_\_\_\_\_

TOTAL NUMBER OF GRADUATE CREDITS REQUIRED FOR MASTERS DEGREE: \_\_\_\_\_

## SIGNATURE ROUTING LOG

**General Information:**

Proposal Type: Course  Program  Other

Proposal Name<sup>1</sup> (course prefix & number, pgm major & degree, etc.): MSMS University Scholars  
Program for ABT  
Undergraduates

Proposal Contact Person Name: Dr. Joe Springer Phone: 323-  
1440 Email: jspring@uky.edu

**INSTRUCTIONS:**

Identify the groups or individuals reviewing the proposal; note the date of approval; offer a contact person for each entry; and obtain signature of person authorized to report approval.

**Internal College Approvals and Course Cross-listing Approvals:**

Reviewing Group	Date Approved	Contact Person (name/phone/email)	Signature
ABT Coordinating Committee	10/03/2014	Dr. Dan Howe / 218-1113 / daniel.howe@uky.edu	
Undergraduate Curriculum Committee, College of Agriculture, Food and Environment	11/07/2014	Larry Grabau / 257-3469 / lgrabau@uky.edu	
		/ /	
		/ /	
		/ /	

**External-to-College Approvals:**

Council	Date Approved	Signature	Approval of Revision <sup>2</sup>
Undergraduate Council			
Graduate Council			
Health Care Colleges Council			
Senate Council Approval		University Senate Approval	

**Comments:**


<sup>1</sup> Proposal name used here must match name entered on corresponding course or program form.

<sup>2</sup> Councils use this space to indicate approval of revisions made subsequent to that council's approval, if deemed necessary by the revising council.



College of Medicine  
Medical Sciences

*Master's of Science in Medical Sciences Program*  
*College of Medicine*  
*University of Kentucky*  
*138 Leader Avenue, Room 113*  
*Lexington, KY 40506-9983*  
<http://graduate.med.uky.edu/ms-medical-sciences>

November 11, 2014

Curriculum Committee  
College of Medicine  
University of Kentucky

RECEIVED

DEC 22 2014

OFFICE OF THE SENATE COUNCIL *Rw*

Re: Proposal to create a University Scholars Program

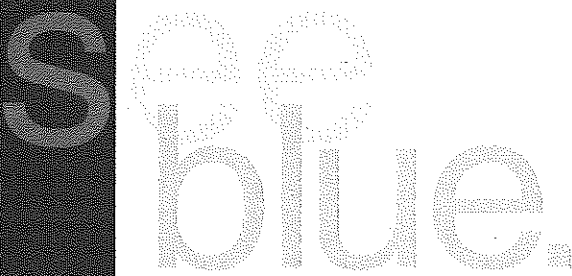
Dear Curriculum Committee Members,

On behalf of the Curriculum Committee of the College of Agriculture, Food, and Environment and the Master's of Science in Medical Sciences (MSMS) Program Advisory Committee, please see the attached proposal to create a University Scholars Program for students in the Agriculture Biotechnology (ABT) program. Dr. Robert Houtz, Chair of the Department of Horticulture and I generated this proposal to provide students in the ABT program the opportunity to seek a MSMS degree during the latter stages of their undergraduate career. It is envisioned that this combined degree program will be of benefit to the students, as well as the ABT and MSMS programs and their respective Colleges, and the University as a whole.

We look forward to hearing from you regarding this proposal and am happy to provide additional information or answer any questions.

Kind regards,

Joe E. Springer, Ph.D.  
Professor  
Director of Graduate Studies  
M.S. in Medical Science  
Neurorehabilitation Endowed Chair  
Spinal Cord and Brain Injury Research Center  
Physical Medicine and Rehabilitation  
University of Kentucky



**Ellis, Janie**

---

**From:** Nikou, Roshan  
**Sent:** Monday, December 22, 2014 1:08 PM  
**To:** Brothers, Sheila C; Carvalho, Susan E; Ellis, Janie; Ett, Joanie M; Hippisley, Andrew R; Jackson, Brian A; Lindsay, Jim D.; Nikou, Roshan; Price, Cleo; Timoney, David M  
**Cc:** Perkins, Andrea L; Wang, Cecilia; Toland, Michael D; Buntin, William J; Crystal, Ralph; Springer, Joe E  
**Subject:** Transmittals  
**Attachments:** Program\_Change\_MPH-signed.pdf; MA Philosophy-signed.pdf; MS in ABA-signed.pdf; ABT-MSMS University Scholars Proposal.pdf

TO: Andrew Hippisley, Chair and Sheila Brothers, Coordinator  
 Senate Council

FROM: Brian Jackson, Chair and Roshan Nikou, Coordinator  
 Graduate Council

Graduate Council approved the following proposals and is now forwarding them to the Senate Council to approve. All the courses listed below have been forwarded to the Senate Council via e-Cats.

**Programs and Certificates**

Master of Public Health

University Scholars for MA in Philosophy

MS in Applied Behavior Analysis

University Scholars for MS in Medical Sciences

**Courses**

MUS 648 Music Software Technology

MUS 731 Music Perception and Cognition

MUS 760 Music Research III

CPH 710 Adverse Events in Healthcare

LIS 690 Special Topics in Library and Information Science

## EDP 656 Methodology of Educational Research

*Roshan Nikou*

The Graduate School

The University of Kentucky

101 Gillis Building - 0033

Phone: (859) 257-1457

Fax: (859) 323-1928

[Roshan.Nikou@uky.edu](mailto:Roshan.Nikou@uky.edu)

<sup>72</sup>  
**Brothers, Sheila C**

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**From:** Schroeder, Margaret <m.mohr@uky.edu>  
**Sent:** Wednesday, January 28, 2015 11:24 AM  
**To:** Brothers, Sheila C; Hippisley, Andrew R  
**Subject:** UPDATED: Undergraduate Certificate in Research in Human Health Sciences

## **New Undergraduate Certificate in Research in Human Health Sciences**

This is a recommendation that the University Senate approve the establishment of a new Undergraduate Certificate in Research in Human Health Sciences in the College of Health Sciences.

Best-  
Margaret

-----  
Margaret J. Mohr-Schroeder, PhD | Associate Professor of Mathematics Education | [STEM PLUS Program Co-Chair](#)  
| [Department of STEM Education](#) | [University of Kentucky](#) | [www.margaretmohrschroeder.com](#)





**MEMO**

August 11, 2014

**TO:** Sharon R. Stewart, Ed.D., Interim Dean and Professor  
**FROM:** Travis Thomas – Chair Academic Affairs  
**RE:** AA recommendation for approval of certificate proposal

Dear Dr. Stewart,

The Academic Affairs (AA) Committee has completed our review of the CHS proposal for a certificate program in undergraduate research. After thorough review, we unanimously recommend approval of this program. Thanks for the opportunity to review this proposal. Please let me know if I can help clarify anything regarding our recommendation.

Sincerely,

A handwritten signature in black ink, appearing to read "Travis Thomas". The signature is fluid and cursive, with a horizontal line extending to the right.

Travis Thomas, PhD, RD, CSSD, *Chair – CHS Academic Affairs Committee (2013-14)*



Office of the Dean  
900 South Limestone, CTW 123  
Lexington KY 40536-0200  
(859) 218-0480 phone  
(859) 323-1058 fax  
<http://www.mc.uky.edu/healthsciences>

## MEMORANDUM

DATE: July 31, 2014  
TO: Undergraduate Council  
FROM: Sharon Stewart, Interim Dean  
College of Health Sciences (CHS)  
RE: Undergraduate Certificate Proposal: Research in Health Sciences

The purpose of this memorandum is to provide my strong support for the Undergraduate Research in Health Sciences Certificate proposal.

This proposal was prepared by the CHS Director of Undergraduate Research, Dr. Gilson Capilouto, in consultation with administrators and faculty in the College. The purpose of the Certificate is to provide students with an interest in research with the opportunity to obtain significant knowledge and experience in health-related research that will benefit their pursuit of a career in health care.

The undergraduate research program in the CHS has been highly successful. In just a few years, it has grown from 30 students and faculty members in 2011 to 82 students and faculty mentors in 2013. These students come from a variety of majors both inside and outside the college, and the faculty members represent programs in both our Rehabilitation Sciences and Clinical Sciences departments. Students enrolled in the research experiences register for HHS 445 (var cr) and work collaboratively with their research mentor to prepare a contract that outlines the duties and expectations. We will offer our new undergraduate research course (HHS 454) for the first time in FY15. This 3-credit hour course is mandatory for all students enrolled in the new Human Health Sciences degree program and will be mandatory for Certificate students. Because of the interdisciplinary nature of the program, we believe it is appropriate to house it administratively in the College of Health Sciences, not in a specific Department.

The College is prepared to support this program. The Certificate Director will be responsible for program administration. This will be accomplished in her role as the CHS Director of

Undergraduate Research in the CHS Office of Research. We presently pay her salary and an administrative stipend for her work. Faculty mentors are full-time members of the CHS faculty, and DOE time for mentoring undergraduate students is provided as appropriate. Students in our college are already assigned to an advisor in our College, and the Office of Student Affairs is prepared to provide the additional necessary support for the Certificate. Our Assessment Office will assist with Student Learning Outcomes and program evaluation.

In summary, the College of Health Sciences is committed to undergraduate research and has taken a number of steps to strengthen its work in this area. The Certificate program is a natural extension of this work and has my full support. We have been and will continue to provide the resources necessary to support this initiative. Please contact me for any additional information that would be helpful to this application.



## UNIVERSITY OF KENTUCKY

Charlotte A. Peterson, Ph.D.  
Joseph Hamburg Endowed  
Professor  
Associate Dean for Research

College of Health Sciences  
University of Kentucky  
900 S. Limestone, CTW 105  
Lexington, KY 40536-0200

DATE: July 31, 2014

TO: Undergraduate Council

FROM: Charlotte A. Peterson, PhD

cpete4@uky.edu  
(859) 218-0476  
(859) 257-2375 fax

RE: Undergraduate Research in Health Sciences Certificate

I am writing to offer my full and enthusiastic support of an Undergraduate Research in Health Sciences Certificate as proposed by the College of Health Sciences. As the CHS Associate Dean for Research, I have been involved with our undergraduate research program since its inception in 2011. The program has grown significantly since then and appeals to a diverse group of students. As stated in the proposal, we have observed that many students stay with their respective mentors for multiple semesters. The addition of a certificate will enhance the research experience of interested students by including didactic coursework in research and research methods, by enabling students to interact more regularly with other undergraduate researchers, and by providing more opportunity to be actively engaged in research reporting and presentation, that will enhance student knowledge of their research area of interest.

I have actively participated in the development of this proposal and have reviewed it multiple times as it was being vetted and finalized. The proposal has the full support of this office. The CHS Office of Research will provide administrative support to the certificate director in the administration of the certificate. In addition, I agree to serve on the committee that considers any program changes.

Thank you in advance for your time and consideration.

Sincerely,

Charlotte A. Peterson, Ph.D.



Department of Rehabilitation Sciences  
900 South Limestone St  
Wethington Building, Rm 210  
Lexington, KY 40536-0200  
859-218-0477

July 31, 2014

Members of the Undergraduate Council:

I am writing to provide enthusiastic support for the Undergraduate Research in Health Sciences Certificate as proposed by the College of Health Sciences (CHS). I actively participated in the development of the program, including extensive discussion with key leaders throughout the process, and I am confident that this will be a meaningful Certificate to enhance undergraduate success on many levels.

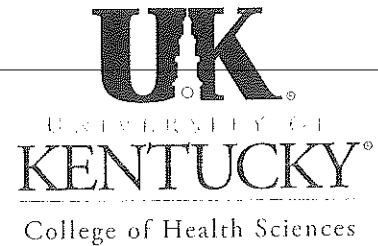
The CHS commitment to undergraduate research was formalized with the appointment of Gilson Capilouto, PhD as the Director in 2011. Dr. Capilouto has done an outstanding job promoting the program to both students and faculty, and you will notice the remarkable growth highlighted in this application. Faculty members of the Rehabilitation Sciences Department have been among the most actively engaged, and they see the benefits of the program in guiding the next generation of professionals to value research. Adding a certificate program will allow a more in-depth opportunity to students to be actively engaged throughout the research process as well as an opportunity to be involved in dissemination of results.

To enable this program to be effective, I commit to allowing the appropriate DOE time for each faculty engaged in mentoring undergraduate research students. This will be a part of the regular annual DOE negotiation process. I also agree to serve on the voting body responsible for considering any program changes in the future.

As I hope is evident, Dr. Capilouto and the entire team have a deep commitment to fostering the development of research throughout the educational process. This proposed Certificate will demonstrate and expand that commitment to serve students and the University in our mission to improve people's lives through excellence in education, research, and creative work.

Sincerely,

Janice Kuperstein, PhD  
Chair, Department of Rehabilitation Sciences



July 30, 2014

University of Kentucky  
Undergraduate Council

Department of Clinical Sciences  
Wethington Building, Room 209  
Lexington, KY 40536-0200  
859 323-1100 ext. 80513  
*fax* 859 257-2454  
[www.uky.edu](http://www.uky.edu)

Dear Council Members:

As interim chair of the Department of Clinical Sciences in the College of Health Sciences, it is my pleasure to support the proposal to develop the Undergraduate Research in Health Sciences Certificate.

Given the importance of undergraduate research in the University's Strategic Plan and the growing evidence of the educational enrichment provided by such experiences, it is evident that this certificate will be a significant addition to the educational offerings of the University.

For the past three years, the College has offered the opportunity for undergraduates to work with faculty members on a research project. The numbers of students involved in the program has grown from 30 to 82 in just three years. The evaluation of the program by the student participants demonstrates the quality of the experiences. There is ample evidence that undergraduate students desire research experience and that the involved faculty work hard to provide a worthwhile experience.

The collaboration of the faculty from the two departments in the College of Health Sciences and those external to the College demonstrate the value that the faculty place on this effort.

We are pleased that the department's HHS (Health Human Sciences) courses will be part of the program and that faculty members from the Department will serve as mentors. We are dedicated to providing outstanding experiences for students in the certificate program and will assure that faculty involved in the program will be provided dedicated DOE time.

Please do not hesitate to contact me if you need additional information.

Regards,

A handwritten signature in black ink, appearing to read "Phyllis J. Nash".

Phyllis J. Nash, M.S.W., Ed.D.  
Interim Chair, Department of Clinical Sciences





UNIVERSITY  
OF KENTUCKY

Chandler Medical Center

**Rehabilitation Sciences Doctoral Program**

---

900 S. Limestone  
Lexington, KY 40536-0200  
(859) 218-0860  
Fax (859) 323-6003

July 30, 2014

TO: Undergraduate Council

I am writing to offer my full and enthusiastic support of the proposed Undergraduate Research in Health Sciences Certificate as proposed by the College of Health Sciences. Since its inception in 2011, a number of the Ph.D. students in our Rehabilitation Sciences doctoral program have involved undergraduates in their research giving them the opportunity to develop their own skills relating to lab management and mentoring. The addition of a certificate will provide the advantage of complimentary didactic coursework in research and research methods as well as complimentary coursework in the respective area of interest enhancing the research skills of our future allied health workforce.

I have carefully reviewed this proposal in its final form and offer my full support. Furthermore, I agree to serve as Certificate Director in Dr. Capiluto's absence.

Thank you for giving this proposal your full consideration.

Sincerely,

A handwritten signature in black ink that reads 'Carl G. Mattacola'.

Carl G. Mattacola, PhD, ATC  
Professor and Director-  
Rehabilitation Science Doctoral Program,  
Division of Athletic Training



College of Health Sciences

Office of Student Affairs  
CTW Building  
900 South Limestone  
Lexington, KY 40536-0200

August 1, 2014

Undergraduate Council,

I am writing to offer my full and enthusiastic support of an Undergraduate Research in Health Sciences Certificate as proposed by the College of Health Sciences (CHS). As the CHS Assistant Dean for Admissions and Student Affairs, my office offers advising to all undergraduates interested in a health profession. The Undergraduate Research in Health Sciences Certificate appeals to a diverse group of students from a variety of disciplines across the university. Students involved in undergraduate research will remain engaged in our college for several semesters, thus it is important to offer advising to students who would like to attain an Undergraduate Research in Health Sciences Certificate, both through their mentors and through formal academic advising. This will support students in their pursuit of the certificate and in exploring all possible career options.

I have actively participated in the development of this proposal and have reviewed it multiple times as it was vetted and finalized. The proposal has the full support of this office. The CHS Office of Student Affairs will provide advising, an electronic application for students applying for a research certificate, and administrative support to the certificate director in the administration of the certificate.

Thank you for giving this proposal your full consideration.

A handwritten signature in black ink that reads "Randa R. Remer". The signature is written in a cursive style.

Randa R. Remer, Ph.D.  
Assistant Dean of Admissions and Student Affairs  
College of Health Sciences

see  
blue.





College of Health Sciences

Division of Health Science  
Education and Research (HSER)  
Programs Human Health Sciences  
Clinical Leadership & Management  
Wethington Building, Room 207  
Lexington, KY 40536-0200

859 323-1100 Ext. 8-0495

*fax* 859 257-2454

[www.mc.uky.edu/healthsciences](http://www.mc.uky.edu/healthsciences)

see  
blue.



Undergraduate Education  
557 Patterson Office Tower  
Lexington, KY 40506-0027

859 257-3027  
fax 859 257-1455

[www.uky.edu](http://www.uky.edu)

December 1, 2014

Dean Sharon Stewart  
College of Health Sciences  
University of Kentucky  
Lexington, Kentucky 40506-0027

Dear Dean Stewart:

I am writing to express the support of the Division of Undergraduate Education for the undergraduate certificate for Research in the Health Sciences that has been prepared by Dr. Gilson Capilouto. Dr. Capilouto has consulted with me during the process.

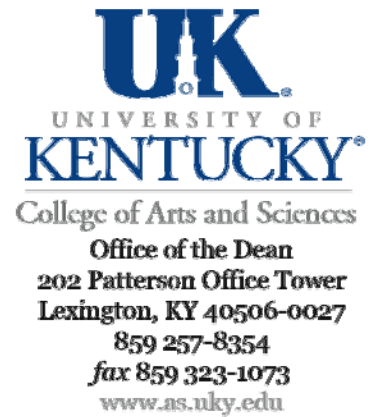
While it is the intention of UGE to submit a proposal for a certificate in undergraduate research, our proposal would be significantly different from the very specific Health Sciences certificate under consideration at this time.

Sincerely,

A handwritten signature in black ink that reads "Benjamin C. Withers". The signature is written in a cursive style with a large, looped "B" and "W".

Benjamin C. Withers, Ph.D.  
Professor of Art History  
Associate Provost for Undergraduate Education

**see blue.**  
An Equal Opportunity University



November 21, 2014

Dr. Sharon Stewart, Interim Dean  
College of Health Sciences  
Charles T. Wethington, Jr. Building, Rm 123  
900 South Limestone  
University of Kentucky  
Lexington, KY 40536-0200

Dear Professor Stewart,

I am pleased to offer my support on behalf of the College of Arts and Sciences for the proposed Undergraduate Research in Human Health Sciences Certificate, to be offered by the College of Health Sciences. I have reviewed the proposed curriculum and find that your certificate will provide a substantive experience for students in your college interested in pursuing research.

The HHS certificate appropriately draws on faculty and instructional staff from all departments in the College of Health Sciences, thus ensuring its interdisciplinary focus. The curriculum provides an excellent model of an interdisciplinary undergraduate research certificate, incorporating one methods class, 6-9 credits in research experience, and an "outside area" class to be approved by the student's faculty mentor. We see the value of encouraging research at the undergraduate level, and we are happy to support your certificate for students in your college. Our own research-intensive undergraduate programs - especially Psychology, Biology, and Chemistry - are already constructed so as to provide a highly-focused research experience for nearly all majors in those disciplines, incorporating discipline-specific methods courses, an independent research experience, and a capstone. For this reason we do not foresee encouraging students in our majors to pursue the Undergraduate Research Certificate in Human Health Sciences, but we acknowledge the value of this certificate for students in your college.

We look forward to continuing to work with you and your college on matters of mutual interest and concern, for the benefit of all our students at the University of Kentucky,

Sincerely,

Mark Lawrence Kornbluh  
Dean

**From:** Stewart, Sharon R  
**Sent:** Tuesday, December 02, 2014 12:21 AM  
**To:** O'Hair, Mary J  
**Subject:** undergraduate certificate proposal

Hi Mary John,

I was glad to hear that the COE does not have any objections to the CHS proposal for an undergraduate certificate in human health sciences research. I was especially glad to hear that Melody voiced no concerns since her program is probably the most closely related to some of our programs.

We plan to move forward with the proposal and hope to get it through the Senate in the near future.

Thanks again for vetting this with your faculty.

All the best,  
Sharon

**Sharon R. Stewart, Ed.D.**  
Interim Dean and Professor

University of Kentucky College of Health Sciences  
Charles T. Wethington, Jr. Building  
900 S. Limestone, 123

Lexington, Kentucky 40536-0200  
Phone: 859.218-0480 FAX: 859.323.1058

Email: [srstew01@uky.edu](mailto:srstew01@uky.edu)

Statement of confidentiality: The contents of this email and any attachments are confidential and are intended solely for the addressee. The information may also be legally privileged. This transmission is sent in trust for the purpose of delivery to the intended recipient. If you have received this transmission in error, any use, reproduction or dissemination of this transmission is strictly prohibited. If you are not the intended recipient, please notify the sender immediately by reply email or at 859.323.1100, ext. 80570, and delete this message and its attachments, if any.

**From:** "O'Hair, Mary J" <[mjohair@uky.edu](mailto:mjohair@uky.edu)>  
**Date:** December 2, 2014 6:04:25 AM EST  
**To:** "Stewart, Sharon R" <[srstew01@uky.edu](mailto:srstew01@uky.edu)>  
**Subject:** **Re: undergraduate certificate proposal**

Thanks, Sharon. Let me know how we can help.

Mary John O'Hair, Dean

College of Education / University of Kentucky / [Education.uky.edu](http://Education.uky.edu)

Sent from my iPhone

## Proposal- Undergraduate Research in Human Health Sciences Certificate

Please find attached a proposal for an undergraduate certificate in undergraduate research in human health sciences. The proposal is presented by Gilson Capilouto, Ph.D. who will serve as the Faculty Director for the certificate and is currently Associate Professor, Department of Rehabilitation Sciences and Director of Undergraduate Research, College of Health Sciences. The certificate proposal was developed by Dr. Capilouto in conjunction with Dr. Sharon Stewart, Interim Dean, College of Health Sciences, Dr. Charlotte Peterson, CHS Associate Dean for Research, Dr. Phyllis Nash, Interim Chair, Department of Clinical Sciences, Dr. Geza Bruckner, Program Director, Human Health Sciences, Dr. Janice Kuperstein, Chair, CHS Department of Rehabilitation Sciences, Dr. Carl Mattacola, Program Director, Rehabilitation Sciences Doctoral Program, Dr. Randa Remer, Assistant Dean, CHS Office of Student Affairs and Dr. Rena Murphree Keath, Director, Office of Assessment.

### 1. General Information:

The home for the proposal will be the College of Health Sciences.

Due to the interdisciplinary and interdepartmental nature of the certificate, it will be housed within the College versus a hosting academic unit. The rationale for this approach is detailed throughout the proposal.

The proposed certificate name is: Undergraduate Research in Human Health Sciences Certificate

Effective date: semester following approval- January 2015

CIP Code: 51.0000

### 2. Proposal Contact:

Dr. Gilson J. Capilouto

Associate Professor and Director of Undergraduate Research, CHS

8592180555

gilson.capilouto@uky.edu

### 3. Routing Log:

Reviewing Group	Date Approved	Contact Person Name/phone/email
Program Director, Human Health Sciences	July 31 <sup>st</sup> , 2014	Dr. Geza Bruckner 218.0859 gbruckn@uky.edu
Interim Chair, Department of Clinical Sciences	July 30 <sup>th</sup> , 2014	Dr. Phyllis Nash 218.0570 pnash@uky.edu
Chair, Department of Rehabilitation Sciences	July 31 <sup>st</sup> , 2014	Dr. Janice Kuperstein 218.0593 jkupe0@uky.edu
College of Health Sciences Academic Affairs Committee		Dr. Travis Thomas 218.0863 dth225@uky.edu
Associate Dean for Research, College of Health Sciences	July 31 <sup>st</sup> , 2014	Dr. Charlotte Peterson 218.0476 cpete4@uky.edu
Interim Dean, College of Health Sciences	August 1 <sup>st</sup> , 2014	Dr. Sharon Stewart 218.0480 srstew01@uky.edu
Undergraduate Council	12/4/14	Joanie Ett-Mims

#### 4. Overview

##### A. Provide a brief description:

The Office of Research in the College of Health Sciences in collaboration with The Departments of Rehabilitation Sciences and Clinical Sciences is offering an undergraduate certificate in Undergraduate Research in Human Health Sciences. This certificate will enhance the educational goals of any University of Kentucky student interested in obtaining experience in health-related research to benefit the pursuit of a health care career. The purpose of this initiative is to encourage and recognize undergraduate students who devote a significant portion of their undergraduate education in scholarly and research pursuits within the College of Health Sciences.

##### B. This proposed certificate (check all that apply):

- Is cross-disciplinary\*
- Is certified by a professional or accredited organization/governmental agency
- Clearly leads to advanced specialization in a field

*\*Required – students must take courses in at least two disciplines, with a minimum of three credits to be completed in a second discipline.*

##### C. Affiliation

Is the certificate affiliated with a degree program?  Yes  No

Due to the interdisciplinary and interdepartmental nature of this initiative, we are proposing that the certificate be housed in the College of Health Sciences. The proposed certificate program provides undergraduate students with the opportunity to gain advanced knowledge in interdisciplinary clinical and translational research in the human health sciences fields. Currently, students from across campus gain knowledge through CHS faculty mentored research experiences. However, the addition of a certificate program will provide select students with a framework for developing higher level critical thinking skills relating to human health sciences research; along with the knowledge and skills fundamental to independent scientific inquiry.

The College of Health Sciences launched its undergraduate research program in January, 2011. Since that time, the program has enjoyed exponential growth. The following table provides an accounting of the number of students who have been involved in undergraduate research in the CHS since 2011 and demonstrates the interdepartmental and interdisciplinary nature of our undergraduate research initiative.

Academic Year	# of students	Dept Home of Faculty Mentor	Student Major (not comprehensive- serve as examples only)
2011	30	CHS Office of Research - 2 Clinical Sciences-2 Rehabilitation Sciences-26	Psychology Honors Kinesiology Communication Sciences/Disorders
2012	75	CHS Office of Research- 4 Clinical Sciences - 1 Rehabilitation Sciences- 70	Linguistics Kinesiology Communication Sciences/Disorders Mathematics Computer engineering Biochemistry Undergraduate Studies
2013	82	CHS Office of Research - 3 Clinical Sciences - 3 Rehabilitation Sciences- 76	Human Health Sciences Linguistics Communication Sciences/Disorders Kinesiology Materials Engineering Human Nutrition Vocal Music Chemistry Biological and Political Science Health Communication

## D. Demand

Increasingly, undergraduate students are entering college with a desire to be involved in research activities that provide real world experience in the scientific process. In our own college, we have observed that a number of students choose to remain involved in research over multiple semesters, which motivated us to consider the certificate mechanism as a means of formalizing an in-depth research opportunity for interested students. In addition, the drive toward evidence-based practice has increased opportunities for research in the human health sciences and demands an allied health work force educated in the conduct and dissemination of research. The College of Health Sciences' research portfolio coupled with our interdisciplinary Human Health Sciences (HHS) degree can provide students with a range of opportunities that provide a strong foundation in 'bench to community' research and prepare them well for productive careers. The addition of a certificate program will allow students to have richer, more meaningful research experiences as they participate over time and link their research experience with complimentary didactic coursework. Moreover, we have placed an emphasis on scholarly products and outcomes to help students understand their responsibility for disseminating research findings; an opportunity not always possible in the typical one semester lab experience.

## E. Describe the demographics of the target student population for the certificate (check each box that applies and describe the intended audience):

- Currently enrolled undergraduate students
- Post-baccalaureate students

## F. Projected enrollment

The following table shows our enrollment projections for the first three years:

	Year 1	Year 2 (Year 1 continuing + new entering)	Year 3 (Yrs. 1 and 2 continuing + new entering)
# of students	15	25	40

## G. Distance learning

The proposed certificate offers a combination of distance education and on-campus offerings (see Section 7B for a description of required coursework). HHS 454: Research in Human Health Sciences (3CH) is approved as a distance learning course. Additionally, the student-mentor selected out-of-disciplinary course could be an approved distance learning course. HHS 455: Research Experience in Health Sciences (6 -9 CH) will not be offered as a distance learning course.

## 5. Administration and Resources

### A. Administration

The Certificate Director will receive applications to the certificate program. The application system will be set-up electronically by the CHS Office of Student Affairs (see LOS Remer). As part of the application process, students will be asked to describe, in writing, their research interests, educational goals and career goals. Based on the written application, the certificate director will identify potential mentors in the College and connect eligible students to those mentors for initial interview. Certificate admission criteria are described in Section 7A.

Student advising will be a shared responsibility between the student's mentor and the CHS Office of Student Affairs (OSA). Faculty mentor advising will be in the areas of the research interest and didactic coursework. The CHS OSA advisors will monitor course completion toward the certificate for each student and when students desire to meet with an OSA advisor, that opportunity will be made available. Once a student is accepted into the certificate program, the student's program advisor will be notified and kept abreast of the student's progression toward the certificate.

To assist with student retention, ongoing mid-semester evaluations with the faculty mentor will be required as long as the student is working toward the certificate. Student progress for all required courses will be monitored to address any deficiencies a student may be demonstrating. Mentors will supply the Certificate Director with each student's midterm evaluation. For concerns that are addressable (e.g. poor organizational skills) a specific plan will be put in place, with specific tasks for improving the concern, in conjunction with definitive timelines for completion. In cases where the concerns are more serious (e.g. poor academic performance), the Certificate Director will work with CHS OSA to connect students to the appropriate University resources, to improve academic success. Again, the student's program advisor will be kept informed of the student's progress.

## **B. Resources**

The projected budget needs for the proposed certificate are minimal. Coursework for the certificate already exists (see LOS Bruckner) and faculty participation is voluntary; however, DOE time commensurate with individual faculty effort will be negotiated annually with respective department chairs (see LOS Kuperstein/Nash/Stewart). The relative contribution across units is based on faculty research opportunities at any given time. The Director of Undergraduate Research is funded by the College of Health Sciences (see LOS Stewart) and administrative assistance for the undergraduate research program is funded by the CHS Office of Research (see LOS Peterson). Additional administrative support will be provided by the CHS Office of Student Affairs (See LOS Remer).

It should be reported that a number of resources are currently in place to complement the certificate program proposed here. For example, the CHS undergraduate research website includes a description of all research opportunities available to undergraduate students. In addition, a faculty toolkit is under construction that includes resources on incorporating undergraduates into research with sample research contracts to assist faculty in developing measurable goals, objectives and tasks. There is also a series of links that support students interested in research such as how to get involved in CHS research and things to think about when considering the type of research experience to pursue. All resources on the website are dynamic and evolve in response to ongoing faculty and student evaluation of the CHS UGR program.

## **C. Faculty of Record**

Faculty of Record will include the Certificate Director (Gilson J. Capilouto) and in Dr. Capilouto's absence, Dr. Carl Mattacola, Director, RHB Doctoral Program (see LOS Mattacola). Participation in the certificate program includes any CHS faculty actively mentoring undergraduate students in research. Currently, for example, this would include seventeen faculty members in the College along with 6 Ph.D. doctoral students in Rehabilitation Sciences (co-mentored by faculty). In addition, we currently have faculty from the Human Development Institute and the College of Pharmacy mentoring CHS undergraduates in research. The body voting on program changes will include the CHS Associate Dean for Research (Peterson), the Certificate Director (Capilouto), the two Chairs from the participating departments (Nash, Kuperstein) and the Program Director, Human Health Sciences (Bruckner). Lastly, the Dean appoints the Director of Undergraduate Research (DUGR) for the College and the DUGR will serve as the Certificate Director. In addition to the approval of the voting body regarding program changes, the college's regular approval process for curriculum approval will be followed.

## **6. Support and Impact**

### **A. Faculty governance**

All required letters of support reflecting college, division and unit support for the certificate accompany this proposal. Written assurance that the resources to support the certificate as presented in the proposal are in place, also accompanies this proposal.

### **B. Other related programs**

The certificate proposed here will compliment many existing UK programs- especially those with a health-related emphasis. Historically, faculty from CHS have served as mentors for students from a variety of UK programs including psychology-honors, kinesiology and chemistry. Our undergraduate research initiative has also served as a compliment to the education of students from nutrition, vocal music, engineering and



linguistics (see section 4C for additional program majors selected at random from our database). We are certain that the addition of a certificate program will only enhance the diversity of students seeking research opportunities in our College. As such, it is not feasible to include a statement of support from each possible academic unit.

The opportunity to pursue a certificate in undergraduate research further enhances the goals of the University of Kentucky Honors Program. The certificate is designed to attract talented, goal-driven students seeking interdisciplinary educational opportunities that are challenging, promote creativity and nurture independent thinking.

Lastly, UK's proposed Strategic Plan, SeeTomorrow, cites the goal to create a "vibrant undergraduate learning community". A draft of the strategic metrics for accomplishing this goal was submitted for faculty review this spring and includes increasing multidisciplinary undergraduate experiences, increasing the percentage of undergraduate students engaged in research and increasing the number of certificate programs. The proposed certificate of undergraduate research in human health sciences meets all of these metrics in a creative, cost-effective, and meaningful way.

### C. External course utilization support

Letters of Support accompany this application from the impacted academic units (Kuperstein and Nash) as well as the Program Director for Human Health Sciences (Bruckner) and the CHS Associate Dean for Research (Peterson). The possibilities for out of discipline/cross discipline didactic coursework are broad and so letters of support for individual courses are not feasible.

## 7. Admissions Criteria and Curriculum Structure

### A. Admissions criteria

The admissions criteria for the proposed certificate are as follows:

- A minimum second semester freshman
- 3.0 GPA
- A statement from a CHS faculty research mentor willing to work with the student
- An application submitted through the Office of Student Affairs

Before beginning, all students accepted into the certificate program will be required to:

- Register with the UK Office of Undergraduate Research
- Complete research ethics education as directed by their mentor
- Complete web-based biosafety modules as directed by their mentor

### B. Curricular structure

- a. Will this certificate program utilize existing courses?  Yes  No
- b. If yes, please indicate the number of existing courses being utilized   2
- c. Will this certificate program require new courses?  Yes  No
- d. If yes, please indicate the number of new courses being proposed

### Required Courses:

A total of 12-15 credit hours will be required for the certificate and are described below. All required courses for the certificate must be completed with an overall GPA of a 3.0 or better **and** each course within the certificate must be completed with at least a C or better. Courses are described below and can be adapted to accommodate students enrolled in The Honors Program as requested:

1. HHS 454: Research in Human Health Sciences (3CH)

This course provides an introduction to basic methods for undertaking research on issues related to health, health care, and within health services organizations and systems.

2. HHS 455: Research Experience in Health Sciences (6 -9 CH)\*

HHS 455 provides the student with the opportunity to engage in independent work devoted to research on a specific problem with the goal to challenge the student to synthesize concepts from his/her total program and relate them to his/her specific field of research interest. Students work under the direction of a faculty mentor in an area of mutual scientific interest. Student and mentor collaborate to develop a research contract that outlines the expectations of the research experience including: a description of the experience with goals and objectives, tasks for completing the objectives with timelines, and criteria, with percentages, for assessment. Students seeking the UGR certificate will complete, as part of one of their HHS 455 contracts, either (1) a presentation to a local targeted group (e.g. CHS Research Day); (2) poster preparation for national/international conference; OR (3) manuscript development/writing with mentor. Additional activities expected of certificate holders could include participation in the mentor's lab group/journal club or IRB/IACUC preparation.

\* If a student comes from another academic unit with research experience, the mentor can agree to have 3 credit hours count toward the 6-9 CH of research experience required for the certificate. In addition, students could elect to complete this requirement under the direction of different mentors as long as they demonstrate this is justified for their scientific field of interest.

3. Mentor/student selected coursework (3CH) (i.e. content specific to area of research)- 300 level or above

Student and mentor will collaborate to select an out-of-discipline course to meet this requirement of the certificate program. The course could come from any program on the UK campus with the caveat that the content of the course be specific to the student's scientific field of interest. For example, a student with a major in communication sciences and disorders interested in the effects of preterm birth on family stress might take a selected course in sociology (A&S), psychology (A&S), or health care navigation (HHS). A student interested in an aspect of aging muscle might take a course in gerontology (GRN) or public health (CPH). The connection between the selected course and its application to the area of research would be clearly linked in the agreement between the student and faculty mentor. In considering course options, the student/mentor would obtain any necessary instructor consent prior to student enrollment.

## 8. Assessment

### A. Student learning outcome assessment

Student Learning Outcome	Course		
	HHS 454	HHS455	Out –of-Discipline Course*
Demonstrate understanding of concepts fundamental to scientific field of interest as evidenced by the ability to identify, summarize and discuss relevant literature.	X	X	
Discuss and apply the ethical components of scientific research to current project(s)	X	X	
Demonstrate advanced knowledge of the scientific process in scientific field of interest		X	X

\*Out-of-discipline coursework is completed after or in conjunction with the first research experience

1. *Demonstrate understanding of concepts fundamental to scientific field of interest as evidenced by the ability to identify, summarize and discuss relevant literature.*

This learning objective will be measured via embedded test questions that are part of HHS 454 as well as faculty evaluation of performance on contract activities that are part of HHS 455 (i.e. presentation, poster preparation, manuscript development, literature review). Students will be graded using standard rubrics for each of these activities. Faculty will access the rubrics via the CHS UGR website. Students must receive 75% or better on both measures to consider this learning objective as met.

2. *Discuss and apply the ethical components of scientific research to current project(s).*

This learning objective will be measured in three ways: (1) via embedded test questions that are part of HHS 454; (2) successful completion of web-based training in research ethics education (i.e. human subjects, animal care and use, and/or lab safety), as directed by mentor and outlined in the contract for HHS 455 (certificate of successful completion issued by CITI); and, (3) via demonstrated knowledge of ethics in scientific research and publishing. Student will complete three required readings on the topic and present the mentor with 2-3 discussion points via reflection from their readings (in prearranged conference). Mentors will grade student responses via standard rubric.

Students must receive 75% or better on embedded test questions/research proposal and reflection to consider this learning objective as met.

3. *Demonstrate advanced knowledge of the scientific process in scientific field of interest.*

This learning objective will be measured in two ways: (1) faculty evaluation of student performance on contract activities that are part of HHS 455 (e.g. participation in the mentor's lab group/journal club; IRB preparation and submission). Students will be graded using standard rubrics for each possible activity; and, (2) student will prepare two-three written statements for discussion with their mentor regarding how information from cross-disciplinary coursework has contributed to their specific research experience (in prearranged conference). Mentors will grade student responses via standard rubric. Students must receive 75% or better to consider this learning objective as met.

Students will also demonstrate their understanding of scientific concepts fundamental to their field and advanced knowledge of the scientific process via their participation in the CHS Community of Undergraduate Research Scholars. The CURS will meet quarterly so students can discuss the work they are doing in their respective labs and get feedback from their peers. In addition, students in the certificate program will be expected to present their work during the CHS Research Day which is part of the CCTS Annual Research Day.

Ongoing student assessment offers multiple opportunities to ensure that the program is delivering on its goals. In cases where students are receiving poor mid-term assessments by their mentors, a remediation plan (including specific targets with stated timelines as criteria for assessment) will be put in place through collaboration between the certificate administrator, respective faculty and student. In cases where the student feels their mentorship is less than good, the Certificate Director as well as an academic advisor from the CHS OSA will meet with faculty and offer resources for improving mentorship.

## **B. Program outcome assessment**

The CHS Undergraduate Research Program has been underway since 2011. Since that time, we have developed a number of benchmarks of success as well as tools for measuring the program's success- from both a student and faculty perspective.

STUDENT PROGRAM ASSESSMENT

At the end of each semester AND the end of the program, students will complete an online assessment of the program with the following questions used as benchmarks of program success:

1. Did your experience result in any scholarly products (Check all that apply)?
  - Poster presentation
  - Platform presentation
  - Co-authorship on peer-reviewed published manuscript
  - Other: Text Box
  - None
2. How would you rate the faculty/mentor supervision you received?
  - Excellent
  - Good
  - Fair
  - Poor
3. Please describe the impact this experience has had on your career/education goals.  
Free text box

We will consider the program successful if students have had 2 or more scholarly products as a result, believe they received excellent or good mentorship, and if the experience altered or advanced their career/educational goals.

FACULTY PROGRAM ASSESSMENT

After a given student completes the certificate, respective mentoring faculty will be required to complete an online assessment of the program with the following questions used as benchmarks of success:

1. How would you rate your experience in the certificate program?
  - Excellent
  - Good
  - Fair
  - Poor
  - NA
2. Has participation in the certificate program facilitated your research goals?
  - Yes
  - No
  - NA
3. If NO, why not?  
Free text box
4. Do you plan to continue participating in the CHS Undergraduate Research Certificate Program?
  - Yes
  - No
5. If NO, why not?  
Free text box

We will consider the program successful from the faculty perspective if faculty rate their experience as excellent or good, if the program has facilitated their research goals and if they plan to continue participating in the program.

In addition to the above, the certificate program will receive periodic external review as organized and directed by the Dean of the College of Health Sciences in collaboration with the CHS Associate Dean for Research.

**From:** Schroeder, Margaret <m.mohr@uky.edu>  
**Sent:** Tuesday, February 03, 2015 9:07 AM  
**To:** Brothers, Sheila C  
**Subject:** Proposed New MS: Applied Behavior Analysis

**Proposed New MS: Applied Behavior Analysis**

This is a recommendation that the University Senate approve, for submission to the Board of Trustees, the establishment of a new MS degree: Applied Behavior Analysis, in the Department of Early Childhood, Special Education, and Rehabilitation Counseling within the College of Education.

Best-  
Margaret

-----  
Margaret J. Mohr-Schroeder, PhD | Associate Professor of Mathematics Education | [STEM PLUS Program Co-Chair](#)  
| [Department of STEM Education](#) | [University of Kentucky](#) | [www.margaretmohrschroeder.com](#)



**NEW MASTERS DEGREE PROGRAM FORM**  
**(Attach completed "Application to Classify Proposed Program"<sup>1</sup>)**

**GENERAL INFORMATION**

College:	Education	Department:	Early Childhood, Special Education, and Rehabilitation Counseling		
Major Name:	Applied Behavior Analysis	Degree Title:	Master of Science		
Formal Option(s):	N/A	Specialty Fields w/in Formal Option:	N/A		
Date of Contact with Associate Provost for Academic Administration <sup>1</sup> :		8/16/13			
Bulletin (yr & pgs):		CIP Code <sup>1</sup> :	42.2814	Today's Date:	3/25/2014
Accrediting Agency (if applicable):					
Requested Effective Date:		<input checked="" type="checkbox"/> Semester following approval.	OR	<input type="checkbox"/> Specific Date <sup>2</sup> :	
Dept. Contact Person:	R. Allan Allday	Phone:	257-0722	Email:	allan.allday@uky.edu

**CHANGE(S) IN PROGRAM REQUIREMENTS**

1.	Number of transfer credits allowed	9
	(Maximum is Graduate School limit of 9 hours or 25% of course work)	
2.	Residence requirement (if applicable)	No
3.	Language(s) and/or skill(s) required	N/A
4.	Termination criteria	Student must maintain a 3.0 GPA; if a student earns a second grade of C or lower, student may be dismissed from program.
5.	Plan A Degree Plan requirements <sup>3</sup> (thesis)	This is a Plan A degree; exit requirement will be a thesis.
6.	Plan B Degree Plan requirements <sup>3</sup> (non-thesis)	
7.	Distribution of course levels required	
	(At least one-half must be at 600+ level & two-thirds must be in organized courses.)	
8.	Required courses (if applicable)	EDS 601, EDS 603, EDS 612, EDS 614, EDS 615, EDS 616, EDS 630, EDS 633, EDS 660, EDS 661, EDS 662, EDS 663, EDS 748
9.	Required distribution of courses within program (if applicable)	Students are required to take 18 credit hours (five 3-hour courses: 601, 603, 612, 630, 633; three 1-hour courses 614, 615, 616), that will qualify them to sit for the examination to become a Board Certified Behavior Analyst. These courses prepare students with the practical (601, 603, 630), research (633), ethical (614, 615, 616) and applied skills (612) experiences to complete the work of a behavior analyst. Students will also be required to take 12 hours

<sup>1</sup> Prior to filling out this form, you MUST contact the Associate Provost for Academic Administration (APAA). If you do not know the CIP code, the APAA can provide you with that during the contact.

<sup>2</sup> Programs are typically made effective for the semester following approval. No changes will be made effective until all approvals are received.

<sup>3</sup> If there is only one plan for the degree, plans involving a thesis (or the equivalent in studio work, etc.) should be discussed under Plan A and those not involving a thesis should be discussed under Plan B.

## NEW MASTERS DEGREE PROGRAM FORM

		of credit toward a Graduate Certificate in Autism Spectrum Disorders (660, 661, 662, 663). Because many behavior analysts work with children with Autism Spectrum Disorders, the course sequence for the graduate certificate will provide a deeper understanding of Autism. Students will take 3-credits of Master's Thesis and have 3-credits of an elective (RC 520 or IEC 710). The electives were selected because behavior analysts have to work with other agencies. Rehabilitation Counselors and/or Early Childhood Education providers are common groups that behavior analysts would have to interact. The electives would provide a broad overview of these two professional fields.
10.	Final examination requirements	<p>The Masters in ABA program requires successful completion of 33 credit hours of coursework and successful defense of a 3-credit hour thesis. Candidates for the Masters in ABA will complete a thesis during their final semester of the program. A student must have satisfactorily completed 20 hours of coursework in order to begin the thesis. A student with an incomplete (I) will not be allowed to begin the thesis until the I has been removed from the student's transcripts. The thesis must include research that involves effects of academic or behavioral intervention on behavior change. The thesis will be assessed by the student's advisory committee and will be graded based on a pass/fail basis, as determined by evaluation rubric. Results of thesis defense will be submitted to the Graduate School by the student's advisory committee chair.</p> <p>A final examination is required of all master's students at the University of Kentucky. It is the student's responsibility to ensure all College and Graduate School requirements are met prior to completion of thesis.</p>
11.	Explain whether the proposed new program (as described in numbers 1 through 10) involve courses offered by another department/program. Routing Signature Log must include approval by faculty of additional department(s).	Each course offered in the new program are offered in the Department of Early Childhood, Special Education and Rehabilitation Counseling (EDSRC). There are no other programs offering courses that cover the topics. In addition the EDSRC is already approved by the Behavior Analyst Certification Board as an approved university to offer the course sequence that leads to certification as a behavior analyst.
12.	What is the rationale for the proposed new program?	

	<p>The field of behavior analysis has grown exponentially nationwide over the past 10 years. As the number of individuals with Autism Spectrum Disorders and children with challenging behavior have increased, there has been a need for professionals uniquely trained to support them and their families. The UK EDSRC has been approved by the Behavior Analyst Certification Board as an approved university to offer the course sequence. All of the BCBA coursework is currently taught in the EDSRC department, as is each course in the new master's degree in applied behavior analysis. Perhaps the greatest rationale for the program is that it does not require any additional faculty for the program. All of the coursework is currently being taught in load by tenure-track faculty. The new program would simply combine specific coursework together to form a specialized training in dealing with children and youth with challenging behaviors, Autism Spectrum Disorders, academic needs, and other needs that affect their functioning in society and school.</p>
--	--

**NEW MASTERS DEGREE PROGRAM FORM**

Currently, the master's programs that offer some of the courses for the BCBA in the EDSRC require teacher certification to enter the program. This eliminates many students who are interested in becoming a BCBA. The reason for the new master's degree is to provide an opportunity for students not seeking teacher certification to be able to complete a graduate degree while completing the requirements to sit for the BCBA examination. To date, there have been approximately 20 students turned away from UK because the current EDSRC programs require teacher certification.

This program will allow for recruitment of students from a variety of undergraduate majors. In addition, it will provide a depth of understanding in applied behavior analysis, managing challenging behaviors, autism spectrum disorders, working in schools, and working with parents and caregivers. Students from this program will be marketable in a variety of private and public entities. Currently, BCBAs are highly sought after by these various entities, so the employability of candidates of this program would be high.



**NEW MASTERS DEGREE PROGRAM FORM**

## Signature Routing Log

**General Information:**Program Name: Master of Science in Education, Applied Behavior AnalysisProposal Contact Person Name: R. Allan Allday Phone: 257-0722 Email: allan.allday@uky.edu**INSTRUCTIONS:**

Identify the groups or individuals reviewing the proposal; note the date of approval; offer a contact person for each entry; and obtain signature of person authorized to report approval.

**Internal College Approvals and Course Cross-listing Approvals:**

Reviewing Group	Date Approved	Contact Person (name/phone/email)	Signature
EDSRC Faculty	8.27.14	Margaret Bausch / 257-8810 / meb@email.uky.edu	
College of Education Courses and Curriculum		Doug Smith / 257-1824 / dcsmit1@uky.edu	
		/ /	
		/ /	
		/ /	

**External-to-College Approvals:**

Council	Date Approved	Signature	Approval of Revision <sup>4</sup>
Undergraduate Council			
Graduate Council			
Health Care Colleges Council			
Senate Council Approval		University Senate Approval	

Comments:

<sup>4</sup> Councils use this space to indicate approval of revisions made subsequent to that council's approval, if deemed necessary by the revising council.  
Rev 8/09

**Name of Program:** Master of Science in Education, Applied Behavior Analysis (MS in ABA)

**Academic Unit:** College of Education, Department of Early Childhood, Special Education,  
And Rehabilitation Counseling (EDSRC)

**Director of Graduate Studies:** Dr. Ralph Crystal

**Roster of Faculty of Record:**

R. Allan Allday, Ph.D., BCBA-D – Program Coordinator and Associate Professor

The Graduate Faculty of the Department of Early Childhood, Special Education and Rehabilitation Counseling will be the program faculty of record.

**Proposed new codes:** There will be no new codes needed because all courses are currently  
being offered.

**Admissions Criteria**

1. Applicants must hold a Bachelor's Degree in psychology, education, special education, social work, communication disorders, or a closely related field.
2. Applicants must have a minimum of a 3.0 undergraduate grade point average or a minimum of 3.25 graduate grade point average.
3. Applicants must take the Graduate Record Examination (GRE) and submit scores to the Graduate School; the Institution Code for the GRE for UK Graduate School is R1837. There are no specific GRE subtests required.
4. Applicants must secure three (3) letters of recommendations with one related to academic performance (e.g., from professor, advisor) and two related to the applicants work with children and youth (e.g., from practicum supervisor, research supervisor).
5. Applicants must submit a writing sample of a scholarly paper (e.g., research paper, literature review completed in APA formatting).
6. Applicants must participate in an interview with program faculty.
7. Upon acceptance, applicants must satisfactorily pass a criminal background check (due to the nature of the work performed by behavior analysts).

## **Rationale for Degree**

The field of applied behavior analysis has grown exponentially nationwide over the past 10 years. As the numbers of individuals with challenging behaviors (e.g., Autism Spectrum Disorders; ASD) have increased, there has been a need for professionals uniquely trained to support them in educational, familial, and vocational settings. Behavior analysts provide assessment, intervention and evaluation of challenging behaviors through the use of behavioral principles that should result in a meaningful change in the individuals social behavior(s).

The Behavior Analyst Certification Board (BACB) has acknowledged the Department of Early Childhood, Special Education, and Rehabilitation Counseling (EDSRC) as an approved university training site for the course sequence to sit for the Board Certified Behavior Analyst (BCBA) certification examination. All of the BCBA coursework is currently taught in the EDSRC department, as is each course in the new master's degree in applied behavior analysis. Perhaps the greatest rationale for the program is that it does not require any additional faculty for the program. All of the coursework is currently being taught in load by tenure-track faculty. The new program would simply combine specific courses together to form a specialized training in dealing with children, youth, and adults with challenging behaviors, academic needs, or other needs that affect their functioning in society and school.

Currently, the masters programs that offer some of the courses for the BCBA in the EDSRC require teacher certification to enter the program. This eliminates many students who are interested in becoming a BCBA. The reason for the new masters degree is to provide an opportunity for students not seeking teacher certification to be able to complete a graduate degree while fulfilling the requirements to sit for the BCBA examination. To date, there have been approximately 20 students turned away from UK because the current EDSRC programs require teacher certification. This program will allow for recruitment of students from a variety of undergraduate majors.

There is currently no master's degree in applied behavior analysis at any public university in Kentucky; however, a private institution (Spalding University) offers a similar degree. There are three (3) universities in Kentucky approved by the BACB (i.e., UK, University of Louisville, and Spalding University). Within the region, the following peer universities are permitted to offer BACB approved coursework: University of Cincinnati, Ohio State University, Vanderbilt University, Ball State University, West Virginia University, and University of Virginia. Of these, only University of Cincinnati and Ball State offers a master's degree in ABA.

The MS in ABA at UK will provide a depth of understanding in applied behavior analysis, managing challenging behaviors, ASD, working in schools, and working with parents and caregivers. Students from this program will be marketable in a variety of private and public entities. Currently, BCBA's are highly sought after by these entities. Each week several emails

from employers seeking BCBA's are sent by the BACB. In these emails, there are jobs listed across the U.S. and the world, so the employability of candidates of this program would be high.

### Student Learning Outcomes (SLO) and Assessments:

	Student Learning Outcomes	SLO Assessments
1	Students will demonstrate behavioral principles to improve academic and behavioral skills of individuals with challenging behaviors.	<ul style="list-style-type: none"> <li>a. Rubric assessment for Behavior Change Project</li> <li>b. Practicum Supervision Evaluation Form addressing BACB 4<sup>th</sup> Edition Task List Subsections D, E, and F</li> <li>c. Successful completion of thesis</li> </ul>
2	Students will demonstrate assessment, intervention, and evaluation techniques for working with individuals with challenging behaviors.	<ul style="list-style-type: none"> <li>a. Practicum Supervision Evaluation Form addressing BACB 4<sup>th</sup> Edition Task List Subsections A, D, E, G, H, I</li> <li>b. Practicum evaluations from client representatives (i.e., school or parent)</li> </ul>
3	Students will demonstrate ethical principles for behavior analysts in providing behavior services.	<ul style="list-style-type: none"> <li>a. Passing score (&gt;90% correct) on exam covering BACB Guidelines for Responsible Conduct for Behavior Analysts</li> <li>b. Practicum evaluations from client representatives (i.e., school or parent)</li> <li>c. Successful completion of thesis (i.e., IRB compliance)</li> </ul>
4	Students will demonstrate behavioral consultation techniques for working with teachers, parents, and caregivers of individuals with behavioral challenges.	<ul style="list-style-type: none"> <li>a. Rubric assessment for Functional Behavioral Assessment Project</li> <li>b. Practicum Supervision Evaluation Form addressing BACB 4<sup>th</sup> Edition Task List Subsections A, D, G, J</li> <li>c. Practicum evaluations from client representatives (i.e., school or parent)</li> </ul>
5	Students will demonstrate research methodologies that can result in behavior change.	<ul style="list-style-type: none"> <li>a. Successful completion of thesis</li> <li>b. Completion and submission for publication of one (1) single subject research project</li> </ul>
6	Students will demonstrate effective written and oral communication to relay behavior analytic information to teachers, parents, caregivers, and individuals with challenging	<ul style="list-style-type: none"> <li>a. Rubric Assessment of Behavior Intervention Plan project.</li> <li>b. Practicum Supervision Evaluation Form addressing BACB 4<sup>th</sup> Edition Task List</li> </ul>

	behaviors.	Subsections C, K c. Successful completion of thesis
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Other Program Assessments:

This program will be directly and indirectly assessed through a variety of methods. Direct Assessments will include (a) Application and acceptance rates to show demand and access; (b) Number of students successfully completing coursework and thesis to show completion rates; (c) Course evaluations to show effectiveness of coursework; and (d) Practicum evaluations to show effectiveness of students in employing behavior analytic skills in applied settings.

Indirect Assessments will include (a) Passing rates of BCBA examination to show effectiveness of program at meeting certification requirements; (b) Program surveys for completers to show strengths and weaknesses of program curriculum and processes; and (c) Advisory committee of practitioners to ensure program is meeting practical guidelines of daily practice in behavior analysis.

### Coursework

Course #	Course Title	Credit Hours
BCBA-Approved Courses – 18 Credit Hours		
EDS 601	Applied Behavior Analysis	3
EDS 603	Behavioral Consultation in Schools	3
EDS 630	Advanced Methods for Teaching Students with Disabilities	3
EDS 633	Single Subject Research Design	3
EDS 612	Advanced Practicum in Special Education (taken for 1 credit hour for 3 consecutive semesters)	3
EDS 614*	Professional Ethics for Behavior Analysts I	1
EDS 615*	Professional Ethics for Behavior Analysts II	1
EDS 616*	Professional Ethics for Behavior Analysts III	1
Autism Certificate Courses – 12 Credit Hours		
EDS 660	Overview of Characteristics and Instructional Strategies for Individuals with ASD	3
EDS 661	Advanced Instructional Strategies for ASD	3
EDS 662	Communication, AAC, and Technology for Individuals with ASD	3
EDS 663	Institute for Serving Individuals with ASD	3
Approved Electives – 3 Credit Hours		
RC 520	Principles of Rehabilitation Counseling	3
IEC 710	Advanced Instructional Methods in Interdisciplinary Early Childhood Education	3
Thesis – 3 Credit Hours		
EDS 748	Master's Thesis Research	3
<b>Total Hours</b>		<b>36</b>

\*Course approved by College of Education Courses and Curriculum Committee and Graduate Council as of 8.14

**From:** Schroeder, Margaret <m.mohr@uky.edu>  
**Sent:** Tuesday, February 03, 2015 9:07 AM  
**To:** Brothers, Sheila C  
**Subject:** Proposed New Dual Degree Program: PhD in Plant Pathology with Universidade Federal de Vicosa

**Proposed New Dual Degree Program: PhD in Plant Pathology with Universidade Federal de Vicosa**

This is a recommendation that the University Senate approve, for submission to the Board of Trustees, the establishment of a new Dual Degree Program: PhD in Plant Pathology with Universidade Federal de Vicosa, in the Department of Plant Pathology within the College of Agriculture, Food, and Environment.

Best-

Margaret

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Margaret J. Mohr-Schroeder, PhD | Associate Professor of Mathematics Education | [STEM PLUS Program Co-Chair](#)  
| [Department of STEM Education](#) | [University of Kentucky](#) | [www.margaretmohrschroeder.com](#)



**UK**  
UNIVERSITY OF  
**KENTUCKY**  
College of Agriculture,  
Food and Environment

RECEIVED

NOV 26 2014

OFFICE OF THE  
SENATE COUNCIL

Department of Plant Pathology  
University of Kentucky  
201F Plant Science Building  
1405 Veterans Drive  
Lexington, KY 40546

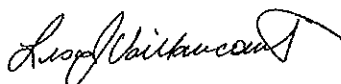
October 13, 2014

Dear Colleagues,

This is a proposal for a dual degree program between the University of Kentucky (UK) Department of Plant Pathology and the Departamento de Fitopatologia at the Universidade Federal de Viçosa (UFV) in Brazil. Both are ranked among the top five similar departments in their respective countries. Students in the dual degree program will earn Doctoral degrees in Plant Pathology from both institutions by simultaneously completing the requirements of both programs. The advantages to the students include the unique ability to obtain advanced practical training and to develop cultural and language fluency in both the United States and Brazil, while the advantages to our respective departments include the ability to recruit academically superior students from both countries, and facilitation of research collaborations to focus on plant disease problems of mutual interest. Our departmental strengths are complementary, with UK specializing in the molecular and cellular biology of plant-microbe interactions, and UFV focused primarily on applied pathology and sustainable approaches to plant disease management. The participating faculty at UFV are fluent in English, and received their higher educations primarily in the US and Europe so they are uniquely suited for this type of collaborative educational endeavor.

To my knowledge, this is the first dual degree proposal at UK. Given this, we anticipate that there may be many questions. We have spent the past several years in continuous discussion with our colleagues at UK and at UFV, as well as with representatives of the UK Graduate School and also the UK International Center, and we hope at this point that we have addressed all of the major issues and obstacles. We are willing to listen to any questions or concerns, and hope sincerely that you will be able to help us to address them expeditiously, so that this proposal can become a reality. Having this program in place will put UK at the forefront of a new revolution in the internationalization of higher education. Already UFV has many such agreements with European universities, but so far there have been none brought to fruition with a US university. I sincerely hope that UK can be the first. Thank you for your attention to the enclosed document.

With best regards  
Lisa Vaillancourt



Professor of Plant Pathology  
Director of Graduate Studies



## **DUAL DOCTORAL DEGREE IN PLANT PATHOLOGY BETWEEN THE UNIVERSITY OF KENTUCKY AND THE UNIVERSIDADE FEDERAL DE VIÇOSA**

### **Program Goal**

This is a proposal for a dual Doctoral degree program between the University of Kentucky (UK) and the Universidade Federal de Viçosa (UFV) in Brazil. Students will acquire academic credits and develop part of the research for their Doctoral dissertations at the partner university. A stay of at least 12 consecutive months at the partner university will be required for the program. Students in the program will obtain Doctoral degrees in Plant Pathology from both UK and UFV. Students in the program will develop language skills in English and Portuguese, and become familiar with norms of the discipline in both countries. Students will fulfill the academic requirements of both institutions in order to obtain degrees from both. The goal is to prepare students to work across borders, in academic, government, or industry settings. Graduates of the program will be able to leverage resources from both countries to solve problems of mutual interest at the highest level.

### **Background and Rationale**

Diseases of plants cause significant crop losses worldwide. Many plant diseases are cosmopolitan in their distribution, and many others are introduced to new regions and initiate epidemics each year. Plant Pathology (the study and management of plant disease) is, consequently, a global activity, and graduate education in this discipline should promote the development of a workforce that is diverse and globally-engaged. Employees that can function effectively across borders are in demand by business, academia, and government agencies. Graduate Plant Pathology programs in the United States (U.S.) attract talented students from all over the world. Fluency in English is an important goal for these international students, because English is the international language of science, and most scientists at the top levels are expected to communicate and publish in English and to follow the norms of scientific practice and inquiry that are emphasized in U.S. graduate programs. The participation of international students in U.S. Plant Pathology graduate programs certainly helps their U.S. counterparts to develop an expanded worldview. However, the U.S. graduate students typically have few opportunities to engage in the extended periods of study abroad that are necessary to develop practical fluency in another language and culture. Our goal is to strengthen and deepen the educational experiences of both U.S. and Brazilian Plant Pathology graduate students by instituting this dual degree program.

Brazil is a major agricultural producer and international supplier of agricultural commodities. It also represents a huge market for U.S. agricultural products and technology. Brazil is one of the rapidly growing BRIC economies, and it has invested heavily in biotechnological innovation, including in the area of biofuels where it is a recognized world leader. Most of the major multinational agricultural corporations have significant presences in Brazil, and the U.S. government is increasingly involved in partnerships with the country to promote our common interests. Brazil has an active research community working in support of its agricultural enterprise. The state sponsored universities and research institutes are extremely well equipped and staffed with a highly educated workforce. Brazil is a geographically, culturally, and economically diverse country that offers a unique international experience for U.S. students. Educational exchanges are likely to be mutually beneficial for U.S. and Brazilian researchers, and to lead to faster progress in solving problems of mutual interest.

UFV was established in 1926 based on the U.S. land grant college model, and its educational system is similar to that of U.S. universities. Its first president was Dr. Peter Henry Rolfs, originally from the University of Florida, who established UFV's long tradition of collaboration with international institutions. UFV has played a major role in the development of Brazilian agriculture. It has trained several generations of plant and agricultural scientists now working at other universities and at Embrapa, Brazil's largest agricultural research institution. UFV is consistently ranked as one of the top agricultural schools in Brazil. Furthermore, UFV provides a welcoming environment for international students: students from dozens of countries in North and South America, Europe, and Asia study there each year. UK already has an extensive history of collaboration with UFV, and the UK International Center recently selected UFV as one of only nine foreign universities worldwide, and the only one in the Western hemisphere, to be a key partner in future internationalization initiatives. In addition to individual faculty research collaborations that have included graduate student visits of up to one year in duration and visiting faculty exchanges, undergraduate students from the Department of Biosystems and Agricultural Engineering (BAE) at UK have been traveling to UFV for nearly a decade to take classes and to obtain cultural exposure during a semester abroad. Their experience has been uniformly excellent.

The Department of Plant Pathology (Departamento de Fitopatologia) at UFV consists of 18 faculty members engaged in a broad range of basic and applied research (<http://www.dfp.ufv.br/>). The faculty has an excellent international reputation, and a collective research focus on disease management, particularly via sustainable methods e.g. biological control. Abbreviated CVs for faculty who would be involved in the dual degree program are included in **APPENDIX 1**. Note that most of the faculty earned their Ph.D. degree at a U.S. or European university, and all

participating faculty have research experience in the U.S. or Europe and are fluent in English. The department is housed in a modern building on the UFV campus that is well equipped for all types of research, including access to some facilities (e.g. an electron microscopy unit) that Plant Pathology researchers at UK lack. The curriculum offered by the department is very traditional, including foundational laboratory courses (i.e. applied plant mycology, nematology, virology, and bacteriology) that have been discontinued (primarily due to limitations in funds and teaching lab space) at UK and many other U.S. universities. These laboratories offer an opportunity for our dual degree students to obtain a level of practical training in Plant Pathology that is currently unavailable at UK.

The Department of Plant Pathology at UK has consistently been ranked among the top five departments for Plant Pathology research in the United States (<http://www2.ca.uky.edu/agcollege/plantpathology/index.html>). It is a relatively small department (11 faculty members), split between basic research and extension. Both groups participate in graduate teaching. Coursework in the department is focused on developing critical thinking, research, and communication skills. The research faculty members are internationally known for their basic studies of the mechanisms of plant-microbe interactions, and they attract talented graduate students from all over the world. The outstanding extension faculty members are engaged mostly in applied disease management research that is focused on the needs of Kentucky growers, and some of them have extensive international experience in their own right. Their ability to advise graduate students is limited because their extension duties require significant amounts of travel and time devoted to grower and agent training. As a result, the department currently serves students interested in basic molecular or cellular research extremely well, but it is not as well equipped for students who are more interested in applied research and disease management.

These two strong departments complement one another very well in their respective strengths and resources. The dual degree student would be able to draw on the particular strengths of both in order to obtain a well-rounded education in Plant Pathology, as well as a working familiarity with a broad range of crops and diseases, and with both cultures and languages. We anticipate that graduates of this program would be highly competitive for jobs in both the U.S. and Brazil.

## **Curriculum**

The recommended core curriculum for the dual degree program provides a rigorous and comprehensive education in both basic and applied Plant Pathology, with an emphasis on critical thinking, communication, and research methodologies. Brazilian students will be required to have an M.S. degree in Plant Pathology before entering the program (this is already the requirement for

entering Ph.D. students there). M.S. programs in Plant Pathology are rare in the U.S. and more than 95% of our domestic students come directly to our program from an undergraduate major in one of the natural sciences. Thus, an M.S. will not be required for the U.S. students. As a result, courses other than the core will vary somewhat for each student in the program. Additionally, individual dissertation advisory committees may choose (by majority vote) to waive some of these core requirements and replace them with other courses, if that seems to fit the student's background and goals better.

**Core Courses for the Dual Degree: 24-25 hours** (PPA are courses at UK, FIP are courses at UFV). Syllabi for these courses are included in **APPENDIX 2**.

Population Biology (1-3 credits) (PPA 641 (1 credit<sup>1</sup>) **OR**<sup>2</sup> FIP 680 (3 credits)

Disease Diagnosis (3 credits) (PPA 640)

Critical Research Methods (3 credits<sup>3</sup>) (PPA 600)

Physiology of Plant Health and Disease (3-4 credits) (FIP 701, **OR**<sup>2</sup> PPA 500 (3) **and** PPA 673 (1))

Mycology (3 credits) (FIP 610<sup>4</sup>)

Bacteriology (3 credits) (FIP 640<sup>4</sup>)

Virology (3 credits) (FIP 630<sup>4</sup>)

Nematology (3 credits) (FIP 620)

Seminar (1 credit) (PPA 799)

A three-credit statistics course is a pre-requisite to the program, and can be taken concurrently.

1. The PPA course is currently listed at only one credit, based on class-meeting time per week, **HOWEVER**, it includes a substantial amount of work that is done outside the regular class period, and after review, UFV faculty agreed that it is equivalent in depth of coverage to FIP 680. An application will be made in the near future to increase the credits for this course.
2. After review by both UK and UFV Plant Pathology faculty, these courses or course combinations have been accepted as equivalent.
3. This course is currently listed at 2 credits but an application will be made in the near future to increase it to 3 credits, because of the significant amount of independent work it requires outside of class.
4. There are three courses that are currently offered for the UK degree (at least two of the three are required) that were not considered equivalent by UFV for their degree, because they do not include laboratories. These courses are PPA 650 (Mycology), PPA 670 (Plant Bacteriology) and PPA 671 (Advanced Plant Virology). The corresponding UFV courses (FIP 610, 630, and 640) contain similar lecture material **PLUS** laboratory exercises, and thus we consider them to be acceptable substitutes for our own courses in these areas for the dual degree students. Because our degree is a more research-intensive degree than the typical UFV (non-dual) degree, our **non-dual** degree students are able to obtain sufficient laboratory experience and training during the process of conducting their dissertation research.

Typical (existing) program for a **non-dual degree** U.S. student entering with a B.S. in Plant Science:

Yr:Semester	1:1	1:2	2:1	2:2	3:1	3:2	4:1	4:2
Classes	PPA 400G <sup>1</sup>	PPA 600	PPA 640	PPA 650	Electives	QUALS	PPA 767	PPA 767
	PPA 500	PPA 794	PPA 641	PPA 670 OR PPA 671	PPA 794	PPA 767		
	PPA 794	PPA 799	PPA 673	PPA 794				
			PPA 794					
Total Graduate Credit	6	9	9	9	9	2	2	2

1. If the student has taken a Plant Pathology course previously they will not need to take PPA 400G. PPA 400G does not count toward the total required credits for the PhD degree.

An example of the program for a U.S. student entering the **dual degree** program with a B.S. in Plant Science. Shaded boxes indicate time spent at UFV.

Yr:Semester	1:1	1:2	2:1	2:2 <sup>3</sup>	3:1	3:2	4:1	4:2
Classes	PPA 400G <sup>1</sup>	PPA 600	PPA 640	FIP 630	FIP 610	QUALS	PPA 767 <sup>6</sup>	PPA 767
	PPA 500	A&S 103 <sup>2</sup>	PPA 641	FIP 640	FIP 620	PPA 767		
	PPA 794	PPA 794	PPA 673	PPA 794 <sup>4</sup>	PPA 794			
		PPA 799	A&S 104 <sup>2</sup>					
			PPA 794					
Total Graduate Credit	6	9	9	9 <sup>5</sup>	9	2	2	2

1. If the student has taken a Plant Pathology course previously they will not need to take PPA 400G. PPA 400G does not count toward the total required credits for the PhD degree.
2. Portuguese levels 1 and 2: These courses are currently being offered by the Department of Hispanic Studies on a trial basis. In addition to taking these courses if available, the students will improve their conversational abilities by engaging with their visiting Brazilian counterparts in the dual degree program. If the courses are not available, the students would benefit from taking Spanish language courses instead.
3. The student will enroll in a noncredit six-week intensive Portuguese course upon arrival in Brazil in January.
4. PPA 794 is Dissertation Research. The student will receive credit for this course based on their independent research performed in the host laboratory. This research will be part of a collaborative project between the host laboratory and the student's home laboratory, and will comprise part of the student's dissertation.
5. Nine credits for the FIP courses will be transferred, the maximum allowable.
6. Post-qualifying research credit.

Typical (existing) program for a **non-dual degree** Brazilian student entering UFV with a M.S. in Plant Pathology: **Guidelines for the Ph.D. degree at UFV are included in APPENDIX 3.**

Yr:Semester	1:1	1:2	2:1	2:2	3:1	3:2	4:1	4:2
Classes	FIP 701	FIP 630	FIP 610	PPA 680	FIP 797 <sup>4</sup>	QUALS	Research	Research
	FIP 603 <sup>2</sup>	FIP 640	FIP 620	FIP 704 <sup>3</sup>	Research <sup>5</sup>	Research		
Total Graduate Credit	8	6	6	6	2	0	0	0

1. A total of at least 24 credits is required for completion of the degree at UFV for a student who enters with an M.S. (APPENDIX 3).
2. FIP 603: Clinica de Doencas de Plantas, Plant Disease Clinic (Disease Diagnosis).
3. FIP 704: Metodos em Fitopatologia Molecular (Methods in Molecular Phytopathology). This class covers techniques that are also discussed in PPA 660, but with much less emphasis on critical analysis of publications.
4. Student seminar. Analogous to our PPA 799.
5. Dissertation research. Not associated with a course number and not awarded credits at UFV. Analogous to our PPA 794 and PPA 767.

An example of the **dual degree** program for a Brazilian student<sup>1</sup>. Shaded boxes indicate time spent at UK.

Yr:Semester	1:1	1:2	2:1	2:2	3:1	3:2	4:1	4:2
Classes	FIP 701	FIP 630	FIP 610	PPA 600	PPA 640	QUALS	PPA 749	Research
	PPA 680	FIP 640	FIP 620	PPA 794	PPA 794	PPA 767		PPA 767
				Elective	PPA 799	Research		
Credit				9 UK credit	9 UK credit	2 UK credit	0 UK credit	2 UK credit

1. UFV students will be required to have completed a M.S. before beginning the dual degree Doctoral program. This will substitute for one year of the required pre-qualifying residency for the UK degree. Prior to coming to UK they would need to achieve a score of 79 or higher on the TOEFL.

### Student Learning Outcomes for the Dual Degree

1. Students will demonstrate technical mastery of the core information and principles of the discipline, including essential factual information, historical context, current literature and issues, practical applications, and professional ethics.
2. Students will demonstrate abilities to think critically, solve problems, work collaboratively, use technology (including information technology) effectively, and develop and carry out high quality, hypothesis driven research.

3. Students will demonstrate mastery of oral and written scientific communication in English.

### Student Learning Outcomes As Addressed in Core Courses

<b>Title</b>	<b>Course</b>	<b>Objective</b>
Population Biology	PPA 641, OR FIP 680	Describe how plants and associated microorganisms behave and evolve in populations, including concepts of selection and gene flow. <b>1,2</b>
Disease Diagnosis	PPA 640	Be able to diagnose diseases caused by major groups of pathogens including fungi, viruses, bacteria, nematodes, and abiotic causes, using the scientific method. <b>1,2,3</b>
Critical Research Methods	PPA 600	Be able to access information from the literature, and critically evaluate and apply that information. Be able to design statistically valid experiments and interpret the data from those experiments. Be able to write persuasively and make logically sound arguments in scientific papers in English. <b>1,2,3</b>
Physiology of Plant Health and Disease	PPA 500 and PPA 673, OR FIP 701	Explain and predict how disease affects the normal physiology of the host plant. Describe the genetics and physiology of plant resistance to pathogens, and predict the performance of resistance sources over time when they are deployed in the field. <b>1,2</b>
Mycology	FIP 610	Be able to identify major groups of fungi in culture and/or <i>in planta</i> , describe the major types of diseases caused by fungi, explain how fungal life cycles and structures relate to their pathogenicity to plants and to disease management. <b>1,2</b>
Bacteriology	FIP 640	Be able to identify major groups of bacteria in culture and/or <i>in planta</i> , describe the major types of diseases caused by bacteria, explain how bacterial life cycles, traits and behaviors relate to their pathogenicity to plants and to disease management. <b>1,2</b>
Nematology	FIP 630	Be able to identify major groups of plant-pathogenic nematodes. Describe the major types of diseases caused by nematodes, explain how nematode life cycles, traits, and behaviors relate to their pathogenicity to plants and to disease management. <b>1,2</b>
Virology	FIP 620	Be able to identify major groups of viruses, describe the major types of diseases caused by viruses, explain how viral traits and behaviors relate to their pathogenicity to plants and to disease management. <b>1,2</b>
Seminar	PPA 799	Display oral communication skills in the English language, including organization and presentation of background information and research findings, and delivery of a logical, evidence-based argument. <b>1,2,3</b>

Research	PPA 794	Develop and carry out high quality, hypothesis driven research. <b>1,2,3</b>
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### **Doctoral Advisory Committee**

The doctoral advisory committee will include one or more members from the partner institution, who will host the student in their laboratory(s) during their exchange. The student will have annual committee meetings, with all committee members attending either in person or via the internet, e.g. Skype. During the first committee meeting, a plan of coursework and travel will be presented, as well as a general overview of the research to be undertaken. For the second committee meeting, the student will prepare a literature review (in English) that will eventually form the first chapter of their dissertation. UFV faculty members who participate on these joint advisory committees will be added to the faculty roster of the UK Graduate School, after their credentials have been verified accordingly. Likewise, UK faculty participating in the dual degree program will be designated as adjunct faculty of UFV in accordance with their established process. This has already been successfully achieved for several faculty in Biosystems and Agricultural Engineering from UFV and from UK.

### **Graduate Degree Requirements**

#### *Qualifying Examination*

Each student will be required to pass a written and an oral qualifying examination before he or she may be admitted to candidacy for the dual doctoral degree. The existing process for the qualifying examination at both institutions is similar. The qualifying examination for the dual degree students will be administered jointly by all the members of the student's advisory committee, and will take place in the student's home department. The qualifying examination will emphasize knowledge in the discipline contained within the core courses, as well as critical thinking and logic, and oral and written communication. Members of the committee from the partner institution will attend the oral examination in person, if possible, but if not possible they may attend the examination via Skype or similar electronic means. The examination will be given primarily in English, although it will be permissible for Brazilian committee members to translate questions and answers for the Brazilian students and for the UK professors participating, as necessary, to ensure that the questions and answers are clear to all parties.



*Doctoral Dissertation*

Each student must write a dissertation based on original research. It is anticipated that dual degree students will be involved in joint research projects between laboratories at both universities. Thus, some of the work for the dissertation will be completed at the partner university and some at the home university. The dissertation will be written in English, with summaries written in both English and Portuguese. The dissertation will be defended at the home institution, in the presence of all members of the joint advisory committee, and it must meet or exceed the usual expectations for dissertations, in terms of both quantity and quality of research, at both institutions. Members of the committee from the partner institution will attend in person, if possible, but if not possible they may attend the examination via Skype or similar electronic means. For Brazilian students defending in Brazil, UK will appoint an outside examiner, consistent with UK Graduate School policy, and the outside examiner may also attend the examination via Skype or similar electronic means. All students will be expected to defend their dissertation in English.

It may not be clear why the dissertation should be written and defended in English, which seems to disadvantage the Brazilian students relative to the U.S. students. This is because an important goal of the dual degree program is to have the Brazilian students develop their skills in English to a level that is sufficient to engage readily in both oral and written scholarly communication in our discipline. English is the international language of science, and it will be very important and advantageous for the Brazilian students to have the high level of English language skill that is demonstrated by writing their dissertation and defending it in English. The Department of Plant Pathology at UFV has already been moving in the direction of having all their students write their dissertations in English. Since all of the participating UFV faculty members have an excellent command of the English language, this will not be a problem. Although it would be desirable for the U.S. students to achieve a similar level of ability in Portuguese, this will not be a requirement of the degree. Some of the U.S. students may already have Portuguese, or more commonly Spanish language skills, when enrolling. They will take one or more introductory Portuguese language courses at UK if these are available (there are two, A&S 103 and A&S 104, currently being offered on a trial basis through the Department of Hispanic Studies). UFV also offers a noncredit six-week “immersion” course in the Portuguese language and Brazilian culture for all new international students each January. The dual degree U.S. students will be required to take this class when they arrive in Brazil for their 12-month exchange. The U.S. students at UFV will be permitted to conduct all of their formal course assessments (tests, written papers) in English (confirmed by the letter from the UFV Director of Graduate Studies, **APPENDIX 4**). Because the participating faculty and many of the Brazilian graduate students speak English well, we don’t anticipate that our U.S. students will

have significant language difficulties with their class or laboratory work. Even a relatively modest level of language proficiency achieved by our U.S. students will be highly advantageous when competing for jobs that involve travel to Brazil and/or collaboration with Brazilian counterparts.

The U.S. and Brazilian dual degree students will fulfill all of the existing requirements for the Plant Pathology degree at UK. These requirements include: completion of four residency semesters prequalifying and two residency semesters postqualifying; successful completion of all core course requirements (unless waived by the student's committee); passing a written and oral qualifying examination, presentation of three seminars, one of which will be graded as PPA 799; and completion and defense of a dissertation based on original independent research. U.S. students will transfer a total of 9 credits from UFV toward their degree. According to Graduate School regulations, up to 25% of the total pre-qualifying credits earned can be transferred. As UK allows, the M.S. will replace two of the four prequalifying semesters for the Brazilian students. Brazilian students will obtain the other two prequalifying semesters during their stay at UK. They will do one of their three required seminars, in English, during their stay at UK. This is the seminar that will be graded for the required PPA 799 course. They will do the other two seminars (one of which will be their exit seminar) in Brazil, and these seminars will be broadcast over the internet so that all committee members and interested department members at UK can attend. Their final seminar will be in English, but the first seminar could be in either Portuguese or English. Brazilian students will register in absentia for at least two postqualifying semesters of PPA 767, including the semester they take their qualifying exams and the semester they defend, and they will register in PPA 749 for 0 credits for the remainder so that they will not need to pay tuition. In Brazil, students are fully supported by the government for up to four years and they attend school tuition-free during that time. Unlike UK, UFV does not have specific residency requirements. UFV will consider that the U.S. students have met their requirements for their Doctoral degree if they complete the core courses (unless waived by the student's committee), and complete and defend a dissertation based on original independent research.

With the exception of the transfer courses, and the co-supervision of doctoral theses, the program of study for Brazilian students at UK contains exactly the same elements as for current doctoral students in Plant Pathology who enter with a Masters degree or the equivalent.

### **Additional procedures, requirements and policies**

#### *Selection procedures*

Admission requirements for each university will be the same as those for regular (non-dual degree) students. Brazilian students will be required to have a M.S. in Plant Pathology or a related discipline before embarking on Doctoral studies. Most U.S. students probably will not have a M.S., as this is less common in the U.S. English proficiency will be required for Brazilian candidates, who will need to receive a score of 79 or higher on the Test of English as a Foreign Language (TOEFL) in order to enroll in the UK graduate program. A similar level of Portuguese proficiency is not required by UFV for U.S. candidates, but these candidates would be expected to enroll in Portuguese language classes at UK, if available, (e.g. A&S 103, 104), and spend some time improving their conversational abilities with their Brazilian dual degree colleagues and by self-study prior to traveling to Brazil. Once in Brazil, the U.S. students will be required to enroll in the accelerated language course offered for all international students by that University.

#### *Attendance at the partner university*

Each student must spend at least one continuous year (12 months) of their program at the partner institution prior to their qualifying examinations. During this year they will engage in a combination of course work and research. The research will usually be part of their dissertation research. Students may also travel to the other country for shorter periods post-qualifying, as funds allow, in order to perform parts of their own research in a field or lab setting there.

It is anticipated that the majority of students in the program will be involved in joint research projects between labs at UK and UFV. There are many areas of potential collaboration between the respective faculties, and various sources of funding from U.S. and Brazilian agencies that could be applied for. In this regard, it is important to point out that plant diseases that are common in Brazil, with its much greater diversity of climates, biodiversity, and cropping systems, have the potential to seriously impact U.S. agriculture if they are introduced here. One good example is soybean rust, which has been a serious problem in Brazil for many years before it was introduced to the southern U.S. Another example is wheat blast, which is causing significant damage in Brazil currently and was detected in the U.S. for the first time right here in Kentucky last year. U.S. funding agencies or private companies should be willing to fund joint research if it involves pathogens that are currently present in Brazil and that threaten U.S. agriculture in the future. It is hoped that the presence of the dual degree program will result in increased levels of research funding for both institutions from both governments.

**APPENDIX 1**

Abbreviated CVs (in English) of UFV Faculty who would be involved in the dual degree.

List of Faculty:

Robert Weingart Barreto  
Sérgio Hermínio Brommonschenkel  
Claudine Márcia de Carvalho  
Leandro Grassi de Freitas  
Eduardo Seiti Gomide Mizubuti  
José Rogério de Oliveira  
Emerson Medeiros del Ponte  
Fabrício de Ávila Rodrigues  
Francisco Murilo Zerbini Júnior

## *Curriculum Vitae*

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### **Robert Weingart Barreto**

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### **Education and Training**

M.Sc. In Pure and Applied Taxonomy, University of Reading, Berkshire, U.K., 1986

Ph.D., Botany, University of Reading, Berkshire, U.K., 1996

Post Ph.D, Centraalbureau voor Schimmelcultures, Utrecht, NL, 2011

### **Publications in Refereed Journals (from 2010 to 2014)**

Coutinho FMF, Macedo DM, Barreto RW (2014) First report of gray mold (*Amphobotrys ricini*) on copperleaf (*Acalypha wilkesiana*) in Brazil. *Plant Disease* 98:276-276.

Miranda BC, Cardoso A, Barreto RW (2014). First Report of *Rhizoctonia solani* AG-1-IB causing leaf blight of sorrel (*Rumex acetosa*) in Brazil. *Plant Disease* 98:278-278.

Duarte LL, Choi Y-J, Soares DJ, Barreto RW (2014) *Plasmopara invertifolia* sp. nov. causing downy mildew on *Helichrysum bracteatum* (Asteraceae). *Mycological Progress* 13:285-289.

Guatimosim E, Pinto HJ, Barreto RW, Prado J (2014) *Rhagadolobiosis*, a new genus of Parmulariaceae from Brazil with a description of the ontogeny of its ascospores. *Mycologia* 106:276-281.

Colman A, Silva RA, Alves R, Silva M, Barreto RW (2014) First report of causing leaf spots on in Brazil. *Plant Disease* 98:849-849.

Guatimosim E, Schwartsburd PB, Barreto RW (2014) A new *Inocyclus* species (Parmulariaceae) on the neotropical fern *Pleopeltis astrolepis*. *IMA Fungus* 5:51-55.

Colman A, Macedo DM, Barreto RW (2014) First report of downy mildew (*Hyaloperonospora lunariae*) on white mustard (*Sinapis alba*) in Brazil. *Plant Disease* 98:1007-1007.

Lima RD, Santin AM, Seni DJ, Dietrich A, Salazar LA, Subbotin AS, Mundo-Ocampo M, Goldenberg R, Barreto RW (2013) *Ditylenchus gallaeformans* sp. n. (Tylenchida: Anguinidae) a neotropical nematode with biocontrol potential against weedy Melastomataceae. *Nematology* 15:179-196.

## *Curriculum Vitae*

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### **Sérgio Hermínio Brommonschenkel**

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### **Education and Training**

B.A., Agronomy, Viçosa Federal University, 1984

M.Sc. Plant Pathology, Viçosa Federal University, 1988

Ph.D., Plant Breeding and Genetics, Cornell University, Cornell, U.S.A., 1995

### **Publications in Refereed Journals (from 2010 to 2014)**

Myburg AA, Grattapaglia D, Tuskan GA, Hellsten U, Hayes RD, Grimwood J, Jenkins J, Lindquist E, Tice H, Bauer D, Goodstein DM, Dubchak I, Poliakov A, Mizrachi E, Kullán ARK, Hussey SG, Pinard D, Merwe KV-D, Singh P, Jaarsveld IV, Silva-Junior OB, Togawa RC, Pappas MR, Faria DA, Sansaloni CP, Petroli CD, Yang X, Ranjan P, Tschaplinski TJ, Ye C-Y, *et al.* (2014) The genome of *Eucalyptus grandis*. *Nature* 510:356-362.

Pereira JF, Almeida APMM, Cota J, Pamphile JÁ, Ferreira-Silva G, Araujo EF, Gramacho KP, Brommonschenkel SH, Pereira GAG, Queiroz MV (2012) Boto, a class II transposon in *Moniliophthora perniciosa*, is the first representative of the PIF/Harbinger superfamily in a phytopathogenic fungus. *Microbiology* 159:112-125.

Alves AA, Faria DA, Grattapaglia D, Alfenas AC, Lau D, Guimarães, LMS, Brommonschenkel SH, Rosado CCG (2011) Genetic mapping provides evidence for the role of additive and non-additive QTLs in the response of inter-specific hybrids of *Eucalyptus* to *Puccinia psidii* rust infection. *Euphytica* 183:27-38.

Ruiz JCD, Silva V, Ali A, Pinto A, Santos AC, Rocha AR, Lopes AAMC, Dorella DO, Pacheco FA, Costa LGC, Turk MP, Seyffert MZ, Moraes N, Soares PMRO, Almeida SC, Castro SS, Abreu TLP, Trost VAC, Baumbach E, Tauch J, Schneider A, McCulloch MPC, Cerdeira J, Ramos LT, Rommel TJ, *et al.* (2011) Evidence for reductive genome evolution and lateral acquisition of virulence functions in two *Corynebacterium pseudotuberculosis* strains. *Plos One* 6:e18551.

Lourenço-Junior, V, Rodrigues TTMS, Campos AMD, Bragança CAD, Scheuermann KK, Reis A, Brommonschenkel SH, Maffia LA, Mizubuti ESG (2011) Genetic structure of the population of *Alternaria solani* in Brazil. *Journal of Phytopathology* 159:233-240.

## *Curriculum Vitae*

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### **Claudine Márcia de Carvalho**

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### **Education and Training**

B.A., Agronomy, Lavras Federal University, 1997  
M.Sc. Plant Pathology, Lavras Federal University, 1999  
Ph.D., Plant Virology, Wageningen University, Wageningen, NL, 2003  
Post Ph.D., Oxford Brookes University, Brookes, U.K., 2006  
Post Ph.D., Viçosa Federal University, 2008

### **Publications in Refereed Journals (from 2010 to 2014)**

Carvalho SL, Silva FN, Zanardo LG, Almeida AMR, Zerbini FM, Carvalho CM (2013) Production of polyclonal antiserum against *Cowpea mild mottle virus* coat protein and its application in virus detection. *Tropical Plant Pathology* 38:49-54.

Zanardo LG, Silva FN, Bicalho AAC, Urquiza GPC, Lima ATM, Almeida AM, Zerbini FM, Carvalho CM (2013) Molecular and biological characterization of *Cowpea mild mottle virus* isolates infecting soybean in Brazil and evidence of recombination. *Plant Pathology* 63:n/a-n/a.

Zanardo LG, Silva FN, Lima ATM, Milanesi DF, Castilho-Urquiza GP, Almeida AMR, Zerbini FM, Carvalho, C. M. . Molecular variability of *Cowpea mild mottle virus* infecting soybean in Brazil. *Archives of Virology* 158:1432-8798.

Souza NA, Silva FN, Bedendo IP, Carvalho CM (2013) A phytoplasma belonging to a 16SrIII-A subgroup and dsRNA virus associated with cassava frogskin disease in Brazil. *Plant Disease*: 98:771-779.

Osterrieder A, Hummel E, Carvalho CM, Hawes C (2010) Golgi membrane dynamics after induction of a dominant-negative mutant Sar1 GTPase in tobacco. *Journal of Experimental Botany* 61:405-422.

## *Curriculum Vitae*

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### **Education and Training**

B.A., Agronomy, Viçosa Federal University, 1987

M.Sc. Plant Pathology, Viçosa Federal University, 1991

Ph.D., Plant Pathology, University of Florida, Gainesville, U.S.A., 1996

### **Publications in Refereed Journals (from 2010 to 2014)**

Viggiano JR, Freitas LG, Lopes EA (2014) Use of *Pochonia chlamydosporia* to control *Meloidogyne javanica* in cucumber. *Biological Control* 69:72-77.

Bontempo AF, Fernandes RH, Lopes J, Freitas LG, Lopes EA (2014) *Pochonia chlamydosporia* controls *Meloidogyne incognita* on carrot. *Australasian Plant Pathology* 43:421-424.

Dallemole-Giaretta R, Freitas LG, Xavier DM, Zooca RJF, Ferraz S, Lopes EA (2014) Incorporação ao solo de substrato contendo micélio e conídios de *Pochonia chlamydosporia* para o manejo de *Meloidogyne javanica*. *Ciência Rural* 44:629-633.

Kramer-Mello IN, Araújo JV, Braga FR, Avelar-Monteiro TS, Freitas LG, Araujo JM, Freitas-Soares FE (2013) Biological control of infective larvae of *Ancylostoma* spp. in beach sand. *Revista Iberoamericana de Micología* 30:1-10.

Dallemole-Giaretta R, Freitas LG, Cavallin IC, Marmentini GA, Faria CMDR, Resende JTV (2013) Avaliação de um produto à base de *Pochonia chlamydosporia* no controle de *Meloidogyne javanica* em alface e cenoura no campo. *Nematropica* 43:131-137.

Maciel AS, Freitas LG, Figueiredo LD, Campos AK, Mello INK (2012) Antagonistic activity of the fungus *Pochonia chlamydosporia* on mature and immature *Toxocara canis* eggs. *Parasitology* 1:1-12.

Ferreira PA, Ferreira PA, Neves WS, Lopes EA, Freitas LG, Ferraz S (2012) Efeito da fertilização e da nutrição de plantas sobre doenças causadas por nematoides. *Revista Trópica - Ciências Agrárias e Biológicas* 6:33-42.



Dallemole-Giaretta R, Freitas LG, Lopes EA, Pereira OL, Zooca RJF, Ferraz S (2012) Screening of *Pochonia chlamydosporia* Brazilian isolates as biocontrol agents of *Meloidogyne javanica*. *Crop Protection* 42:102-107.

Viggiano JR, Freitas LG, Ferreira PA (2012) Resíduo da produção de *Pochonia chlamydosporia* no desenvolvimento de mudas e plantas de alface. *Pesquisa Agropecuária Brasileira* 47:983-990.

Neves WS, Freitas LG, Dallemole-Giaretta R, Coutinho MM, Ferraz S, Parreira DF (2012) Incorporação de farinha de semente de mamão ao solo para o controle de *Meloidogyne javanica*. *Nematologia Brasileira* 36:25-31.

Ferreira SR, Araújo JV, Braga FR, Araujo JM, Carvalho RO, Silva AR, Frassy LN, Freitas LG (2011) Ovicidal activity of seven *Pochonia chlamydosporia* fungal isolates on *Ascaris suum* eggs. *Tropical Animal Health and Production* 43:639-642.

Lopes EA, Ferraz S, Ferreira PA, Freitas LG, Dallemole-Giaretta R (2011) Soil amendment with chopped or ground dry leaves of six species of plants for the control of *Meloidogyne javanica* in tomato under greenhouse conditions. *Ciência Rural* 41:935-938.

Dallemole-Giaretta R, Freitas LG, Caixeta LB, Xavier DM, Ferraz S, Fabry CFS (2011) Produção de clamidósporos de *Pochonia chlamydosporia* em diferentes substratos. *Ciência e Agrotecnologia* 35, p. 314-321.

Dias-Arieira CR, Santana SM, Freitas LG, Cunha TPL, Biela F, Puerari HH, Chiamolera FM (2011) Efficiency of *Pochonia chlamydosporia* in *Meloidogyne incognita* control in lettuce crop (*Lactuca sativa* L.). *International Journal of Food, Agriculture and Environment* 9:561-563.

Bernardo JT, Freitas LG, Yamada JK, Almeida VS, Dallemole-Giaretta R, Ferraz S (2011) Efeito de adubos orgânicos sobre *Meloidogyne javanica* em tomateiro. *Nematologia Brasileira* 35:10-19.

Dallemole-Giaretta R, Ferraz S, Freitas LG, Podestá GS, Lopes EA, Agnes EL (2011) Cover crops and *Pochonia chlamydosporia* for the control of *Meloidogyne javanica*. *Nematology* 13:919-926.

Dallemole-Giaretta R, Freitas LG, Coutinho MM, Neves WS, Zooca RJF, Ferraz S (2011) Efeito de farinha de sementes de abóbora e de *Pochonia chlamydosporia* no controle de *Meloidogyne javanica*. *Nematologia Brasileira* 34:91-97.

Dallemole-Giaretta R, Freitas LG, Zooca RJF, Caixeta LB, Lopes EA, Ferraz S (2010) Controle de *Meloidogyne javanica* por meio de aplicação de palha de café colonizada por *Pochonia chlamydosporia* var. *chlamydosporia*. *Nematologia Brasileira* 34:137-140.

Dallemole-Giaretta R, Freitas LG, Zooca RJF; Podestá GS, Caixeta LB, Ferraz S, Lopes EA (2010) Associação de *Pochonia chlamydosporia*, *Bacillus cereus* e fibra de coco no controle de *Meloidogyne javanica* em tomateiro. *Nematologia Brasileira* 4:18-22.

Gardiano CG, Dallemole-Giaretta R, Lopes EA, Zooca RJF, Ferraz S, Freitas LG (2010) Atividade nematicida de extratos de sementes de espécies de crotalária sobre *Meloidogyne javanica*. *Revista Trópica - Ciências Agrárias e Biológicas* 4:3-7.

Maciel AS, Freitas LG, Campos AK, Lopes EA, Araújo JV (2010) The biological control of *Ancylostoma* spp. dog infective larvae by *Duddingtonia flagrans* in a soil microcosm. *Veterinary Parasitology* 173:262-270.

### **Book and Book Chapters (from 2010 to 2014)**

Ferraz S, Freitas LG, Lopes EA, Dias-Arieira CR (2010) Manejo Sustentável de Fitonematoides. Vol. 1. Editora UFV, Viçosa, MG. 304p.

Ferreira PA, Ferraz S, Freitas LG (2012) Sintomas causados por fitonematoides. In: Zambolim L, Jesus Junior WC, Pereira OL (Eds.). *O Essencial da Fitopatologia - Agentes Causais*. Vol. 1. Suprema Gráfica e Editora Ltda., Visconde do Rio Branco, MG. pp. 203-222.

Freitas LG, Oliveira RDL, Ferraz S (2012) Nematoides como Patógenos de Plantas. In: Zambolim L, Jesus Júnior WC, Pereira OL (Eds.). *O Essencial da Fitopatologia - Agentes Causais*. Vol. 2. Suprema Gráfica e Editora Ltda., Visconde do Rio Branco, MG. pp. 89-128.

Oliveira RDL, Freitas LG (2012) Métodos Empregados em Fitonematologia. In: Zambolim L, Jesus junior WC, Pereira OL (Eds.). *O Essencial da Fitopatologia - Agentes Causais*. Vol. 1. Suprema Gráfica e Editora Ltda., Visconde do Rio Branco, MG. pp. 355-376.

Freitas LG, Oliveira RDL, Ferraz S (2012) Identificação de Fitonematoides. In: Zambolim L, Jesus Junior WC, Pereira OL (Eds.). *O Essencial da Fitopatologia - Agentes Causais*. Vol. 1. Suprema Gráfica e Editora Ltda., Visconde do Rio Branco, MG. pp. 377-416.

Paiva JAP, Prat E, Vautrin S, Santos MD, San-Clemente H, Brommonschenkel SH, Fonseca PGS Grattapaglia D, Song X, Ammiraju JSS, Kudrna D, Wing RA, Freitas AT, Bergès H, Grima-Pettenati J (2011) Advancing *Eucalyptus* genomics: identification and sequencing of lignin biosynthesis genes from deep-coverage BAC libraries. *BMC Genomics* 12:137.

Lopes FJF, Pauly M, Brommonschenkel SH, Lau EY, Diola V, Passos JL, Loureiro ME (2010) The EgMUR3 xyloglucan galactosyltransferase from *Eucalyptus grandis* complements the mur3 cell wall phenotype in *Arabidopsis thaliana*. *Tree Genetics & Genomes* 6:745-756.

Varejão EVV, Demuner AJ, Barbosa LCA, Barreto RW, Veira BS (2013) Toxicidade de filtrados de cultura de *Alternaria euphorbiicola* em folhas de *Euphorbia heterophylla*. *Planta Daninha* 31:1-9.

Macedo DM, Pereira OL, Wheeler GS, Barreto RW (2013) *Corynespora cassiicola* f. sp. *schinii*, a potential biocontrol agent for the weed *Schinus terebinthifolius* in the United States. *Plant Disease* 97:496-500.

Varejão EVV, Demuner AJ, Barbosa LCA, Barreto RW (2013) The search for new natural herbicides strategic approaches for discovering fungal phytotoxins. *Crop Protection* 48:41-50.

Morais EGF, Picanço MC, Lopes-Mattos KLB, Bouchier RS, Alves Meira RMS, Barreto RW (2013) *Diclidophlebia smithi* (Hemiptera: Psyllidae), a potential biocontrol agent for *Miconia calvescens* in the Pacific: Population dynamics, climate-match, host-specificity, host-damage and natural enemies. *Biological Control* 66:33-40.

Alves JL, Woudenberg JHC, Duarte LL, Crous PW, Barreto RW (2013) Reappraisal of the genus *Alternariaster* (Dothideomycetes). *Persoonia* 31:77-85.

Rocha FB, Hanada RE, Albuquerque ST, Barreto RW (2013) *Pseudocercospora piperis* associated with leaf spots on *Piper aduncum* in Brazil. *Australasian Plant Disease Notes* 1:1-3.

Evans HC, Bezerra JL, Barreto RW (2013) Of mushrooms and chocolate trees: a etiology and phylogeny of witch's broom and frosty pod diseases of cacao. *Plant Pathology* 62:728-740.

Quaedvlieg W, Verkley GJM, Shin H-D, Barreto RW, Alfenas AC, Swart WJ, Groenewald JZ, Crous PW (2013) Sizing up *Septoria*. *Studies in Mycology* 75:307-390.

Fernandes AF, Miranda BEC, Duarte LL, Barreto RW (2013) *Passalora stromatica* sp. nov. associated with leaf spots of *Tithonia diversifolia* in Brazil. *IMA Fungus* 4:201-204.

Augustin JO, Groenewald JZ, Nascimento RJ, Mizubuti ESG, Barreto RW, Elliot SL, Evans HC (2013) Yet more -weeds- in the garden: Fungal novelties from nests of leaf-cutting ants. *Plos One* 8:e82265.

Fowler SV, Barreto RW, Dodd S, Macedo DM, Paynter Q, Pedrosa-Macedo JH, Pereira OL, Peterson P, Smith L, Waipara N, Winks CJ, Forrester G (2013) *Tradescantia fluminensis*, an exotic weed affecting native forest regeneration in New Zealand: Ecological surveys, safety tests and releases of four biocontrol agents from Brazil. *Biological Control* 64:323-329.

Silva M, Freitas NM, Mendonca HL, Barreto RW (2013) First report of *Stagonosporiopsis cucurbitacearum* causing fruit rot of *Luffa cylindrica* in Brazil. *Plant Disease* 97:1120-1121.

Miranda BEC, Barreto RW, Crous PW, Groenewald JZ (2012) *Pilidiella tibouchinae* sp. nov. associated with foliage blight of *Tibouchina granulosa* (quaresmeira) in Brazil. *IMA Fungus* 3:1-7.

Costa LC, Macedo DM, Barreto RW (2012) Reappraisal and neotypification of *Phyllachora feijoa*. *IMA Fungus* 3:9-14.

Silva M, Barreto RW, Pereira OL (2012) Fungal pathogens of “cat’s claws” from Brazil for biocontrol of *Macfadyena unguis-cati*. Mycotaxon 119:181-195.

Silva M, Castañeda-Ruiz RF, Pereira OL, Barreto RW (2012) *Alveariospora*, a new anamorphic genus from trichomes of *Dimorphandra mollis* in Brazil. Mycotaxon 119:109-116.

Morais EGF, Picanço MC, Semeão AA, Barreto RW, Rosado JF, Martins JC (2012). Lepidopterans as potential agents for the biological control of the invasive plant, *Miconia calvescens*. Journal of Insect Science 12:1-17.

Schoch CL, Seifert KA, Huhndorf S, Robert V, Spouge JL, Levesque CA, Chen W, Bolchacova E, Voigt K, Crous PW, Miller AN, Wingfield MJ, Aime MC, An K-D, Bai F-Y, Barreto RW, Begerow D, Bergeron M-J, Blackwell M, Boekhout T, Bogale M, Boonyuen N, Burgaz AR, Buyck B, Cai L et al. (2012) From the Cover: Nuclear ribosomal internal transcribed spacer (ITS) region as a universal DNA barcode marker for Fungi. Proceedings of the National Academy of Sciences of the United States of America 109:6241-6246.

Passos JL, Barbosa LCA, Demuner AJ, Alvarenga ES, Silva CM, Barreto RW (2012) Chemical Characterization of volatile compounds of *Lantana camara* L. and *L. radula* Sw. and their antifungal activity. Molecules 17:11447-11455.

Barreto RW, Johnston PR, Crous PW, Evans HC (2012) A new species of the lenticel fungal genus *Claviradulomyces* (Ostropales) from the Brazilian Atlantic forest tree *Xylopia sericea* (Annonaceae). IMA Fungus 3:135-141.

Guatimosim E, Pinto HJ, Barreto RW (2012) *Passalora acrocomiae* sp. nov. and *Exosporium acrocomiae* from the palm *Acrocomia aculeata* in Puerto Rico. Mycotaxon 122:61-67.

Santana EA, Guatimosim E, Fuga CAG, Barreto RW (2011) First record of *Pyricularia grisea* causing leaf blight of *Costus spiralis* in Brazil. Australasian plant disease notes 5:1-8.

Soares DJ, Rocha FB, Duarte LL, Barreto RW (2011) *Pyriculariopsis calathea* sp. nov., a novel anamorphic hyphomycete from the Atlantic forest of Brazil causing leaf spots on *Calathea longifolia*. Mycological Progress 10:315-321.

Carvalho CR, Fernandes RC, Carvalho GMA, Barreto RW, Evans HC (2011) Cryptosexuality and the genetic diversity paradox in coffee rust, *Hemileia vastatrix*. Plos One 6:e26387.

Guatimosim E, Fuga CAG, Pinto HJ, Barreto RW (2011) First report of gray mold caused by on yellow cosmos (*Cosmos sulphureus*) in Brazil. Plant Disease 95:1588-1588.

Evans HC, Barreto RW (2011) Embracing invasives: a view of compromise. Science 331:1383, 2011.

Vieira BS, Barreto RW (2010) Liquid culture production of chlamydospores of *Lewia chlamidosporiformans* (Ascomycota: Pleosporales), a mycoherbicide candidate for wild poinsettia. Australasian Plant Pathology 39:154-160.

Alves JL, Barreto RW, Pereira OL, Soares DJ (2010) Additions to the mycobiota of the invasive weed *Miconia calvescens* (Melastomataceae). *Mycologia* 102:69-82.

Citações:4|4

Alves JL, Barreto RW (2010) *Pseudocercospora ixoricola* causing leaf spots on *Ixora coccinea* in Brazil. *Plant Disease* 94:278-278.

Morais EGF, Picanco MC, Barreto RW, Silva NR, Campos MR (2010) Biological performance of *Diclidophlebia smithi* (Hemiptera: Psyllidae), a potential biocontrol agent for the invasive weed *Miconia calvescens*. *Biocontrol Science and Technology* 20:107-116.

Passos JL, Demuner AJ, Barbosa LCA Barreto RW, King-Diaz B, Lotina-Hennsen B (2010) Effects of *Corynespora cassiicola* on *Lantana camara*. *Planta Daninha* 28:229-237.

Almeida DB, Macedo DM, Barreto RW (2010) Leaf spot on *Clerodendrum speciosus* in Brazil caused by *Pseudocercospora clerodendricola* sp. nov.. *Tropical Plant Pathology* 35:170-173.

Morais EGF, Picanço MC, Barreto RW, Silva GA, Moreno SC, Queiroz RB (2010) Biology of the leaf roller *Salbia lotanalis* and its impact on the invasive tree *Miconia calvescens*. *BioControl* 55:685-694.

Rocha FB, Barreto RW, Bezerra JL, Neto JAAM (2010) Foliar mycobiota of *Coussapoa floccosa*, a highly threatened tree of the Brazilian Atlantic forest. *Mycologia* 102:1240-1252.

Lima BV, Soares DJ, Barreto RW (2010) Inoculum density of *Plectosporium alismatis*, a potential mycoherbicide, in relation to control of the aquatic weed *Sagittaria montevidensis*. *Tropical Plant Pathology* 35:236-240.

Crous PW, Barreto RW, Alfenas AC, Alfenas RF, Groenewald JZ (2010) What is *Johansonia*? *IMA Fungus* 1:117-122.

Macedo DM, Pinho DB, Barreto RW, Pereira OL, Gusmão LFP, Cuda J (2010) Black mildew fungi (Meliolaceae) associated with *Schinus terebinthifolius* (Brazilian pepper tree) in Brazil. *Mycotaxon* 114:429-437.

### **Book and Book Chapters (from 2010 to 2014)**

Barreto RW, Ellison CA, Seier MK, Evans H (2012) Biological control of weeds with plant pathogens: Four decades on. In: Dharam P, Shankar AU (Eds.). *Integrated Pest Management Principles and Practice*. Vol. 1. CABI, Wallingford, UK. pp. 299-350.

## *Curriculum Vitae*

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Post Ph.D, Molecular Genetics of Microorganisms, Universidad de Valencia, Valencia, ES, 2006

### **Publications in Refereed Journals (from 2010 to 2014)**

Santiago TR, Grabowski C, Mizubuti ESG (2014) First report of bacterial wilt caused by on sp. in Paraguay. *New Disease Reports* 29:2.

Paz-Carrasco LC, Castillo-Urquiza GP, Lima ATM, Xavier CAD, Vivas-Vivas LM, Mizubuti ESG, Zerbini FM (2014) Begomovirus diversity in tomato crops and weeds in Ecuador and the detection of a recombinant isolate of *Rhynchosia golden mosaic yucatan virus* infecting tomato. *Archives of Virology* 159:2127-2132.

Gomes LIS, Bibiano LBJ, Silva GF, Hanada RE, Mizubuti ESG (2014) Baseline sensitivity of brazilian *Mycosphaerella fijiensis* isolates to protectant and systemic fungicides. *Tropical Plant Pathology* 39:172-177.

Haddad F, Saraiva RM, Mizubuti ESG, Romeiro RS, Maffia LA (2014) Isolation and selection of *Hemileia Vastatrix* antagonists. *European Journal of Plant Pathology* 139: 763-772.

Pinho DB, Honorato Junior J, Firmino AL, Hora Junior BT, Mizubuti ESG, Pereira OL (2014) Reappraisal of the black mildews (Meliolales) on *Hevea brasiliensis*. *Tropical Plant Pathology* 39:89-94.

Correia KC, Mizubuti ESG, Silva EKC, Câmara MPS, Sales Junior R, Armengol J, Jimenez JG, Michereff SJ (2014) Fitness components of *Monosporascus cannonballus* isolates from northeastern Brazilian melon fields. *Tropical Plant Pathology* 39:217-223.

Santana MF, Silva JCF, Mizubuti ESG, Araújo EF, Condon BJ, Turgeon B, Queiroz MV (2014) Characterization and potential evolutionary impact of transposable elements in the genome of *Cochliobolus heterostrophus*. *BMC Genomics* 15:536.

Gomes LIS, Douhan GW, Bibiano LBJ, Maffia LA, Mizubuti ESG (2013) *Mycosphaerella musicola* Identified as the only pathogen of the Sigatoka Disease Complex present in Minas Gerais State, Brazil. *Plant Disease* 97:1537-1543.

Queiroz CB, Santana MF, Silva GF, Mizubuti ESG, Araújo EF, Queiroz MV (2013) Use of the IRAP marker to study genetic variability in *Pseudocercospora fijiensis* populations. *Current Microbiology* 68:358-364.

Duarte HSS, Zambolim L, Capucho AS, Nogueira Junior AF, Rosado AWC, Cardoso CR, Paul PA, Mizubuti ESG (2013) Development and validation of a set of standard area diagrams to estimate severity of potato early blight. *European Journal of Plant Pathology* 137:249-257.

Haddad F, Saraiva RM, Mizubuti ESG, Romeiro RS, Maffia LA (2013) Antifungal compounds as a mechanism to control *Hemileia vastatrix* by antagonistic bacteria. *Tropical Plant Pathology* 38:398-405.

Graça RN, Ross-Davis AL, Klopfenstein NB, Kim M-S, Peever TL, Cannon PG, Aun CP, Mizubuti ESG, Alfenas AC (2013) Rust disease of eucalypts, caused by *Puccinia psidii*, did not originate via host jump from guava in Brazil. *Molecular Ecology* 22:6033-6047.

Augustin JO, Groenewald JZ, Nascimento RJ, Mizubuti ESG, Barreto RW, Elliot SL, Evans HC (2013) Yet more -weeds- in the garden: fungal novelties from nests of leaf-cutting ants. *Plos One* 8:e82265.

Maia TA, Maciel-Zambolim E, Caixeta ET, Mizubuti ESG, Zambolim L (2013) The population structure of *Hemileia vastatrix* in Brazil inferred from AFLP. *Australasian Plant Pathology* 42:533-542.

Rocha CS, Castillo-Urquiza GP, Lima ATM, Silva FN, Xavier CAD, Hora Júnior BT, Beserra Junior JEA, Malta AWO, Martin DP, Varsani A, Alfenas-Zerbini P, Mizubuti ESG, Zerbini FM (2013) Brazilian Begomovirus populations are highly recombinant, rapidly evolving, and segregated based on geographical location. *Journal of Virology* 87:5784-5799.

Duarte HSS, Zambolim L, Mizubuti ESG, Pádua JG, Júnior JI, Ribeiro L, Carmo E, Nogueira Junior AF (2012) The field resistance of potato cultivars to foliar late blight and its relationship with foliage maturity type and skin type in Brazil. *Australasian Plant Pathology* 41:139-155.

Silva SJC, Castillo-Urquiza GP, Hora Junior BT, Assunção IP, Lima GSA, Pio-Ribeiro G, Mizubuti ESG, Zerbini FM (2012) Species diversity, phylogeny and genetic variability of begomovirus populations infecting leguminous weeds in northeastern Brazil. *Plant Pathology* 61:257-267.

Abadio AKR, Lima SS, Santana MF, Salomão TMF, Sartorato A, Mizubuti ESG, Araújo EF, Queiroz MV (2012) Genetic diversity analysis of isolates of the fungal bean pathogen *Pseudocercospora griseola* from central and southern Brazil. *Genetics and Molecular Research* 11:1272-1279.



Mizobutsi EH, Ferraz S, Mizubuti ESG, Dias-Arieira CR, Ribeiro RCF (2012) Viabilidade e sobrevivência do inóculo de *Heterodera glycines* raça 3 no solo. *Tropical Plant Pathology* 37:223-226.

Souza AGC, Maffia LA, Mizubuti ESG (2012) Cultural and aggressiveness variability of *Cercospora coffeicola*. *Journal of Phytopathology* 160:540-546.

Macedo PEF, Maffia LA, Maffia LA, Cota LV, Lourenço W, Mizubuti ESG (2012) Sensitivity of four isolates of *Clonostachys rosea* to pesticides used in the strawberry crop in Brazil. *Journal of Pesticide Science* 37:333-337.

Elsayed AY, Mizubuti ESG, Silva DJH, Pedrosa CE (2012) The inheritance of late blight resistance derived from *Solanum habrochaites*. *Crop Breeding and Applied Biotechnology* 12:199-205.

Santana MF, Araújo EF, Souza JT, Mizubuti ESG, Queiroz MV (2012) Development of molecular markers based on retrotransposons for the analysis of genetic variability in *Monilophthora perniciosa*. *European Journal of Plant Pathology* 134:497-507.

Souza AGC, Rodrigues FA, Maffia LA, Mizubuti ESG (2011) Infection Process of *Cercospora coffeicola* on Coffee Leaf. *Journal of Phytopathology* 159:6-11.

Lourenço Junior V, Rodrigues TTMS, Campos AMD, Bragança CAD, Scheuermann KK, Reis A, Brommonschenkel SH, Maffia LA, Mizubuti ESG (2011) Genetic structure of the population of *Alternaria solani* in Brazil. *Journal of Phytopathology* 159:233-240.

Alvarado ICM, Michereff SJ, Souza EB, Quezado-Duval AM, Resende LV, Cardoso E, Mizubuti ESG (2011) Characterization and variability of soft rot-causing bacteria in Chinese cabbage in north eastern Brazil. *Journal of Plant Pathology* 93:173-181.

Ferreira MA, Harrington TC, Alfenas AC, Mizubuti ESG (2011) Movement of Genotypes of *Ceratocystis fimbriata* within and among *Eucalyptus* plantations in Brazil. *Phytopathology* 101:1005-1012.

Grigolli JFJ, Kubota MM, Alves DP, Rodrigues GB, Cardoso CR, Silva DJH, Mizubuti ESG (2011) Characterization of tomato accessions for resistance to early blight. *Crop Breeding and Applied Biotechnology* 11:174-180.

Elsayed AY, Silva DJH, Mizubuti ESG, Carneiro PC (2011) Combing the monogenic and polygenic resistant genes to late blight in tomato. *Journal of Plant Breeding and Crop Science* 3:251-259.

Silva SJC, Castillo-Urquiza GP, Hora Junior BT, Assunção IP, Lima GSA, Pio-Ribeiro G, Mizubuti ESG, Zerbini FM (2011) High genetic variability and recombination in a begomovirus population infecting the ubiquitous weed *Cleome affinis* in northeastern Brazil. *Archives of Virology* 156:2205-2213.

Oliveira Costa VS, Michereff SJ, Martins RB, Gava CAT, Mizubuti ESG, Câmara MPS (2010) Species of Botryosphaeriaceae associated on mango in Brazil. *European Journal of Plant Pathology* 127: 509-519.

Alves MRR, Torres MCL, Soares NFF, Melo NR, Geraldine RM, Mizubuti ESG, Silveira MFA (2010) Efeito de soluções de enxágue na remoção de resíduos de mancozeb em tomates de mesa. *Pesquisa Agropecuária Tropical* 40:1-6.

Rodrigues TTMS, Berbee ML, Simmons EG, Cardoso CR, Reis A, Maffia LA, Mizubuti ESG (2010) First report of *Alternaria tomatophila* and *A. grandis* causing early blight on tomato and potato in Brazil. *New Disease Reports* 22:28.

Rodrigues TTMS, Maffia LA, Dhingra OD, Mizubuti ESG (2010) *In vitro* production of conidia of *Alternaria solani*. *Tropical Plant Pathology* 35:203-212.

Fiorini CVA, Silva DJH, Mizubuti ESG, Barros JS, Silva LJ, Milagres C, Zapparoli MR (2010) Caracterização de linhagens de tomateiro originadas de cruzamento interespecífico quanto à resistência à requeima. *Horticultura Brasileira* 28:197-202.

Marchi CE, Brommonschenkel SH, Queiroz MV, Borges MF, Mizubuti ESG (2010) Padrão de integração de pAN7-1 em mutantes de *Magnaporthe grisea* com patogenicidade alterada em arroz. *Summa Phytopathologica* 36:21-24.

Nascimento RJ, Mizubuti ESG, Câmara MPS, Ferreira MF, Maymon M, Freeman S, Michereff SJ (2010) First report of papaya fruit rot caused by *Colletotrichum magna* in Brazil. *Plant Disease* 92:1506-1506.

Fiorini CVA, Silva DJH, Silva FF, Mizubuti ESG, Alves DP, Cardoso TS (2010) Agrupamento de curvas de progresso de requeima, em tomateiro originado de cruzamento interespecífico. *Pesquisa Agropecuária Brasileira* 45:1095-1101.

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### **Publications in Refereed Journals (from 2010 to 2014)**

Andrade CCL, Andrade CCL, Resende RS, Rodrigues FA, Ferraz HGM, Moreira WR, Oliveira JR, Mariano RLR (2013) Silicon reduces bacterial speck development on tomato leaves. *Tropical Plant Pathology* 38:436-442.

Lima HE, Nechet KL, Halfeld-Vieira BA, Oliveira JR, Duarte HSS, Queiroz ES, Oliveira FL (2013) Elaboração e validação de escalas diagramáticas para avaliação da severidade da mancha bacteriana do feijão - caupi em cultivares com trifólios morfologicamente distintos. *Ciência Rural* 43:1735-1743.

Andrade CCL, Resende RS, Rodrigues FA, Silveira PR, Rios JÁ, Oliveira JR, Mariano RLR (2013) Indutores de resistência no controle da pinta bacteriana do tomateiro e na atividade de enzimas de defesa. *Tropical Plant Pathology* 38:28-34.

Moreira SI, Dutra DC, Rodrigues AC, Oliveira JR, Dhingra OD, Pereira OL (2013) Fungi and bacteria associated with post-harvest rot of ginger rhizomes in Espírito Santo, Brazil. *Tropical Plant Pathology* 38:218-226.

Furtado GQ, Guimarães LMS, Lisboa DO, Cavalcante GP, Arriel DAA, Alfenas AC, Oliveira JR (2012) First Report of *Enterobacter cowanii* causing bacterial spot on *Mabea fistulifera*, a native forest species in Brazil. *Plant Disease* 96:1576-1576.

Miguel-Wruck DS, Oliveira JR, Dias LAS (2010) Especificidade de hospedeiro nas interações *Xanthomonas campestris* pv. *campestris* - brássicas. *Summa Phytopathologica* 36:129-133.

**Book and Book Chapters (from 2010 to 2014)**

Silva IT, Rodrigues FA, Oliveira JR (2010) Silicon on the management of bacterial disease. In: Rodrigues FA (Ed.). Silício na Agricultura: anais do V Simpósio Brasileiro sobre Silício na Agricultura. Vol. 1. Editora UFV, Viçosa, MG, BRA. pp. 269-278.

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### **Publications in Refereed Journals (from 2010 to 2014)**

Spolti P, Del Ponte EM, Dong Y, Cummings JA, Bergstrom GC (2014) Assessment of triazole sensitivity in a contemporary population of *Fusarium graminearum* from New York wheat and competitiveness of a tebuconazole-resistant isolate. *Plant Disease* 98:607-613.

Spolti P, Del Ponte EM, Cummings J, Dong Y, Bergstrom GC (2014) Fitness attributes of *Fusarium graminearum* isolates from wheat in New York possessing a 3-ADON or 15-ADON trichothecene genotype. *Phytopathology* 104:513-519.

Gonzales-Dominguez E, Martins RB, Del Ponte EM, Michereff SJ, Garcia-Jimenez J, Armengol J (2014) Development and validation of a standard area diagram set to aid assessment of severity of loquat scab on fruit. *European Journal of Plant Pathology* 139:413-422.

Pagnussatt FA, Del Ponte EM, Garda-Bufferon J, Badiale-Furlong E (2014) Inhibition of *Fusarium graminearum* growth and mycotoxin production by phenolic extract from *Spirulina* sp.. *Pesticide Biochemistry and Physiology* 108:21-26.

Alves G, Spolti P, Nesi CN, Del Ponte EM, May de Mio LL (2014) Susceptibility levels and grouping of peach cultivars in relation to peach rust under field conditions. *Acta Scientiarum. Agronomy* 36:167-174.

Jahnke SM, Del Ponte EM, Redaelli LR, Rego DGP (2014) Spatial patterns and associations of *Anastrepha fraterculus* (Diptera: Tephritidae) and its parasitoid *Doryctobracon areolatus* (Hymenoptera: Braconidae) in organic orchards of *Psidium guajava* and *Acca sellowiana*. *The Florida Entomologist* 97:744-752.

Stumpf R, dos Santos J, Gomes LB, Silva CN, Tessmann DJ, Ferreira FD, Machinski Junior M, Del Ponte EM (2013) *Fusarium* species and fumonisins associated with maize kernels produced in Rio Grande do Sul State for the 2008/09 and 2009/10 growing seasons. *Brazilian Journal of Microbiology* 44:89-95.

Chevarria VV, Del Ponte EM, Jahnke SM (2013) Número de gerações de um percevejo e seu parasitoide e da severidade da ferrugem asiática em soja, simulados em cenários de clima e manejo no norte do RS. *Ciência Rural* 43:571-578.

Spolti P, Guerra DS, Badiale-Furlong Eliana, Del Ponte EM (2013) Single and sequential applications of metconazole alone or in mixture with pyraclostrobin to improve *Fusarium* head blight control and wheat yield in Brazil. *Tropical Plant Pathology* 38:85-96.

Kuhnem PR, Stumpf R, Spolti P, Del Ponte EM (2013) Características patogênicas de isolados do complexo *Fusarium graminearum* e de *Fusarium verticillioides* em sementes e plântulas de milho. *Ciência Rural* 43:583.

Spolti P, Del Ponte EM (2013) Agressividade diferencial de espécies do complexo *Fusarium graminearum* em interação com o fungicida tebuconazole na redução do rendimento de trigo. *Ciência Rural* 43:1569-1575.

Pagnussatt FA, Kupski L, Darley FT, Filoda PF, Del Ponte EM, Garda-Bufferon J, Badiale-Furlong E (2013) *Fusarium graminearum* growth inhibition mechanism using phenolic compounds from *Spirulina* sp.. *Ciência e Tecnologia de Alimentos* 33:75-80.

Guerra DS, Nickel O, Del Ponte EM, Sanhueza RMV, Fajardo TVM, Marodin GAB (2012) Development of *Glomerella* leaf spot (*Colletotrichum gloeosporioides*) is enhanced in virus-infected Maxi Gala apples. *Journal of Plant Pathology* 94:237-241.

Del Ponte EM, Garda-Bufferon J, Badiale-Furlong E (2012) Deoxynivalenol and nivalenol in commercial wheat grain related to *Fusarium* head blight epidemics in southern Brazil. *Food Chemistry* 132:1087-1091.

Wiebke-Strohm B, Pasquali G, Margis-Pinheiro M, Bencke M, Bucker-Neto L, Becker-Ritt AB, Martinelli AHS, Rechenmacher C, Polacco JC, Stolf R, Marcelino FC, Abdelnoor RV, Homrich MS, Del Ponte EM, Carlini CR, Carvalho MCG, Bodanese-Zanettini MH (2012) Ubiquitous urease affects soybean susceptibility to fungi. *Plant Molecular Biology* 79:75-87.

Astolfi P, Reynoso MM, Ramirez L, Chulze SN, Alves TCA, Tessmann DJ, Del Ponte EM (2012) Genetic population structure and trichothecene genotypes of *Fusarium graminearum* isolated from wheat in southern Brazil. *Plant Pathology* 61:289-295.

Spolti P, Valdebenito-Sanhueza RM, Laranjeira FF, Del Ponte EM (2012) Comparative spatial analysis of the sooty blotch and flyspeck disease complex, bull's eye and bitter rots of apples. *Plant Pathology* 61:271-280.

De Paula VA, Bergamaschi H, Del Ponte EM, Cardoso LS, Bosco LC (2012) Duração do período de molhamento foliar em pomares de macieira em céu aberto e sob tela antigranizo, em Vacaria, RS. *Revista Brasileira de Fruticultura* 34:504-514.

Spolti P, Barros NC, Gomes LB, dos Santos J, Del Ponte EM (2012) Phenotypic and pathogenic traits of two species of the *Fusarium graminearum* complex possessing either 15-ADON or NIV genotype. *European Journal of Plant Pathology* 133:621-629.

Spolti P, De Jorge BC, Del Ponte EM (2012) Sensitivity of *Fusarium graminearum* causing head blight of wheat in Brazil to tebuconazole and metconazole fungicides. *Tropical Plant Pathology* 37:419-423.

Spolti P, Schneider L, Sanhueza RMV, Batzer J, Gleason ML, Del Ponte EM (2011) Improving sooty blotch and flyspeck severity estimation on apple fruit with the aid of a diagrammatic scale. *European Journal of Plant Pathology* 129:21-29.

Del Ponte EM, Maia AHN, Santos TV, Martins EJ, Baethgen W (2011) Early-season warning of regional soybean rust epidemics using El Niño/Southern Oscillation information. *International Journal of Biometeorology* 55:575-583.

Gleason ML, Batzer JC, Sun G, Zhang R, Arias MMD, Sutton TB, Crous PW, Ivanović M, McManus PS, Cooley DR, Mayr U, Weber RWS, Yoder KS, Del Ponte EM, Biggs AR, Oertel B (2011) A new view of sooty blotch and flyspeck. *Plant Disease* 95:368-383.

Citações:17|20

Farias CRJ, Afonso APS, Pierobom CR, Del Ponte EM (2011) Regional survey and identification of *Bipolaris* spp. associated with rice seeds in Rio Grande do Sul State, Brazil. *Ciência Rural* 41:369-372.

Spolti P, Sanhueza RMV, Gleason ML, Del Ponte EM (2011) Inoculum and infection dynamics of the sooty blotch and flyspeck complex of apples in southern Brazil. *Journal of Plant Pathology* 93:497-501.

Astolfi P, dos Santos J, Schneider L, Gomes LB, Silva CN, Tessmann DJ, Del Ponte EM (2011) Molecular survey of tricothecene genotypes of *Fusarium graminearum* species complex from barley in Southern Brazil. *International Journal of Food Microbiology* 148:197-201.

Spolti P, Sanhueza RMV, Gleason ML, Del Ponte EM (2011) Sooty blotch and flyspeck control with fungicide applications based on calendar, local IPM, and warning system. *Pesquisa Agropecuária Brasileira* 46:697-705.

Spolti P, Sanhueza RMV, Del Ponte EM (2010) Meio semi-seletivo para recuperação e quantificação de *Cryptosporiopsis perennans* em maçãs. *Ciência Rural* 40:661-665.

Farias CRJ, Del Ponte EM, Corrêa CL, Afonso AP, Pierobom CR (2010) Infecção de sementes de trigo com *Bipolaris sorokiniana* pela técnica de restrição hídrica. *Tropical Plant Pathology* 35:253-257.

Valdebenito-Sanhueza RM, Spolti P, Del Ponte EM (2010) Controle do inóculo inicial para redução dos danos pela podridão: 'olho-de-boi' em macieiras. *Revista Brasileira de Fruticultura* 32:1044-1054.

Astolfi P, Santos J, Spolti P, Tessmann DJ, Del Ponte EM (2010) Complexo *Fusarium graminearum*: taxonomia, perfil toxigênico e genética populacional na era molecular. Revisão Anual de Patologia de Plantas 18:119-161.

### **Book and Book Chapters (from 2010 to 2014)**

Del Ponte EM, Tessmann DJ, Spolti P, Kuhnem PR, Silva CN (2013) Species identification, genetic diversity and phenotypic variation studies on the *Fusarium graminearum* complex populations from Brazil. In: Alconada Magliano TM, Chulze SN (Eds.). *Fusarium* Head Blight in Latin America. Vol. 1. Springer: Netherlands. pp. 15-29.

Del Ponte EM, Dalla Lana F (2012) Avaliação de risco de doenças de plantas: conceitos e aplicações para decisões táticas e estratégicas no manejo. In: Núcleo de Estudos em Fitopatologia. (Ed.). Avanços na otimização do uso de defensivos agrícolas no manejo fitossanitário. Vol. 1. Suprema Gráfica e Editora, São Carlos, SP, BRA. pp. 237-257.

Godoy CV, Del Ponte EM (2011) Roya de la soja (*Phakopsora pachyrhizi*, *P. meibomiae*). In: Margarita S, Roberto M (Eds.). Las enfermedades de la soja y su importancia en los países del Mercosur. Vol. 1. Hemisferio Sur, Buenos Aires, ARG. pp. 104-112.

Sanhueza RMV, Bogo A, Cantillano RFF, Stadnik M, Bartnicki VA, Becker WF, Castro LAS, Katsurayama Y, Del Ponte EM, Spolti P (2011) Caracterização e controle das doenças de verão. In: Gilmar RN (Ed.). Inovações tecnológicas para o setor da maçã - Inovamaçã: relatório técnico. Vol. 1. Embrapa Uva e Vinho, Bento Gonçalves, RS, BRA. pp. 23-106.



## *Curriculum Vitae*

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B.A., Agronomy, Uberlândia Federal University, 1996

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### **Publications in Refereed Journals (from 2010 to 2014)**

Polanco LR, Rodrigues FA, Moreira EN, Duarte HSS, Cacique IS, Valente LA, Vieira RF, Paula Júnior TJ, Vale FXR (2014) Management of anthracnose in common bean by foliar sprays of potassium silicate, sodium molybdate, and fungicide. *Plant Disease* 98:84-89.

Lopes UP, Zambolim L, Souza Neto PN, Duarte HSS, Ribeiro JI, Souza AF, Rodrigues FA (2014) Silicon and Triadimenol for the Management of Coffee Leaf Rust. *Journal of Phytopathology* 162:124-128.

Cruz MFA, Rodrigues FA, Diniz APC, Moreira MA, Barros EG (2014) Soybean Resistance to *Phakopsora pachyrhizi* as affected by acibenzolar-S-methyl, jasmonic acid and silicon. *Journal of Phytopathology* 162:132-136.

Perez CEA, Rodrigues FA, Moreira WR, DaMatta FM (2014) Leaf Gas Exchange and chlorophyll *a* fluorescence in wheat plants supplied with silicon and infected with *Pyricularia oryzae*. *Phytopathology* 104:143-149.

Debona D, Rodrigues FA, Rios JA, Martins SCV, Pereira LF, DaMatta FM (2014) Limitations to photosynthesis in leaves of wheat plants infected by *Pyricularia oryzae*. *Phytopathology* 104:33-39.

Polanco LR, Rodrigues FA, Nascimento KJT, Cruz MFA, Curvelo CRS, DaMatta FM, Vale FXR (2014) Photosynthetic gas exchange and antioxidative system in common bean plants infected by *Colletotrichum lindemuthianum* and supplied with silicon. *Tropical Plant Pathology* 39:35-42.

- Dallagnol LJ, Rodrigues FA, Mielli MVB, Ma JF (2014) Rice grain resistance to brown spot and yield are increased by silicon. *Tropical Plant Pathology* 39:56-63.
- Carré-Missio V, Rodrigues FA, Schurt DA, Resende RS, Souza NFA, Rezende DC, Moreira WR, Zambolim L (2014) Effect of foliar-applied potassium silicate on coffee leaf infection by. *Annals of Applied Biology* 164:396-403.
- Debona D, Rodrigues FA, Rios JA, Nascimento KJT, Silva LC (2014) The effect of silicon on antioxidant metabolism of wheat leaves infected by *Pyricularia oryzae*. *Plant Pathology* 63:581-589.
- Rios JA, Rodrigues FA, Debona D, Silva LC (2014) Photosynthetic gas exchange in leaves of wheat plants supplied with silicon and infected with *Pyricularia oryzae*. *Acta Physiologiae Plantarum* 36:371-379.
- Guerra AMNM, Rodrigues FA, Lima TC, Berger PG, Barros AF, Silva YCR (2014) Capacidade fotossintética de plantas de algodoeiro infectadas por ramulose e supridas com silício. *Bragantia* 73:50-64.
- Fortunato AA, Da Silva WL, Rodrigues FA (2014) Phenylpropanoid Pathway Is Potentiated by Silicon in the Roots of Banana Plants During the Infection Process of *Fusarium oxysporum* f. sp. *cubense*. *Phytopathology* 104:596-603.
- Rios JA, Rodrigues FA, Debona D, Resende RS, Moreira WR, Andrade CCL (2014) Induction of resistance to *Pyricularia oryzae* in wheat by acibenzolar-S-methyl, ethylene and jasmonic acid. *Tropical Plant Pathology* 39:224-233.
- Domiciano GP, Duarte HSS, Moreira EM, Rodrigues FA (2014) Development and validation of a set of standard area diagrams to aid in estimation of spot blotch severity on wheat leaves. *Plant Pathology* 63:922-928.
- Araujo L, Bispo W, Cacique I, Moreira W, Rodrigues FA (2014) Resistance in mango against infection by *Ceratocystis fimbriata*. *Phytopathology* 104:820-833.
- Resende RS, Rodrigues FA, Costa RV, Silva DD (2013) Silicon and fungicide effects on anthracnose in moderately resistant and susceptible sorghum lines. *Journal of Phytopathology* 161:11-17.
- Dallagnol LJ, Rodrigues FA, Chaves ARM, Vale FXR, DaMatta FM (2013) Photosynthesis and sugar concentration are impaired by the defective active silicon uptake in rice plants infected with *Bipolaris oryzae*. *Plant Pathology* 62:120-129.
- Andrade CCL, Resende RS, Rodrigues FA, Silveira PR, Rios JA, Oliveira JR, Mariano RLR (2013) Indutores de resistência no controle da pinta bacteriana do tomateiro e na atividade de enzimas de defesa. *Tropical Plant Pathology* 38:28-34.
- Silva RV, Oliveira RDL, Ferreira OS, Ferreira AO, Rodrigues FA (2013) Defense responses to *Meloidogyne exigua* in resistant coffee cultivar and non-host plant. *Tropical Plant Pathology* 38:114-121.

- Schurt DA, Rodrigues FA, Souza NFA, Reis RD (2013) Efeito de diferentes moléculas na redução dos sintomas da queima das bainhas em arroz e no crescimento de *Rhizoctonia solani* in vitro. *Revista Ceres* 60:221-225.
- Resende RS, Rodrigues FA, Gomes RJ, Nascimento KJT (2013) Microscopic and biochemical aspects of sorghum resistance to anthracnose mediated by silicon. *Annals of Applied Biology* 63:114-123.
- Rios JA, Debona D, Duarte HSS, Rodrigues FA (2013) Development and validation of a standard area diagram set to assess blast severity on wheat leaves. *European Journal of Plant Pathology* 136:603-611.
- Curvelo CRS, Rodrigues FA, Silva LC, Nascimento KJT, Berger PG (2013) Mecanismos bioquímicos da defesa do algodoeiro à mancha de ramulária mediados pelo silício. *Bragantia* 72:41-51.
- Schurt DA, Rodrigues FA, Missio VC, Soares NFF (2013). Silício alterando compostos derivados da pirólise de bainhas foliares de plantas de arroz infectadas por *Rhizoctonia solani*. *Bragantia* 72:52-60.
- Domiciano GP, Rodrigues FA, Guerra AMN, Vale FXR (2013) Infection process of *Bipolaris sorokiniana* on wheat leaves is affected by silicon. *Tropical Plant Pathology* 38:258-263.
- Moreira WR, Resende RS, Rodrigues FA, Andrade CCL, Nascimento CWA (2013) Influência do magnésio na resistência do arroz à mancha parda. *Bragantia* 72:154-161.
- Cruz MFA, Rodrigues FA, Rodriguez LP, Curvelo CRS, Nascimento KJT, Moreira MA, Barros EG (2013) Inducers of resistance and silicon on the activity of defense enzymes in the soybean-*Phakopsora pachyrhizi* interaction. *Bragantia* 72:162-172.
- Pereira AC, Cruz MFA, Paula Júnior TJ, Rodrigues FA, Carneiro JES, Vieira RF, Carneiro PCS (2013) Infection process of *Fusarium oxysporum* f. sp. *phaseoli* on resistant, intermediate and susceptible bean cultivars. *Tropical Plant Pathology* 38:323-328.
- Dhingra OD, Schurt DA, Oliveira RDL, Rodrigues FA (2013) Potential of soil fumigation with mustard essential oil to substitute biofumigation by cruciferous plant species. *Tropical Plant Pathology* 38:337-342.
- Moreira WR, Rodrigues FA, Duarte HSS (2013) Effect of zinc on the development of brown spot in rice. *Journal of Phytopathology* 161:749-751.
- Guerra AMNM, Rodrigues FA, Berger PG, Barro AF, Rodrigues YC, Lima TC (2013) Resistência do algodoeiro à ferrugem tropical potencializada pelo silício. *Bragantia* 72:279-291.
- Guerra AMNM, Rodrigues FA, Berger PG, Barros AF, Rodrigues YC, Lima TC (2013) Aspectos bioquímicos da resistência do algodoeiro à ramulose potencializada pelo silício. *Bragantia* 72:292-303.

Cacique IS, Domiciano GP, Moreira WR, Rodrigues FA, Cruz MFA, Serra NS, Catala AB (2013) Effect of root and leaf applications of soluble silicon on blast development in rice. *Bragantia* 72:304-309.

Andrade CCL, Resende RS, Rodrigues FA, Ferraz HGM, Moreira WR, Oliveira JR, Mariano RLR (2013) Silicon reduces bacterial speck development on tomato leaves. *Tropical Plant Pathology* 38:436-442.

Wordell Filho JA, Duarte HSS, Rodrigues FA, Efeito da aplicação foliar de silicato de potássio e de fungicida na severidade da ferrugem da folha e da mancha amarela do trigo. *Revista Ceres* 60:726-730.

Sousa RS, Rodrigues FA, Schurt DA, Souza NFA, Cruz MFA (2013) Cytological aspects of the infection process of *Pyricularia oryzae* on leaves of wheat plants supplied with silicon. *Tropical Plant Pathology* 38:472-477.

Dallagnol LJ, Rodrigues FA, Mielli MVB (2013) Silicon improves the emergence and sanity of rice seedlings obtained from seeds infected with *Bipolaris oryzae*. *Tropical Plant Pathology* 38:478-484.

Lopes UP, Zambolim L, Souza Neto PN, Souza AF, Capucho AS, Rodrigues FA (2013) Effect of foliar application of potassium silicate on the progress of coffee leaf rust. *Tropical Plant Pathology* 38:547-551.

Curvelo CRS, Rodrigues FA, Pereira LF, Silva LC, DaMatta FM, Berger PG (2013) Trocas gasosas e estresse oxidativo em plantas de algodoeiro supridas com silício e infectadas por *Ramularia areola*. *Bragantia* 72:346-359.

Schurt DA, Rodrigues FA, Colodette JL, Missio VC (2013) Efeito do silício nas concentrações de lignina e de açúcares em bainhas de folhas de arroz infectadas por *Rhizoctonia solani*. *Bragantia* 72:360-366.

Cruz MFA, Rodrigues FA, Diniz APC, Moreira MA, Barros EG (2013) Potassium silicate and calcium silicate on the resistance of soybean to *Phakopsora pachyrhizi* infection. *Bragantia* 72:373-377.

Silva IT, Rodrigues FA, Baroni JCP (2012) Effect of Soil-applied Zinc and Manganese on the Development of *Rhizoctonia* aerial blight of soybean. *Journal of Phytopathology* 160:135-138.

Dallagnol LJ, Rodrigues FA, Tanaka FAO, Amorim L, Camargo LEA (2012) Effect of potassium silicate on epidemic components of powdery mildew on melon. *Plant Pathology* 61:323-330.

Cruz MFA, Silva FS, Rodrigues FA, Araujo JM, Barros EG (2012) Silício no processo infeccioso de *Phakopsora pachyrhizi* em folíolos de plantas de soja. *Pesquisa Agropecuária Brasileira* 47:142-145.

Carré-Missio V, Rodrigues FA, Schurt DA, Rezende DC, Moreira WR, Korndorfer GH, Zambolim L (2012) Componentes epidemiológicos da ferrugem do cafeeiro afetados pela aplicação foliar de silicato de potássio. *Tropical Plant Pathology* 37:50-56.

Schurt DA, Rodrigues FA, Dutra RR, Moreira WR, Souza NFA, Silva WA (2012) Resistência física de bainhas de plantas de arroz supridas com silício e infectadas por *Rhizoctonia solani*. *Tropical Plant Pathology* 37:281-285.

Carré-Missio V, Rodrigues FA, Schurt DA, Moreira WR, Rezende DC, Korndörfer GH, Zambolim L (2012) Proteção local, não sistêmica, do silicato de potássio reduz os sintomas da ferrugem do cafeeiro. *Tropical Plant Pathology* 37:275-280.

Rodriguez LP, Rodrigues FA, Nascimento KJT, Schulman P, Silva LC, Neves FW, Vale FXR (2012) Biochemical aspects of bean resistance to anthracnose mediated by silicon. *Annals of Applied Biology* 161:140-150.

Resende RS, Rodrigues FA, Cavatte PC, Martins SCV, Moreira WR, Chaves GRM, DaMatta FM (2012) Leaf gas exchange and oxidative stress in sorghum plants supplied with silicon and infected by *Colletotrichum sublineolum*. *Phytopathology* 102:892-898.

Cacique IS, Domiciano GP, Rodrigues FA, Vale FXR (2012) Silicon and manganese on rice resistance to blast. *Bragantia* 72:239-244.

Fortunato AA, Rodrigues FA, Nascimento KJT (2012) Physiological and biochemical aspects of the resistance of banana plants to *Fusarium* wilt potentiated by silicon. *Phytopathology* 102:957-966.

Fortunato AA, Rodrigues FA, Baroni JCP, Soares GCB, Rodriguez MAD, Pereira OL (2012) Silicon suppresses *Fusarium* wilt development in banana plants. *Journal of Phytopathology* 160:674-679.

Detmann KC, Araújo WL, Martins SCV, Sanglard LMVP, Reis JV, Detmann E, Rodrigues FA, Nunes-Nesi A, Fernie AR, DaMatta FM (2012) Silicon nutrition increases grain yield, which, in turn, exerts a feed-forward stimulation of photosynthetic rates via enhanced mesophyll conductance and alters primary metabolism in rice. *New Phytologist* 196:752-762.

Silva MRJ, Pereira SC, Rodrigues FA, Zanão Júnior LA, Fontes RLF, Oliveira MGA (2012) Silicon and manganese on the activity of enzymes involved in rice resistance against brown spot. *Tropical Plant Pathology* 37:339-345.

Debona D, Rodrigues FA, Rios JA, Nascimento KJT (2012) Biochemical changes in the leaves of wheat plants infected by *Pyricularia oryzae*. *Phytopathology* 102:1121-1129.

Prabhu AS, Barbosa Filho MP, Datnoff LE, Snyder GH, Berni RF, Rodrigues FA, Dallagnol LJ (2012) Silicon reduces brown spot severity and grain discoloration on several rice genotypes. *Tropical Plant Pathology* 37:409-414.

Souza AGC, Rodrigues FA, Maffia LA, Mizubuti ESG (2011) Infection process of *Cercospora coffeicola* on coffee leaf. *Journal of Phytopathology* 159:6-11.

Filha MSX, Rodrigues FA, Domiciano GP, Oliveira HV, Silveira PR, Moreira WR (2011) Wheat resistance to leaf blast mediated by silicon. *Australasian Plant Pathology* 40:28-38.

Dallagnol LJ, Rodrigues FA, DaMatta FM, Mielli MVB, Pereira SC (2011) Deficiency in silicon uptake affects cytological, physiological, and biochemical events in the rice interaction. *Phytopathology* 101:92-104.

Cruz MFA, Souza GA, Rodrigues FA, Sediyaama CS, Barros EG (2011) Reação de genótipos de soja à infecção natural por ferrugem asiática. *Pesquisa Agropecuária Brasileira* 46:215-218.

Dallagnol LJ, Rodrigues FA, DaMatta FM (2011) Brown spot of rice is affected by photon irradiance and temperature. *Journal of Phytopathology* 159:630-634.

Dallagnol LJ, Rodrigues FA, Martins SCV, Cavatte PC, DaMatta FM (2011) Alterations on rice leaf physiology during infection by *Bipolaris oryzae*. *Australasian Plant Pathology* 40:360-365.

Rodrigues FA, Carré-Missio V, Jham GN, Berhow M, Schurt DA (2011) Chlorogenic acid levels in leaves of coffee plants supplied with silicon and infected by *Hemileia vastatrix*. *Tropical Plant Pathology* 36:404-408.

Cruz MFA, Diniz APC, Rodrigues FA, Barros EG (2011) Aplicação foliar de produtos na redução da severidade da brusone do trigo. *Tropical Plant Pathology* 36:424-428.

Carvalho MP, Rodrigues FA, Silveira PR, Andrade CCL, Baroni JCP, Paye HS, Loureiro Junior JE (2010) Rice resistance to brown spot mediated by nitrogen and potassium. *Journal of Phytopathology* 158:160-166.

Silva IT, Rodrigues FA, Oliveira JR, Pereira SC, Andrade CCL, Silveira PR, Conceição MM (2010) Wheat resistance to bacterial leaf streak mediated by silicon. *Journal of Phytopathology* 158:253-262.

Domiciano GP, Rodrigues FA, Vale FXR, Xavier Filha MS, Moreira WR, Andrade CCL, Pereira SC (2010) Wheat resistance to spot blotch potentiated by silicon. *Journal of Phytopathology* 158:334-343.

Silva RV, Oliveira RDL, Nascimento KJT, Rodrigues FA (2010) Biochemical responses of coffee resistance against *Meloidogyne exigua* mediated by silicon. *Plant Pathology* 59:586-593.

Curvelo CRS, Rodrigues FA, Berger PG, Rezende DC, Microscopia eletrônica de varredura do processo infeccioso de *Ramularia areola* em folhas de algodoeiro. *Tropical Plant Pathology* 38:108-113.

French-Monar RD, Rodrigues FA, Korndorfer GH, Datnoff LE (2010) Silicon suppresses *Phytophthora* blight development on bell Pepper. *Journal of Phytopathology* 158:554-560.

Domiciano GP, Rodrigues FA, Moreira WR, Oliveira HV, Vale FXR, Xavier Filha MS (2010) Silício no progresso da mancha marrom na folha bandeira do trigo. *Tropical Plant Pathology* 35:186-189.

Carré-Missio V, Rodrigues FA, Schurt DA, Rezende DC, Ribeiro NB, Zambolim L (2010) Aplicação foliar de silicato de potássio, acibenzolar-S-metil e fungicidas na redução da mancha de *Pestalotia* em morango. *Tropical Plant Pathology* 35:182-185.

Rodrigues FA, Duarte HSS, Rezende DC, Wordell Filho JA, Korndorfer GH, Zambolim L (2010) Foliar spray of potassium silicate on the control of angular leaf spot on beans. *Journal of Plant Nutrition* 33:2082-2093.

### **Book and Book Chapters (from 2010 to 2014)**

Rodrigues FA, Fortunato AA, Resende RS (2012) Indução de Resistência em Plantas a Patógenos. Vol. 1. Suprema Gráfica e Editora Ltda, Visconde do Rio Branco, MG, BRA. 358p.

Rodrigues FA (2011) Silício na Agricultura - Anais do V Simpósio Brasileiro sobre Silício na Agricultura. Vol. 1. Suprema Gráfica e Editora Ltda, Visconde do Rio Branco, MG, BRA. 385p .

Dhingra OD, Silva Júnior GJ, Rodrigues FA (2013) Patologia de sementes. In: Tuneo S (Ed.). *Tecnologias de Produção de Sementes de Soja*. Vol. 1. Mecenas Ltda, Londrina, PR, BRA. pp. 135-162.

Rodrigues FA, Fortunato AA, Resende RS (2012) Silício no manejo integrado de doenças de Plantas. In: Podestá GS, Amora DX, Santiago TR, Nasu EGC, Machado PS, Guatimosim E, Fortunato AA (Eds.). *Nutrição no Manejo de Doenças de Plantas*. Vol. 1. Viçosa, MG, BRA. pp. 213-235.

Rodrigues FA, Resende RS, Fortunato AA (2012) Silício no manejo de doenças em culturas anuais e perenes. In: Silva LC, Moura Filho G, Moura AB, Albuquerque AW (Eds.). *Reunião Brasileira de Fertilidade do Solo e Nutrição de Plantas, Fertbio 2012 - A Responsabilidade Socioambiental da Pesquisa Agrícola*. Vol. 1. Sociedade Brasileira de Ciência do Solo, Viçosa, MG, BRA. pp. 1-17.

Rodrigues FA, Resende RS, Fortunato AA, Cruz MFA (2012) Silício na Resistência de Plantas à Patógenos. In: EMBRAPA Clima Temperado (Ed.). *Workshop Insumos para Agricultura Sustentável. 27 a 29 de novembro de 2012*. Embrapa Clima Temperado. Vol. 1. EMBRAPA Clima Temperado, Pelotas, RS, BRA. pp. 1-6.

Rodrigues FA, Resende RS, Dallagnol LJ, Silva IT, Domiciano GP (2011) A review of silicon's use on the monocots sorghum, rice and wheat. In: Pele L, Powell JJ, Kinrade S, Juddaohsingh R, Collery P, Maynard I, Badawi A (Eds.). *Metal in Biology and Medicine and Aqueous Chemistry and Biochemistry of Silicon*. Vol. 11. John Libbet: Paris, FRA. pp. 299-304.

Rodrigues FA, Silva IT, Dallagnol LJ, Domiciano GP, Resende RS, Rezende DC, Schurt DA (2010) The Use of silicon to control foliar diseases. In: Prado RM, Cecílio Filho AB, Correia MAR, Puga AP (Eds.) *Nutrição de Plantas - Diagnose Foliar em Hortaliças*. Vol. 1. Fundunesp, Jaboticabal, SP, BRA. pp. 91-108.

Rodrigues FA, Resende RS, Domiciano GP (2010) O potencial do silício para as fruteiras. In: Rodrigues FA (Ed.). *Silício na Agricultura - Anais do V Simpósio Brasileiro sobre Silício na Agricultura*. Vol. Suprema Gráfica e Editora Ltda, Visconde do Rio Branco, MG, BRA. pp. 171-181.

Rodrigues FA, Resende RS, Dallagnol LJ (2010) A review of silicon's use on the monocots rice and sorghum. In: Rodrigues FA (Ed.). *Silício na Agricultura - Anais do V Simpósio Brasileiro sobre Silício na Agricultura*. Vol. 1. Suprema Gráfica e Editora Ltda, Visconde do Rio Branco, MG, BRA. pp. 257-267.

Silva IT, Rodrigues FA, Oliveira JR (2010) Silicon on the management of bacterial diseases. In: Rodrigues FA (Ed.). *Silício na Agricultura - Anais do V Simpósio Brasileiro sobre Silício na Agricultura*. Vol. 1. Suprema Gráfica e Editora Ltda, Visconde do Rio Branco, MG, BRA. pp. 269-278.

Rodrigues FA, Resende RS (2010) Silício na potencialização da resistência de plantas a patógenos. In: Núcleo de Estudos em Fitopatologia da UFLA e Sociedade Brasileira de Fitopatologia (Ed.). *Anais da V Reunião Brasileira sobre Indução de Resistência em Plantas*. Vol. 1. Brasília, DF, BRA pp. 171-180.



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### **Publications in Refereed Journals (from 2010 to 2014)**

Paz-Carrasco L, Castillo-Urquiza GP, Lima ATM, Xavier CAD, Vivas-Vivas L, Mizubuti ESG, Zerbini FM (2014) Begomovirus diversity in tomato crops and weeds in Ecuador and the detection of a recombinant isolate of rhynchosia golden mosaic Yucatan virus infecting tomato. *Archives of Virology* 159: 2127-2132.

Varsani A, Martin DP, Navas-Castillo J, Moriones E, Hernández-Zepeda C, Idris A, Zerbini FM, Brown JK (2014) Revisiting the classification of curtoviruses based on genome-wide pairwise identity. *Archives of Virology* 159: 1873-1882.

Varsani A, Navas-Castillo J, Moriones E, Hernández-Zepeda C, Idris A, Brown JK, Zerbini FM, Martin DP (2014) Establishment of three new genera in the family Geminiviridae: Becurtovirus, Eragrovirus and Turncurtovirus. *Archives of Virology* 159:2193-2203.

Silva FN, Lima ATM, Rocha CS, Castillo-Urquiza GP, Alves Junior M, Zerbini FM (2014) Recombination and pseudorecombination driving the evolution of the begomoviruses *Tomato severe rugose virus* (ToSRV) and *Tomato rugose mosaic virus* (ToRMV): two recombinant DNA-A components sharing the same DNA-B. *Virology Journal* 11:66.

Al-Shihi AAM, Khan AJ, Akhtar S, Lima ATM, Zerbini FM, Briddon R (2014) Occurrence of new recombinant begomovirus species infecting tomato in the Al Batinah region of Oman. *Plant Pathology*:n/a-n/a.

Ramos-Sobrinho R, Xavier CAD, Pereira HMB, Lima GSA, Assunção IP, Mizubuti ESG, Duffy S, Zerbini FM (2014) Contrasting genetic structure between two begomoviruses infecting the same leguminous hosts. *Journal of General Virology* 95:online-online.

Lima ATM, Ramos-Sobrinho R, Gonzalez-Aguilera J, Rocha CS, Silva SJC, Xavier CAD, Silva FN, Duffy S, Zerbini FM (2013) Synonymous site variation due to recombination explains higher variability in begomovirus populations infecting non-cultivated hosts. *Journal of General Virology* 94:418-431, 2013.

Carvalho SL, Silva FN, Zanardo LG, Almeida AMR, Zerbini FM, Carvalho CM (2013) Production of polyclonal antiserum against Cowpea mild mottle virus coat protein and its application in virus detection. *Tropical Plant Pathology* 38:49-54.

Rocha CS, Castillo-Urquiza GP, Lima ATM, Silva FN, Xavier CAD, Hora Junior BT, Beserra Junior JEA, Malta AWO, Martin DP, Varsani A, Alfenas-Zerbini P, Mizubuti ESG, Zerbini FM (2013) Brazilian begomovirus populations are highly recombinant, rapidly evolving, and segregated based on geographical location. *Journal of Virology* 87:5784-5799.

Melgarejo T, Kon T, Rojas MR, Paz-Carrasco L, Zerbini FM, Gilbertson RL (2013) Characterization of a New World monopartite begomovirus causing leaf curl disease of tomato in Ecuador and Peru reveals a new direction in geminivirus evolution. *Journal of Virology* 87:5397-5413.

Quiñones-Pantoja M, Martinez-Zubiaur Y, Arana F, Martinez MA, Zamora L, Miranda I, Zerbini FM (2013) Coexistencia de potyvirus y begomovirus en el cultivo del pimiento (*Capsicum annuum* L.) en Cuba. *Revista de Protección Vegetal* 28:36-44.

Lima JS, Lima ATM, Castillo-Urquiza GP, Silva SJC, Assunção IP, Michereff SJ, Zerbini FM, Lima GSA (2013) Variabilidade genética de isolados de badnavirus infectando inhame (*Dioscorea* spp.) no nordeste do Brasil. *Tropical Plant Pathology* 38:349-353.

Gonzalez-Aguilera J, Hurtado FD, Almeida VS, Tavares SS, Ramos-Sobrinho R, Nick C, Soares, MO, Xavier CAD, Freitas RD, Gil MA, Zerbini FM, Silva DJH (2013) Response of tomato (*Solanum* L. section *Lycopersicon* Mill.) germplasm to begomovirus inoculation under controlled and field conditions. *Genetic Resources and Crop Evolution* 61:435-450.

Zanardo LG, Silva FN, Lima ATM, Milanesi DF, Castilho-Urquiza GP, Almeida AMR, Zerbini FM, Carvalho CM (2013) Molecular variability of cowpea mild mottle virus infecting soybean in Brazil. *Archives of Virology* 159:727-737.

Muhire B, Martin DP, Brown JK, Navas-Castillo J, Moriones E, Zerbini FM, Rivera-Bustamante R, Malathi VG, Briddon RW, Varsani A (2013) A genome-wide pairwise-identity-based proposal for the classification of viruses in the genus Mastrevirus (family Geminiviridae). *Archives of Virology* 158:1411-1424.

Zanardo LG, Silva FN, Bicalho AAC, Urquiza GPC, Lima ATM, Almeida AMR, Zerbini FM, Carvalho CM (2013) Molecular and biological characterization of *Cowpea mild mottle virus* isolates infecting soybean in Brazil and evidence of recombination. *Plant Pathology* 63:n/a-n/a.

Daltro CB, Pereira AJ, Cascardo RS, Alfenas-Zerbini P, Beserra Junior JEA, Lima JAA, Zerbini FM, Andrade EC (2012) Genetic variability of papaya lethal yellowing virus isolates from Ceará and Rio Grande do Norte states, Brazil. *Tropical Plant Pathology* 37:37-43.

Tavares SS, Ramos-Sobrinho R, Gonzalez-Aguilera J, Assunção IP, Lima GSA, Zerbini FM (2012) Further molecular characterization of weed-associated begomoviruses in Brazil, with emphasis on *Sida* spp.. *Planta Daninha* 30:305-315.

Pereira AJ, Alfenas-Zerbini P, Cascardo RS, Andrade EC, Zerbini FM (2012) Analysis of the full-length genome sequence of *Papaya lethal yellowing virus* (PLYV), determined by deep sequencing, confirms its classification in the genus Sobemovirus. *Archives of Virology* 157:2009-2011.

Silva SJC, Castillo-Urquiza GP, Hora Junior BT, Assunção IP, Lima GSA, Pio-Ribeiro G, Mizubuti ESG, Zerbini FM (2012) Species diversity, phylogeny and genetic variability of begomovirus populations infecting leguminous weeds in northeastern Brazil. *Plant Pathology* 61:457-467.

González-Aguilera J, Tavares SS, Ramos-Sobrinho R, Xavier CAD, Dueñas-Hurtado F, Lara-Rodrigues RM, Silva DJH, Zerbini FM (2012) Genetic structure of a Brazilian population of the begomovirus *Tomato severe rugose virus* (ToSRV). *Tropical Plant Pathology* 37:346-353.

Dueñas-Hurtado Francisco, Gil MA, Martinez-Zubiaur Y, González-Aguilera J, Xavier CAD, Zerbini FM, Silva DJH (2012) Fontes de resistência em tomateiro aos begomovírus bissegmentados *Tomato yellow spot virus* e *Tomato severe rugose virus*. *Horticultura Brasileira* 30:639-644.

Rodriguez-Pardina P, Hanada K, Graciela-Laguna I, Zerbini FM, Ducasse DA (2011) Molecular characterization and relative incidence of bean- and soybean-infecting begomoviruses in northwestern Argentina. *Annals of Applied Biology* 158:69-78.

Barros DR, Alfenas-Zerbini P, Beserra Junior JEA, Antunes TFS, Zerbini FM (2011) Comparative analysis of two isolates of *Cowpea aphid-borne mosaic virus* (CABMV) obtained from different hosts. *Archives of Virology* 156:1085-1091.

Beserra Junior JEA, Carvalho MG, Barguil BM, Zerbini FM (2011) Partial genome sequence of a Potyvirus and of a virus in the order Tymovirales found in *Senna macranthera* in Brazil. *Tropical Plant Pathology* 36:116-120.

Aguilera GAH, Dueñas-Hurtado F, Xavier CAD, Laurindo BS, Nick C, Gil MA, Silva DJH, Zerbini FM (2011) Identificação dos genes Ty-2 e Ty-3 de resistência a begomovírus em genótipos de tomateiro. *Pesquisa Agropecuária Brasileira* 46:772-775.

Aguilera GAH, Malta AWO, Flores MP, Almeida VS, Nick C, Xavier CAD, Silva DJH, Zerbini FM (2011) Characterization of the resistance of tomato accessions from the BGH-UFV to the geminivírus *Tomato yellow spot virus*. *Revista Brasileira de Agropecuária Sustentável* 1:66-70.

Quiñones M, Arana F, Alfenas-Zerbini P, Soto M, Ribeiro D, Diaz A, González D, Carbonell J, Depestre T, Zerbini FM (2011) First report of in sweet pepper in Cuba. *New Disease Reports* 24:16.

Silva SJC, Castillo-Urquiza GP, Hora Junior BT, Assunção IP, Lima GSA, Mizubuti ESG, Zerbini FM (2011) High genetic variability and recombination in a begomovirus population infecting the ubiquitous weed *Cleome affinis* in northeastern Brazil. Archives of Virology 156:2205-2213.

Fernandes FR, Albuquerque LC, Oliveira CL, Cruz ARR, Rocha WB, Pereira TG, Naito FYB, Dias NM, Nagata T, Faria JC, Zerbini FM, Aragão FJL, Inoue-Nagata AK (2011) Molecular and biological characterization of a new Brazilian begomovirus, *Euphorbia yellow mosaic virus* (EuYMV), infecting *Euphorbia heterophylla* plants. Archives of Virology 156:2063-2069.

Rocha CS, Xavier CAD, Lima ATM, Silva FN, Zerbini FM (2011) Molecular characterization of the begomovirus *Tomato mottle leaf curl virus* (TMOLCV). Virus Reviews and Research 16:online.

Ferreira SS, Barros DR, Almeida MR, Zerbini FM (2010) Characterization of Passion fruit severe leaf distortion virus, a novel begomovirus infecting passion fruit in Brazil, reveals a close relationship with tomato-infecting begomoviruses. Plant Pathology 59:221-230.

#### **Book and Book Chapters (from 2010 to 2014)**

Zerbini FM, Silva FN, Castillo-Urquiza GP, Basso MF (2014) Transgenic plants. In: Borém A, Fritsche-Neto R (Eds.). Biotechnology and Plant Breeding: Applications and Approaches for Developing Improved Cultivars. Vol.1. Elsevier Academic Press, New York, NY, USA. pp. 179-199.

Zerbini FM, Silva FN, Castillo-Urquiza GP, Basso MF (2013) Plantas Transgênicas. In: Borém A, Fritsche-Neto R (Eds.). Biotecnologia Aplicada ao Melhoramento de Plantas. Vol. 1. Suprema Gráfica e Editora, Viçosa, MG, BRA. pp. 229-265.

Zerbini FM, Alfenas-Zerbini P (2013) Supressores de RNAi. In: Pereira TC (Ed.). Introdução à Técnica de Interferência por RNA - RNAi. Vol. 1. Sociedade Brasileira de Genética, Ribeirão Preto, SP, BRA. pp. 101-116.

Brown J, Fauquet CM, Briddon R, Zerbini FM, Moriones E, Navas-Castillo J (2012) Family Geminiviridae. In: King AMQ, Adams MJ, Carstens EB, Lefkowitz EJ (Eds.). Virus Taxonomy. Ninth Report of the International Committee on Taxonomy of Viruses. Vol. 1. Elsevier Academic Press, Londres, UK. pp. 351-373.

Adams MJ, Zerbini FM, French R, Rabenstein F, Stenger DC, Valkonen JPT (2012) Family Potyviridae. In: King AMQ, Adams MJ, Carstens EB, Lefkowitz EJ (Eds.). Virus Taxonomy. Ninth Report of the International Committee on Taxonomy of Viruses. Vol. 1. Elsevier Academic Press, Londres, UK. pp. 1069-1089.

Silva FN, Lima ATM, Zerbini FM (2012) Sintomas induzidos por vírus, viroides, fitoplasmas e espiroplasmas em plantas. In: Zambolim L, Jesus Júnior WC, Pereira OL (Eds.). O Essencial da Fitopatologia - Agentes Causais. Vol. 1. Suprema Gráfica e Editora, Viçosa, MG, BRA. pp. 161-176.

**APPENDIX 2**

Syllabi for courses included in the dual-degree required curriculum

List of courses included:

PPA 500

PPA 600

PPA 640

PPA 641

PPA 673

FIP 610

FIP 620

FIP 630

FIP 640

FIP 680

FIP 701

**PPA (PLS 640) – Identification of Plant Diseases, Fall Semester, 2014**  
***Syllabus and Course Requirements***

**INSTRUCTOR**

Sladana Bec, Dept. of Plant Pathology, 211 Plant Science Building

Telephone: (859) 536-2554; e-mail: [sladanabec@gmail.com](mailto:sladanabec@gmail.com)

Nicole Ward Gauthier, Dept. of Plant Pathology, 204 Plant Science Building

Telephone: (859) 218-0720; e-mail: [Nicole.ward@uky.edu](mailto:Nicole.ward@uky.edu)

Office hours: please contact for arrangements

**PURPOSE**

PPA (PLS) 640 is intended to give graduate students practical exposure to plant pathology and science-based diagnostics. The objectives of PPA (PLS) 640 are to learn the processes involved in diagnosing plant diseases and making control recommendations, recognize common diseases found on various hosts in Kentucky, understand the workings of Extension plant pathology, and be exposed to the Kentucky agricultural industry.

**PREREQUISITES**

The students are required to have taken PPA 400G (Principles of Plant Pathology) or its equivalent from another institution. Students are expected to be familiar with microbiology, including mycology, and microscopy.

**CLASS MEETINGS**

Class will be held in the Ag North Greenhouse Teaching Classroom / Laboratory. The classroom portion of PPA/PLS 640 will meet once or twice per week from June 9 through August 12, and we will hold two class meetings after the beginning of the Fall 2014 semester.

Each class will consist of lectures, demonstrations, diagnosis of specimens, and discussion. We will also take field trips to view diseases and agricultural production around Kentucky. Date, duration, and location of these trips will be listed in the class schedule to be distributed on the first day of class.

Classroom space and supplies will be provided for students to examine specimens and make cultures. Basic reference materials will be provided in the class library. Additional reference materials may be used in the Plant Disease Diagnostic Laboratory; however, these references are not to be removed from the laboratory. Students will be allotted space in the Greenhouse Teaching Classroom/Laboratory walk-in cold room for storage of specimens. *Students are encouraged, but not required, to bring a digital camera to each session.*

Students will be expected to read the Kentucky Pest News (KPN) newsletter. Issues of KPN can be obtained by subscribing to the KPN Listserv at [www.uky.edu/kpn](http://www.uky.edu/kpn). From the main menu, select 'Subscribe' and follow instructions. Past issues of KPN are available under 'Previous Issues' at [www.uky.edu/kpn](http://www.uky.edu/kpn).

**STUDENT RESPONSIBILITIES**

**General.** Using specimens provided by the instructors, students will diagnose samples during lab sessions. Students will work on samples in groups of 2-3, and a brief, written report will be expected for each sample (example format will be provided). Disease reports are to be kept in a

lab notebook that will serve as a study guide for later exams, so each student will be expected to complete a report for each diagnosis. Each group will be responsible for presenting their findings to the class for ONE of the assigned samples (selected by the instructor), so that all samples are discussed before the end of the lab session. Each group member must participate in the presentation to the class.

**Disease Collection.** Each student must collect and diagnose 10 specimens of disease on different types of plants over the summer, as follows:

2 – field crops

2 – vegetable crops

2 – ornamentals and landscape/forest trees

2 – fruits

2 – turf and forages

**The disease collection must be turned in by August 15.** A complete collection will consist of fresh or preserved specimens along with supporting materials (illustrations of pathogen signs or digital images, diagnostic tests, etc.). A **brief** written report also is required that identifies each disease and its importance, the causal agent, symptoms and signs, disease cycle, and control measures. Diseases that have been diagnosed during class may be included in the disease collection; however, students must use materials that they have collected on their own or during field trips (not specimens provided during lab).

## **EXAMINATIONS**

Students will be expected to understand and apply the general principles and practices of plant disease diagnosis. In addition, they will recognize or know how to diagnose the diseases of samples with which they have worked **plus** important diseases of other crops discussed by the instructor and other students. Students will also be expected to be familiar with information presented in the weekly Kentucky Pest News and other practical plant disease information introduced during class-related activities. **All examinations are 'open book' - the use of class notes is permitted.**

## **CRITERIA FOR GRADING STUDENTS IN PPA (PLS) 640**

First examination: 100 points

Second examination: 100 points

Final examination: 100 points

Disease collection: 100 points

*Score will be based on quality of specimens, accuracy of diagnoses, and quality of written reports (clear documentation of importance, disease cycles, symptoms, signs, identification, and management practices).*

Class Participation: 100 points

*Score will be based on class attendance (two excused absences are permitted during the semester; each additional absence will result in a loss of 10 class participation points), oral diagnostic reports, and participation in discussions during class or field trips.*

**PPA 654: Advanced Plant Disease Resistance****Semesters taught:** Every fall.**Credit hours:** 1**Prerequisites:** PPA 400G, PPA 500, PPA 600**Requirement:** Option to fulfill the requirement for two courses in Advanced Plant Pathology (PPA 65x)**Organizer and Instructor:** Pradeep Kachroo**Major Teaching Objectives:** Give student an in-depth understanding of the interaction between host and pathogen. Emphasis is on the host defense signaling.**Readings:** At least 1 week before each lecture, students will be assigned one review paper and one recent research paper for that lecture.**Topics:**

- Lecture 1 Genetic analysis of plant disease interactions  
Gene for Gene interaction
- Lecture 2 Mapping, map based cloning of genes,
- Lecture 3 R gene structure and function
- Lecture 4 Hypersensitive response, Lesion mimics
- Lecture 5 Downstream signaling, signal transduction
- Lecture 6 Signaling and disease resistance
- Lecture 6 SA and disease resistance
- Lecture 7 JA/ethylene and disease resistance
- Lecture 8 **Midterm exam**
- Lecture 9 FA signaling and disease resistance
- Lecture 10 NO and disease resistance
- Lecture 11 Cross talk and comparison of R signaling pathways against virus,  
bacterial, oomycete and fungal pathogens
- Lecture 12 Virus-induced gene silencing
- Lecture 13 Virus-induced gene silencing
- Lecture 14 Resistance via tolerance

**Assignments, Exams and Grades:**


Participation: 40 pts

Midterm exam: 30 pts

Final exam: 30 pts

Grades: 90-100%, A; 80-89%, B; 70-79%, C; &lt;70%, D



 <b>UNIVERSIDADE FEDERAL DE VIÇOSA</b>	<b>COURSE PROGRAM</b>	Nº	
		SHEET:	INITIALS:

IDENTIFICATION			
COURSE: <b>PHYTOMYCOLOGY (Fitomicologia)</b>			CODE: <b>FIP 610</b>
DEPARTMENT: <b>PLANT PATHOLOGY (Fitopatologia)</b>			ADMINISTRATIVE UNIT CODE: <b>CCA</b>
DURATION IN WEEKS <b>15</b>	NUMBER OF HOURS PER WEEK		TOTAL NUMBER OF HOURS
LECTURES: <b>02</b>	LABORATORIES: <b>04</b>	TOTAL: <b>06</b>	<b>90</b>
CREDIT NUMBER: <b>04</b>		SEMESTER: <b>1</b>	
PRE-REQUISITES		PRE OR CO-REQUISITES	

CONTENT
<p>Evolution, systematics and classification of the fungi. Fungal genetics. Fungal physiology. Fungi of the Kingdom Protista. Fungi of the Kingdom Chromista / Straminipila. Fungi of the Kingdom Fungi. Control of fungal diseases.</p>

OFFERED TO THE FOLLOWING PROGRAMS (ONLY FOR UNDERGRADUATE LEVEL COURSES)			
1.	( )	7.	( )
2.	( )	8.	( )
3.	( )	9.	( )
4.	( )	10.	( )
5.	( )	11.	( )
6.	( )	12.	( )
(OB)= OBLIGATORY      (OP)= OPTIONAL			

Nº DA ATA DA REUNIÃO:	DATA DE APROVAÇÃO:	_____
_____/____/____	____/____/____	CHEFE DO DEPARTAMENTO

<b>ALTERAÇÃO</b>	APROVADA PELO	<input type="checkbox"/> CTP	<input type="checkbox"/> CTG
Nº DA ATA DA REUNIÃO	DATA DE APROVAÇÃO:	_____	
_____/____/____	____/____/____	PRESIDENTE DO CONSELHO	

<b>APROVAÇÃO</b>	DA COORDENAÇÃO DE ENSINO, PESQUISA E EXTENSÃO - CEPE
Nº DA ATA DA REUNIÃO	DATA DE APROVAÇÃO
_____/____/____	____/____/____
SECRETÁRIO DE ÓRGÃOS COLEGIADOS	



UNIVERSIDADE  
FEDERAL DE  
VIÇOSA

COURSE PROGRAM (continued)

Nº

SHEET:

INITIALS:

COURSE:

**PHYTOMYCOLOGY**

CODE:

**FIP 610**

**UNITS AND TOPICS**

LECTURES

LABORATORY  
SESSIONS

NUMBER OF  
HOURS PER WEEK

1. Evolution, systematics and classification of the fungi.		02
2. Fungal genetics.		02
3. Fungal physiology.		02
4. Fungi of Kingdom Protista.		01
5. Fungi of the Kingdom Chromista / Straminipila		03
6. Fungi of the Kingdom Fungi:		16
6.1. Phylum Chytridiomycota;		
6.2. Phylum Zygomycota;		
6.3. Phylum Ascomycota;		
6.4. Phylum Basidiomycota.		
7. Controle de doenças fúngicas		04

DEPARTMENT CHAIR



UNIVERSIDADE  
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VIÇOSA

COURSE PROGRAM (continued)

N<sup>o</sup>

SHEET:

INITIALS:

COURSE:

**PHYTOMYCOLOGY**

CODE:

**FIP 610**

UNITS AND TOPICS	<input type="checkbox"/> LECTURES	<input checked="" type="checkbox"/> LABORATORY SESSIONS	NUMBER OF HOURS PER WEEK
01. Basic methods in mycology: collection and processing, microscopy and literature.			04
02. Fungal genetics lab: isolation, cultivation, and conservation of cultures.			04
03. Fungal genetics lab.			04
04. Observation of mixomycetes			02
05. Genera <i>Pythium</i> and <i>Phytophthora</i> .			02
06. Peronosporales			04
07. Chytridiomycota.			02
08. Zygomycota.			02
09. Anamorphs.			16
10. Ascomycota.			08
11. Basidiomycota			08
12. Control of fungal diseases.			04

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BIBLIOGRAPHIC  
REFERENCES

Nº

SHEET:

INITIALS:

CODE:

**PHYTOMYCOLOGY**

CODE:

**FIP 610**

ALEXOPOULOS, C.J., MIMS, C.W. & BLACKWELL, M. 1996. *Introductory Mycology*. John Wiley & Sons, New York.

CARLILE, M.J., WATKINSON, S.C. & GOODAY, G.W. 2001. *The Fungi*. Academic Press.

DIGHTON, J. 2001. *Fungi in Ecosystem Processes*. Marcel Dekker.

HOLLYDAY, P. 1980. *Fungus Diseases of Tropical Crops*. Cambridge University Press.

GAMS, W., HOEKSTRA, E.S. & APTROOT, A. 1998. *CBS Course of Mycology*. Centraalbureau voor Schimmelcultures.

HENNEN, J. et al. 2005. *Catalogue of the Species of Plant Rust Fungi (Uredinales) of Brazil*. Jardim Botânico do Rio de Janeiro (disponível on-line <http://www.jbrj.gov.br/>).

KIRK, P.F., CANNON, P.F., MINTER, D.W. & STALPERS, J.A. 2008 *Dictionary of the Fungi*. CAB INTERNATIONAL MENDES et al. 1998. *Fungos em Plantas no Brasil*. EMBRAPA.


MUELLER, G.M., BILLS, G.F. & FOSTER, M.S. 2004. *Biodiversity of fungi: inventory and monitoring methods*. Elsevier Academic Press.

WALLER, J. M., LENNÉ, J.M., WALLER, S.J. (Eds). 2001. *Plant Pathologist's Pocketbook*. Oxford University Press.

WEBSTER, J. & WEBER, R.W.S. 2007. *Introduction to Fungi*. Cambridge University Press.

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 <b>UNIVERSIDADE FEDERAL DE VIÇOSA</b>	<b>COURSE PROGRAM</b>	Nº	
		SHEET:	INITIALS:

IDENTIFICATION				
COURSE: <b>PHYTONEMATOLOGY (Fitonematologia)</b>			CODE: <b>FIP 620</b>	
DEPARTMENT: <b>PLANT PATHOLOGY (Fitopatologia)</b>			ADMINISTRATIVE UNIT CODE: <b>CCA</b>	
DURATION IN WEEKS	NUMBER OF HOURS PER WEEK			TOTAL NUMBER OF HOURS
<b>15</b>	LECTURES: <b>02</b>	LABORATORIES: <b>02</b>	TOTAL: <b>04</b>	<b>60</b>
CREDIT NUMBER: <b>03</b>		SEMESTER: <b>1</b>		
PRE-REQUISITES		PRE OR CO-REQUISITES		

CONTENT
<p>History and importance. Morphological and biological characteristics of the nematodes. Ecological relationships. Pathogenic relationships. Interaction of nematodes with other pathogens. Basic considerations for the control of nematodes. Prevention of the spread. Reducing nematode populations through soil management and cultural practices. Control by heat. Biological control of nematodes. Control by chemicals. Use of resistant varieties.</p>

OFFERED TO THE FOLLOWING PROGRAMS (ONLY FOR UNDERGRADUATE LEVEL COURSES)	
1. ( )	7. ( )
2. ( )	8. ( )
3. ( )	9. ( )
4. ( )	10. ( )
5. ( )	11. ( )
6. ( )	12. ( )
(OB)= OBLIGATORY      (OP)= OPTIONAL	

Nº DA ATA DA REUNIÃO:	DATA DE APROVAÇÃO:	_____
_____/____/____	____/____/____	CHEFE DO DEPARTAMENTO

<b>ALTERAÇÃO</b>	APROVADA PELO <input type="checkbox"/> CTP <input type="checkbox"/> CTG
Nº DA ATA DA REUNIÃO	DATA DE APROVAÇÃO:
_____/____/____	____/____/____
PRESIDENTE DO CONSELHO	

<b>APROVAÇÃO</b>	DA COORDENAÇÃO DE ENSINO, PESQUISA E EXTENSÃO - CEPE
Nº DA ATA DA REUNIÃO	DATA DE APROVAÇÃO
_____/____/____	____/____/____
SECRETÁRIO DE ÓRGÃOS COLEGIADOS	



UNIVERSIDADE  
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VIÇOSA

COURSE PROGRAM (continued)

Nº

SHEET:

INITIALS:

COURSE:

**PHYTONEMATOLOGY**

CODE:

**FIP 620**

UNITS AND TOPICS	<input checked="" type="checkbox"/> LECTURES	<input type="checkbox"/> LABORATORY SESSIONS	NUMBER OF HOURS PER WEEK
1 History and significance. 1.1. History of nematology. 1.2. Importance of nematodes to agriculture. 1.3. The nematological literature: books, manuals, journals and other references.			02
2. Morphological and biological characteristics of nematodes: 2.1. Anatomy and morphology; 2.2. Types of nematodes and general eating habits; 2.3. Life cycle of parasitic plant species.			06
3 Ecological Relations.: 3.1. Vertical and horizontal distribution of nematodes in the soil; 3.2. Populations and survival; 3.3. Soil environment; 3.4. Plant environment.			02
4 Pathogenic Relations.: 4.1. Symptoms of diseases caused by nematodes; diagnosis; 4.2. Histopathology of plants parasitized by nematodes; 4.3. Biochemical Aspects of diseases caused by nematodes; 4.4. The verification of the plant pathogenic nematodes. Terminology, Methodology.			02
5 Interaction of nematodes with other pathogens: 5.1. Fungi, bacteria and nematodes; 5.2. Transmission of viruses.			04
6 Basic considerations for the control of nematodes: 6.1. Economic aspect; 6.2. Integrated control; 6.3. Annual crops and perennial crops; 6.4. Eradication versus coexistence.			01
7 Prevention of spread: 7.1. Dissemination processes; 7.2. Natural barriers; 7.3. Practices to restrict the spread. Quarantine. Treatment of plants or plant organs with hot water and chemicals. Use of healthy seedlings.			01

DEPARTMENT CHAIR



UNIVERSIDADE  
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COURSE PROGRAM (continued)

Nº

SHEET:

INITIALS:

COURSE:

**PHYTONEMATOLOGY**

CODE:

**FIP 620**

UNITS AND TOPICS	<input checked="" type="checkbox"/> LECTURES	<input type="checkbox"/> LABORATORY SESSIONS	NUMBER OF HOURS PER WEEK
<p>8 Reduction of nematode population through soil management practices and cultures: 8.1. Fallow; 8.2. Organic fertilization; 8.3. Crop rotation; 8.4. Antagonistic plants; 8.5. Flooding; 8.6. Planting date; 8.7. Destruction or removal of infected plants; 8.8. Other practices.</p>			04
<p>9 Control by heat: 9.1. Heat transfer in the soil; 9.2. Methods and equipments; 9.3. Solar thermotherapy (soil solarization); 9.4. Effects of heat on soil properties.</p>			02
<p>10. Biological control of nematodes: Nematophagous fungi. General characteristics. Main genera and species; Other organisms (bacteria, viruses, nematodes, protozoa, etc.). Current situation and future prospects.</p>			02
<p>11. Control by chemicals: Characteristics of the major nematicides; Techniques and dosages of application; Ecological considerations; Problems of residues in food.</p>			02
<p>12 Use of resistant varieties: Development of new varieties; The nature of resistance; The genetic basis for resistance.</p>			02

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COURSE PROGRAM (continued)

Nº

SHEET:

INITIALS:

COURSE:

**PHYTONEMATOLOGY**

CODE:

**FIP 620**

UNITS AND TOPICS	<input type="checkbox"/> LECTURES	LABORATORY SESSIONS	NUMBER OF HOURS PER WEEK
01 Sample collection and extraction of nematodes: 1.1. Sampling techniques; 1.2. Methods of extraction of nematodes from soil; 1.3. Methods of extraction of nematodes from plant tissue.			04
02 Preparation of slides for examination under a microscope: 2.1. Temporary mounts; 2.2. Permanent mounts; 2.3. Staining of nematodes "in situ" in plant tissues.			04
03 The soybean cyst nematode ( <i>Heterodera glycines</i> ): 3.1. Techniques for the extraction of larvae, cysts and eggs; 3.2. Resistance of soybean cultivars to nematode; 3.3. Race identification.			04
04 The root-knot nematodes ( <i>Meloidogyne</i> spp.): 4.1. Techniques for the extraction of eggs and inoculation of plants. Staining of egg masses; 4.2. Preparation of perineal cuts; 4.3. Polyacrylamide gel electrophoresis for species identification; 4.4. Identification of races.			04
05. Important nematodes: features and significance: 5.1. <i>Pratylenchus</i> and <i>Radopholus</i> ; 5.2. <i>Ditylenchus</i> , <i>Anguina</i> , <i>Bursaphelenchus</i> and <i>Aphelenchoides</i> ; 5.3. <i>Rotylenchulus</i> and <i>Tylenchus</i> ; 5.4. <i>Criconemella</i> , <i>Paratylenchus</i> , <i>Hemicycliophora</i> and <i>Hemicriconemoides</i> ; 5.5. <i>Helicotylenchus</i> , <i>Rotylenchus</i> , <i>Hoplolaimus</i> , <i>Scutellonema</i> , <i>Aorolaimus</i> and <i>Tylenchorhynchus</i> ; 5.6. <i>Longidorus</i> , <i>Paralongidorus</i> , <i>Trichodorus</i> , <i>Paratrachodorus</i> and <i>Xiphinema</i>			14

DEPARTMENT CHAIR





UNIVERSIDADE  
FEDERAL DE  
VIÇOSA

BIBLIOGRAPHIC  
REFERENCES

Nº

SHEET:

INITIALS:

CODE:

**PHYTONEMATOLOGY**

CODE:

**FIP 620**

CHEN, Z. X.; CHEN, S. Y. & DICKSON, D. W. 2004. (ed.) Nematology: Advances and Perspectives Vol 1: Nematode Morphology, Physiology and Ecology. CABI Publishing. Cambridge, MA, USA. 640 p.

CHEN, Z. X.; CHEN, S. Y. & DICKSON, D. W. 2004. (ed.) Nematology: Advances and Perspectives Vol II: Nematode Management and Utilization. CABI Publishing. Cambridge, MA, USA. 608 p.

GAUGLER, R. & BILGRAMI, A. L. 2004. (Editors) Nematode Behaviour. CABI. 432 p.

LUC, M., SIKORA, R. A. & BRIDGE, J. 2005. (ed.) Plant parasitic nematodes in subtropical and tropical agriculture. 2<sup>nd</sup> edition. CABI. 871 p.

MAI, W. F. & MULLIN, P. G. 1996. Plant-Parasitic nematodes: a pictorial key to genera. 5th. Edition. Cornell Univ. Press. Ithaca. 277 p.

PERRY, R. N. & Moens, M. 2006. (ed.) Plant Nematology. CABI. 480 p.

REGNAULT-ROGER, C., PHILOGÈNE, B. J. R. & VINCENT, C. 2005. (ed.) Biopesticides of Plant Origin. Lavoisier 310 p.


SIDDIQI, M. R. 2000. Tylenchida: parasites of plants and insects. 2<sup>nd</sup> edition. CABI. 833 p.

SOUTHEY, J. F. (ed.) 1986. Laboratory Methods for work with Plant and Soil Nematodes. Ministry of Agriculture, Fisheries and Food, London, England. 193 p.

ZUCKERMAN, B. M., MAI, W. F. & KRUSBERG, L. R. 1990. Plant Nematology Laboratory Manual. The University of Massachusetts Agricultural Experiment Station. Massachusetts, USA. 252 p.

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DEPARTMENT CHAIR


 <b>UNIVERSIDADE FEDERAL DE VIÇOSA</b>	<b>COURSE PROGRAM (continued)</b>	N <sup>o</sup>	
		SHEET:	INITIALS:

COURSE: <b>PLANT VIROLOGY</b>	CODE: <b>FIP 630</b>
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UNITS AND TOPICS	<input checked="" type="checkbox"/> LECTURES	<input type="checkbox"/> LABORATORY SESSIONS	NUMBER OF HOURS PER WEEK
1. History and importance of plant virology.			02
2. Symptoms induced by plant viruses in their hosts: 2.1. Macroscopic alterations; 2.2. Microscopic alterations.			02
3. Morphology and structure: 3.1. Morphology; 3.2. Chemical composition and structure of the capsid; 3.3. Nomenclature and taxonomy.			02
4. Strategies of viral replication: 4.1. Stages of the process of establishment of systemic infection; 4.2. Virus replication: Positive RNA viruses; 4.3. Virus replication: Negative RNA viruses; 4.4. Virus replication: DNA genome.			10
5. Cell-to-cell and long-distance movement: 5.1. Cell-to-cell movement via tubules; 5.2. Cell-to-cell movement via increase of plasmodesmal SEL; 5.3. Long-distance movement.			02
6. Subviral infectious agents: 6.1. Viroids; 6.2. Satellite viruses; 6.3. Satellite RNAs.			02
7. Natural transmission: 7.1. Transmission by contact and by seeds; 7.2. Transmission by vectors.			04
8. Control of plant virus diseases. 8.1. Vector control; 8.1. Use of virus-free propagation material; 8.2. Natural resistance; 8.3. Pathogen-derived resistance.			06

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 <b>UNIVERSIDADE FEDERAL DE VIÇOSA</b>	<b>COURSE PROGRAM (continued)</b>	<b>Nº</b>	
		SHEET:	INITIALS:
<b>COURSE: PLANT VIROLOGY</b>		<b>CODE: FIP 630</b>	
<b>UNITS AND TOPICS</b>	<input type="checkbox"/> LECTURES	LABORATORY SESSIONS	NUMBER OF HOURS PER WEEK
01. Artificial transmission of plant viruses; host range.			02
02. Purification of a rod-shaped virus.			04
03. Purification of an isometric virus.			04
04. Optical and electronic microscopy: Observation of cytoplasm inclusions and viral particles.			02
05. Cloning a fragment of a viral genome:			14
5.1. Extraction and whole-genome amplification of a begomovirus.			
5.2. Extraction of viral RNA.			
5.3. RT-PCR: Amplification of fragments of a viral genome.			
5.4. Ligation of amplified products into plasmid vector.			
5.5. Transformation of <i>E. coli</i> .			
5.6. Extraction and electrophoretic analysis of recombinant plasmids.			
06. Analysis of viral sequences.			02
07. Identification of viral suppressors of RNA silencing.			02
_____ DEPARTMENT CHAIR			

 <b>UNIVERSIDADE FEDERAL DE VIÇOSA</b>	<b>BIBLIOGRAPHIC REFERENCES</b>	<b>Nº</b> SHEET:   INITIALS:
CODE: <b>PLANT VIROLOGY</b>	CODE: <b>FIP 630</b>	
<p>FAUQUET, C.M., MAYO, M.A., MANIOFF, J., DESSELBERGER, U. &amp; BALL, L.A. (Eds.) Virus Taxonomy. Eighth Report of the International Committee on Taxonomy of Viruses. San Diego, EUA: Elsevier Academic Press. 1259p. 2005.</p> <p>HOGENHOUT, S.A., AMMAR, E.D., WHITFIELD, A.E. &amp; REDINBAUGH, M.G. Insect vector interactions with persistently transmitted viruses. Annu. Rev. Phytopathol. 46:327-359. 2008.</p> <p>HULL, R. Matthew's Plant Virology (4a ed.). Londres, Inglaterra: Academic Press. 1001p. 2002.</p> <p>LEWIN, B. Genes VIII. Upper Saddle River, EUA: Pearson Prentice Hall. 1027p. 2004.</p> <p>NG, J.C.K. &amp; FALK, B.W. Virus-vector interactions mediating nonpersistent and semipersistent transmission of plant viruses. Annual Review of Phytopathology 44:183-212. 2006.</p> <p>ROJAS, M.R., HAGEN, C., LUCAS, W.J. &amp; GILBERTSON, R.L. Exploiting chinks in the plant's armor: Evolution and emergence of geminiviruses. Annual Review of Phytopathology 43:361-394. 2005.</p> <p>SAMBROOK, J. &amp; RUSSEL, D. Molecular Cloning - A Laboratory Manual (3a ed.). Cold Spring Harbor, EUA: Cold Spring Harbor Laboratory Press. 2344p. 2001.</p> <p>SIMON, A.E., ROOSSINCK, M.J. &amp; HAVELDA, Z. Plant virus satellite and defective interfering RNAs: New paradigms for a new century. Annual Review of Phytopathology 42:415-437. 2004.</p> <p>ZERBINI, F.M. &amp; ALFENAS-ZERBINI, P. Métodos em virologia vegetal. pp. 293-358 In: Alfenas, A.C. &amp; Mafia, R.G. (Eds.) Métodos em Fitopatologia. Viçosa, MG: Editora UFV. 2007.</p> <p>ZERBINI, F.M., ALFENAS, P.F. &amp; ANDRADE, E.C. O silenciamento de RNA como um mecanismo de defesa de plantas a vírus. Revisão Anual de Patologia de Plantas 13:191-246. 2005.</p>		
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UNIVERSIDADE  
FEDERAL DE  
VIÇOSA

COURSE PROGRAM

Nº

SHEET:

INITIALS:

IDENTIFICATION

COURSE: <b>PLANT PATHOGENIC BACTERIA (Bactérias Fitopatogênicas)</b>		CODE: <b>FIP 640</b>	
DEPARTMENT: <b>PLANT PATHOLOGY (Fitopatologia)</b>		ADMINISTRATIVE UNIT CODE: <b>CCA</b>	
DURATION IN WEEKS <b>15</b>	NUMBER OF HOURS PER WEEK		TOTAL NUMBER OF HOURS <b>60</b>
LECTURES: <b>02</b>	LABORATORIES: <b>02</b>	TOTAL: <b>04</b>	
CREDIT NUMBER: <b>03</b>	SEMESTER: <b>2</b>		
PRE-REQUISITES		PRE OR CO-REQUISITES	

CONTENT

History and economic importance. Anatomy and morphology of the bacterial cell: physiology, bacterial metabolism and growth and main recombination processes. Taxonomy of plant pathogenic bacteria. Symptomatology. Penetration, colonization, movement and multiplication of bacteria during plant infection and histopathological aspects of the colonization process. Seed pathology of plant pathogenic bacteria. Survival and spread of plant pathogenic bacteria: life cycle and its implications to spread and survival. Control methods for bacterial plant diseases.

OFFERED TO THE FOLLOWING PROGRAMS (ONLY FOR UNDERGRADUATE LEVEL COURSES)

1.	( )	7.	( )
2.	( )	8.	( )
3.	( )	9.	( )
4.	( )	10.	( )
5.	( )	11.	( )
6.	( )	12.	( )

(OB)= OBLIGATORY (OP)= OPTIONAL

Nº DA ATA DA REUNIÃO: _____/____/____	DATA DE APROVAÇÃO: ____/____/____	_____ CHEFE DO DEPARTAMENTO
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<b>ALTERAÇÃO</b>	APROVADA PELO <input type="checkbox"/> CTP <input type="checkbox"/> CTG
Nº DA ATA DA REUNIÃO _____/____/____	DATA DE APROVAÇÃO: ____/____/____
_____ PRESIDENTE DO CONSELHO	

<b>APROVAÇÃO</b>	DA COORDENAÇÃO DE ENSINO, PESQUISA E EXTENSÃO - CEPE
Nº DA ATA DA REUNIÃO _____/____/____	DATA DE APROVAÇÃO ____/____/____
_____ SECRETÁRIO DE ÓRGÃOS COLEGIADOS	



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VIÇOSA

COURSE PROGRAM (continued)

Nº

SHEET:

INITIALS:

COURSE:

**PLANT PATHOGENIC BACTERIA**

CODE:

**FIP 640**

UNITS AND TOPICS	<input checked="" type="checkbox"/> LECTURES	<input type="checkbox"/> LABORATORY SESSIONS	NUMBER OF HOURS PER WEEK
1. History and economic importance: 1.1. Introduction; 1.2. General recommendations; 1.3. Bacteriology as a science; 1.4. Economic importance of plant bacterial diseases; 1.5. Plant bacteriologists in Brazil and in the world.			02
2. Anatomy and morphology of the bacterial cell: physiology, bacterial metabolism and growth and main recombination processes			05
3. Taxonomy of plant pathogenic bacteria: 3.1. Positioning of the bacteria in the world of living beings; 3.2. Procaryotes and eucaryotes; 3.3. Taxonomy of the plant pathogenic genera and species; 3.4. The concept of pathovar.			05
4. Symptomatology: 4.1. Main types of symptoms; 4.2. Elementary concepts of physiology of parasitism; 4.3. Primary and secondary factors of pathogenesis; 4.4. Compatible and incompatible associations; 4.5. Hypersensitivity.			04
5. Penetration, colonization, movement and multiplication of bacteria during plant infection and histopathological aspects of the colonization process.			02
6. Seed pathology of plant pathogenic bacteria: 6.1. Association of bacteria with seeds and its plant pathological and epidemiological significance; 6.2. Seed treatment as eradication measure; 6.3. Methods of detection of plant pathogenic bacteria in seeds.			04
7. Survival and spread of plant pathogenic bacteria: life cycle and its implications to spread and survival.			04
8. Control methods of bacterial plant diseases: 8.1. General measures; 8.2. Chemical and biological control; 8.3. Seed certification; 8.4. Antibiotics; 8.5. Induced resistance and its implications; 8.6. Plant growth promoting rhizobacteria as biological control agents.			04



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VIÇOSA

COURSE PROGRAM (continued)

N<sup>o</sup>

SHEET:

INITIALS:

COURSE:

**PLANT PATHOGENIC BACTERIA**

CODE:

**FIP 640**

UNITS AND TOPICS	<input type="checkbox"/> LECTURES	LABORATORY SESSIONS	NUMBER OF HOURS PER WEEK
01. Dilution of colonies.			02
02. Isolation of plant pathogenic bacteria from infected plant organs.			02
03. Hypersensitivity test.			02
04. Artificial inoculation.			02
05. Bacterial growth curve.			04
06. Preservation of bacterial cultures by different methods.			02
07. Visualization of bacterial cell and of some structures.			02
08. Seed pathology – rapid detection.			02
09. Determination of a plant pathogenic genus.			02
10. Determination of a plant pathogenic species.			04
11. Bioassays with antibiotics and their application in plant pathology.			02
12. Bacteriocins – bioassays for synthesis detection.			02
13. Bacteriophages – isolation, detection and specificity.			02

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BIBLIOGRAPHIC  
REFERENCES

Nº

SHEET:

INITIALS:

CODE:

**PLANT PATHOGENIC BACTERIA**

CODE:

**FIP 640**

BRENNER, D. J.; KRIEG, N. R. & STALEY, J. T. (Eds.). *Bergey's Manual of Systematic Bacteriology, Vol. 2, The Proteobacteria (Parts A, B & C)*, 2nd ed. Springer, 2005. 2816p.

CROSA, J.H. & KADO, C. I. (eds.). *Molecular mechanisms of bacterial virulence (Developments in Plant Pathology, Vol 3)*. Boston, Kluwer Academic Publishers, 2002. 704p.

GNANAMANICKAM, S. S. (Ed.) *Plant-Associated Bacteria*, Dordrecht, Springer, 2006. 724p.

HAMPTON, R.; BALL, E.; DeBOER, S. (eds.). *Serological methods for detection and identification of viral and bacterial plant pathogens - a laboratory manual*. St. Paul, APS Press, 1990. 387p.

JACKSON, R. W. (Ed.). *Plant Pathogenic Bacteria: Genomics and Molecular Biology*. Norfolk, Caister Academic Press, 2009. 330p.

JANSE, J. D. *Phytobacteriology: Principles and Practice*. Wallingford, Cabi Publishing, 2006. 360p.

KLEMENT, Z.; RUDOLPH, K.; SANDS, D.C. (eds.). *Methods in phytobacteriology*. Budapest, Akadémiai Kiadó, 1990. 568p.

MADIGAN, M. M.; MARTINKO, J. DUNLAP, P.V. & CLARK, D.P. *Brock biology of microorganisms*. 12th ed. Upper Saddle River, Benjamin Cummings, 2008. 1168p.

NESTER, E.; GORDON, M. P. & KERR, A (Eds.). *Agrobacterium Tumefaciens: From Plant Pathology To Biotechnology*. St. Paul, APS Press, 2005. 319p.


ROSSELLÓ-MORA, R. & AMANN, R. The species concept for prokaryotes. *FEMS Microbiology Reviews*, 25: 39-67, 2001.

SCHAAD, N.W.; JONES, J.B. & CHUN, W. (eds). *Laboratory guide for identification of plant pathogenic bacteria*. 3rd ed. St. Paul, APS Press, 2001. 373p.

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DEPARTMENT CHAIR



 <b>UNIVERSIDADE FEDERAL DE VIÇOSA</b>	<b>COURSE PROGRAM</b>	N <sup>o</sup>	
		SHEET:	INITIALS:

IDENTIFICATION			
COURSE: <b>POPULATION BIOLOGY OF PLANT PATHOGENS (Biologia de Populações de Fitopatógenos) *</b>			CODE: <b>FIP 680</b>
DEPARTMENT: <b>PLANT PATHOLOGY (Fitopatologia)</b>			ADMINISTRATIVE UNIT CODE: <b>CCA</b>
DURATION IN WEEKS	NUMBER OF HOURS PER WEEK		TOTAL NUMBER OF HOURS
<b>15</b>	LECTURES: <b>02</b>	LABORATORIES: <b>02</b> TOTAL: <b>04</b>	<b>60</b>
CREDIT NUMBER: <b>03</b>	SEMESTER: <b>1 (even years)</b>		
PRE-REQUISITES		PRE OR CO-REQUISITES	

CONTENT
Concepts of population biology. Basic concepts of evolution. Quantifying genetic diversity. Recombination and variability of populations. Genetic drift and variability of populations. Mutations and variability of populations. Migration and population structure. Selection and variability of populations.

OFFERED TO THE FOLLOWING PROGRAMS (ONLY FOR UNDERGRADUATE LEVEL COURSES)			
1.	( )	7.	( )
2.	( )	8.	( )
3.	( )	9.	( )
4.	( )	10.	( )
5.	( )	11.	( )
6.	( )	12.	( )

(OB)= OBLIGATORY      (OP)= OPTIONAL

N <sup>o</sup> DA ATA DA REUNIÃO:	DATA DE APROVAÇÃO:	
____/____/____	____/____/____	_____
CHEFE DO DEPARTAMENTO		

<b>ALTERAÇÃO</b> APROVADA PELO <input type="checkbox"/> CTP <input type="checkbox"/> CTG
N <sup>o</sup> DA ATA DA REUNIÃO _____ DATA DE APROVAÇÃO: ____/____/____
PRESIDENTE DO CONSELHO

<b>APROVAÇÃO</b> DA COORDENAÇÃO DE ENSINO, PESQUISA E EXTENSÃO - CEPE
N <sup>o</sup> DA ATA DA REUNIÃO _____ DATA DE APROVAÇÃO ____/____/____
SECRETÁRIO DE ÓRGÃOS COLEGIADOS



UNIVERSIDADE  
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VIÇOSA

COURSE PROGRAM (continued)

Nº

SHEET:

INITIALS:

COURSE:

**POPULATION BIOLOGY OF PLANT PATHOGENS**

CODE:

**FIP 680**

UNITS AND TOPICS	<input checked="" type="checkbox"/> LECTURES	<input type="checkbox"/> LABORATORY SESSIONS	NUMBER OF HOURS PER WEEK
01. Concepts of population biology: 1.1 Terminology 1.2 Introduction to population biology: history, names and concepts			02
02. Evolution: basic concepts			04
03. Quantifying genetic diversity			04
04. Recombination: 4.1. Hardy-Weinberg equilibrium; 4.2. Finite populations, panmictic populations, sexual x clonal; 4.3. How to detect and quantify recombination.			04
05. Genetic drift and variability of populations: 5.1. Finite populations and genetic drift; 5.2. Identity by descent and endogamy; 5.3. How to detect genetic drift.			04
06. Mutation and variability: 6.1. Mutation models; 6.2. Quantification of mutation rates.			04
07. Migration and population structure. 7.1. Migration models; 7.2. Migration and genetic drift; 7.3. How to estimate migration between populations.			04
08. Selection: 8.1. Selection models 8.2. The concept of fitness, 8.3. Selection x (drift, recombination, mutation and gene flow), 8.4. Selection estimates in populations.			04

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COURSE PROGRAM (continued)

N<sup>o</sup>

SHEET:

INITIALS:

COURSE:

**POPULATION BIOLOGY OF PLANT PATHOGENS**

CODE:

**FIP 680**

UNITS AND TOPICS	<input type="checkbox"/> LECTURES	LABORATORY SESSIONS	NUMBER OF HOURS PER WEEK
01. Critical analysis of scientific articles – exercise.			04
02. Quantification of genetic diversity using R (RStudio) and DNAsp			02
03. Recombination detection and quantification methods			04
04. Genetic drift			04
05. Quantitative methods to estimate mutation			04
06. Quantitative methods to estimate migration rates			04
07. Detecting and quantifying selection			04
08. Coalescent-based methods			04

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BIBLIOGRAPHIC  
REFERENCES

Nº

SHEET:

INITIALS:

CODE:

**PHYTOPATHOGENIC BACTERIA**

CODE:

**FIP 640**

- Charlesworth, B. Fundamental concepts in genetics: effective population size and patterns of molecular evolution and variation. *Nat. Rev. Genet.* 10:195-205. 2009
- Garrett, K. A., Hulbert, S. H., Leach, J. E. & Travers, S. E. Ecological genomics and epidemiology. *Eur. J. Plant Pathol* 115:31-51. 2006.
- Hartl, D. L. & Clark, A. G. Principles of population genetics. 4th Sinauer Associated, Inc, Sunderland. 2007.
- Nei, M. & Kumar, S. Molecular evolution and phylogenetics. Oxford University Press, New York. 2000.
- Meeûs, T. D., McCoy, K. D., Prugnolle, F., Chevillon, C., Durand, P., Hurtrez-Boussès, S. & Renaud, F. Population genetics and molecular epidemiology or how to "débusquer la bête". *Inf. Genetics Evol.* 7:308-332. 2007.
- Milgroom, M. G. & Peever, T. L. Population biology of plant pathogens. The synthesis of plant disease epidemiology and population genetics. *Plant Dis* 87:608-617. 2003.
- Orr, H. A. Fitness and its role in evolutionary genetics. *Nat. Rev. Genet.* 10:531-539. 2009.
- Stukenbrock, E. H. & McDonald, B. A. Population genetics of fungal and oomycete effectors involved in gene-for-gene interactions. *Mol. Plant Microbe Interact.* 22:371-380. 2009.
- Wakeley, J. Coalescent Theory: An Introduction. Roberts & Company Publishers, Village. 2008.
- Waples, R. S. & Gaggiotti, O. What is a population? An empirical evaluation of some genetic methods for identifying the number of gene pools and their degree of connectivity. *Mol. Ecol* 15:1419-1439. 2006.
- Yang, Z. Computational molecular evolution. Oxford University Press, Oxford. 2006.

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UNIVERSIDADE  
FEDERAL DE  
VIÇOSA

COURSE PROGRAM

Nº

SHEET: \_\_\_\_\_ INITIALS: \_\_\_\_\_

IDENTIFICATION

COURSE: <b>HOST-PATHOGEN INTERACTIONS (Interação Patógeno-Hospedeiro)</b>		CODE: <b>FIP 701</b>	
DEPARTMENT: <b>PLANT PATHOLOGY (Fitopatologia)</b>		ADMINISTRATIVE UNIT CODE: <b>CCA</b>	
DURATION IN WEEKS <b>15</b>	NUMBER OF HOURS PER WEEK		TOTAL NUMBER OF HOURS <b>60</b>
LECTURES: <b>04</b>	LABORATORIES: <b>00</b>	TOTAL: <b>04</b>	
CREDIT NUMBER: <b>04</b>	SEMESTER: <b>1</b>		
PRE-REQUISITES		PRE OR CO-REQUISITES	

CONTENT

Importance of studying host-pathogen interactions in plant pathology. The plant cell. Pathogenesis events. Enzymes. Toxins. Physiological changes in the plant during the infection. Resistance mechanisms. Induction of resistance.

OFFERED TO THE FOLLOWING PROGRAMS (ONLY FOR UNDERGRADUATE LEVEL COURSES)

1.	( )	7.	( )
2.	( )	8.	( )
3.	( )	9.	( )
4.	( )	10.	( )
5.	( )	11.	( )
6.	( )	12.	( )

(OB)= OBLIGATORY (OP)= OPTIONAL

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DATA DE APROVAÇÃO:

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CHEFE DO DEPARTAMENTO

ALTERAÇÃO APROVADA PELO  CTP  CTG

Nº DA ATA DA REUNIÃO

DATA DE APROVAÇÃO:

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PRESIDENTE DO CONSELHO

APROVAÇÃO

DA COORDENAÇÃO DE ENSINO,  
PESQUISA E EXTENSÃO - CEPE

Nº DA ATA DA REUNIÃO

DATA DE APROVAÇÃO

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SECRETÁRIO DE ÓRGÃOS COLEGIADOS



UNIVERSIDADE  
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VIÇOSA

COURSE PROGRAM (continued)

Nº

SHEET:

INITIALS:

COURSE:

**HOST-PATHOGEN INTERACTIONS**

CODE:

**FIP 701**

UNITS AND TOPICS	<input checked="" type="checkbox"/> LECTURES	<input type="checkbox"/> LABORATORY SESSIONS	NUMBER OF HOURS PER WEEK
01. Importance of studying host-pathogen interactions in plant pathology			1
02. The plant cell			1
03. Pathogenesis events: <ul style="list-style-type: none"> <li>3.1. Infection process: adhesion, germination, pre-penetration, penetration;</li> <li>3.2. Molecular events during the recognition process of the host by the pathogen and of the pathogen by the host;</li> <li>3.3. Signal cascades during host-pathogen interactions;</li> <li>3.4. Host colonization and nutrient transfer.</li> </ul>			14
04. Enzymes			6
05. Toxins			6
06. Physiological changes in the plant during the infection: <ul style="list-style-type: none"> <li>6.1. Transpiration and respiration;</li> <li>6.2. Photosynthesis;</li> <li>6.3. Translocation, permeability and metabolism of carbohydrates and other nutrients;</li> <li>6.4. Enzyme activity and concentration of proteins, nucleic acids and growth regulators.</li> </ul>			5
07. Resistance mechanisms: <ul style="list-style-type: none"> <li>7.1. Structural and/or pre-formed resistance mechanisms;</li> <li>7.2. Biochemical and/or post-formed resistance mechanisms.</li> </ul>			15
08. Induction of resistance <ul style="list-style-type: none"> <li>8.1. Induced systemic resistance</li> <li>8.2. Acquired systemic resistance</li> </ul>			12

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VIÇOSA

COURSE PROGRAM (continued)

Nº

SHEET:

INITIALS:

COURSE:

**HOST-PATHOGEN INTERACTIONS**

CODE:

**FIP 701**

UNITS AND TOPICS



LECTURES



LABORATORY  
SESSIONS

NUMBER OF HOURS PER  
WEEK

No lab sessions

DEPARTMENT CHAIR



UNIVERSIDADE  
FEDERAL DE  
VIÇOSA

## REFERENCES

Nº

SHEET:

INITIALS:

CODE:

**HOST-PATHOGEN INTERACTIONS**

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**FIP 701**

Daniel, M.; Purkayastha, R.P. (eds.). Handbook of Phytoalexin - Metabolism and Action. Marcel Dekker, Inc. New York, 615 p., 1995.

Heitefuss, R.; Williams, P.H. (eds.). Physiological Plant Pathology. Encyclopedia of Plant Physiology, vol. 4, Springer. Verlag, New York, 890 p., 1976.

Huang, J.S. Plant Pathogenesis and Resistance. Biochemistry and Physiology of Plant-Microbe Interactions. Kluwer Academic Publishers, Norwell, Madison, 691 p., 2001.

Kamal, B.; Normand, B.; Daayf, F. (eds.). Molecular Plant-Microbe Interactions. CABI, 352 p., 2009.

Loon, L.C.; Kader, J.C.; Delseny, M. (eds.). Plant Innate Immunity. Advances in Botanical Research, vol. 51, Academic Press, 1<sup>st</sup> Edition, 400 p., 2009.

Sadik, T.; Elizabeth, B. Multigenic and induced systemic resistance in plants. Springer, 1<sup>st</sup> Edition, 521 p. 2007.

Sutic, D.; Sinclair, J.B. Anatomy and Physiology of Diseased Plants. CRC Press, Boca Raton, Florida, 208 p., 1990.

Upadhyay, R.K.; Mukerji, K.G. (eds.). Toxins in Plant Disease Development and Evolving Biotechnology, Science Publishers Inc., Enfield, 246 p., 1997.

Vidhyasekaran, P. Fungal Pathogenesis in Plants and Crops - Molecular Biology and Host Defense Mechanisms. Marcel Dekker Inc., New York, 553 p., 1997.

Walters, D.; Newton, A.; Lyon, G. (eds.). Induced resistance for plant defence: a sustainable approach to crop protection. Blackwell Publishing, 258 p., 2007.

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DEPARTMENT CHAIR



### **APPENDIX 3**

Guidelines for the PhD degree at UFV (in English).

UNIVERSIDADE FEDERAL DE VIÇOSA – UFV  
OFFICE OF RESEARCH AND OF THE GRADUATE SCHOOL

Disclaimer: This is an edited version of the original document. Operational details were removed for the sake of brevity. Nevertheless, the original Portuguese and English versions can be obtained upon request ([pr.ppg@ufv.br](mailto:pr.ppg@ufv.br))

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ACADEMIC REQUIREMENTS  
GRADUATE PROGRAMS

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#### ACADEMIC YEAR

The academic year at the Universidade Federal de Viçosa comprises two regular terms of academic activity and a special summer term.

1. Each regular term lasts a minimum of 100 (one hundred) days of school work, excluding the time reserved for exams.
2. The special summer term lasts at least 45 (forty-five) days.

#### COURSES AND PROGRAMS OFFERED

The University offers the following courses and programs:

##### 1. Regular:

1.1. **UNDERGRADUATE PROGRAMS:** courses that provide university education and enable students to obtain academic degrees and professional practice. They are open to holders of certificate of completion of high school or equivalent, who have been approved in the UFV entrance examination, or bearers of a higher education diploma.

1.2. – “*Stricto sensu*” (Master’s and Doctorate degree) and “*Lato sensu*” (Specialization/MBA)

**GRADUATE PROGRAMS:** programs and courses designed to candidates with college degree that meet the conditions prescribed for each case.

##### 2. Special Courses:

2.1. **EXTENSION COURSES:** courses which are open to any applicant, although not at higher education level, aiming to spread knowledge and work techniques.

2.2. **SEQUENTIAL COURSES:** open to candidates who have graduated from high school or equivalent course and meet the requirements of the institution. These courses can be in-classroom, semi-in-classroom or distance based.

## GENERAL RULES FOR *STRICTO SENSU* GRADUATE PROGRAMS

### OBJECTIVES

Art. 1 – The *Stricto Sensu* Graduate Programs offered by the Universidade Federal de Viçosa are intended to provide broad and deep scientific and cultural background to students, through the development of research and innovation ability, in different branches of knowledge.

### *STRICTO SENSU* GRADUATE PROGRAMS

Art. 2 – The *Stricto Sensu* Graduate Programs comprise two levels of training, Master's and Doctoral degrees, which will confer the titles of *Magister Scientiae* (M.Sc.) and *Doctor Scientiae* (D.Sc), respectively.

## CHAPTER I

### GENERAL ORGANIZATION

Art. 3 - The minimum duration of the Master's and Doctoral Programs is one (1) and two (2) years and maximum of three (3) and 5 (five) years, respectively, counted from the date of admission.

Art. 4 - In addition to other requirements, students must take courses in the area of concentration (core group of courses defined by each Program) or in other knowledge fields that are related to the Program. The related fields are defined by each Program.

§ 1 – Courses of the area of concentration are those that characterize the field of study of the program, while disciplines of the related field are those that do not belong to this field, but are considered desirable or necessary to complete the training of students.

§ 2 - The disciplines in the area of concentration should total at least 50% (fifty percent) of the number of credits required.

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## CHAPTER II

### TECHNICAL BOARD OF GRADUATE PROGRAMS

Art. 6 - The Council of Graduate Programs is in charge of the general teaching coordination of the Graduate Programs.

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Art. 9 - The Council of Graduate Programs is in charge of the following activities:

a) preparation of the general schedule of the activities of the graduate programs, which will be submitted to approval by the Board of Teaching, Research and Extension;

- b) elaboration of the Statute of Graduate Programs for approval by the Board of Teaching, Research and Extension, and edition of supplementary instructions;
- c) establishment of the minimum requirements of the Graduate Programs, after the general standards established by law are met;
- d) approval of the areas of concentration of Graduate Programs and the requirements for each of them;
- e) accreditation of professionals who will work in the Graduate Programs;
- f) approval of the names of candidates for graduate titles;
- g) approval of the admission of students indicated by the respective coordinators of Graduate Programs;
- h) approval of the number of vacancies for Graduate Programs;
- i) promote the development of graduate activities;
- j) make adjustments, agreements or arrangements, either academic or financial, for the support, cooperation and development of Graduate Programs;
- k) evaluation of the operation and performance of Graduate Programs; and
- l) performance of actions attributed to an informative and consultative organ of the Board of Teaching, Research and Extension, for graduate studies.

### CHAPTER III

#### CREATION OF THE PROGRAMS

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### CHAPTER IV

#### COORDINATION OF THE PROGRAMS

Art. 13 - The teaching and scientific coordination of each Graduate Program, under the administration of the respective departments, will be exercised by a Coordinating Committee consisting of:

- a) one (1) coordinator, as its chairman, appointed by the head of the department and appointed by the President of the University, whose name is included in a triple list organized by his/her peers;
- b) three (3) professors elected by their peers; and
- c) one (1) representative of the students in the Program, elected by his/her peers, and respective alternate.

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Art. 19 - The Coordinating Committee is responsible for:

- a) defining the disciplines of the area of concentration and related field, and establishing if they will be mandatory or optional (electives), which will be approved by competent authorities;
- b) establishing specific requirements of the Program and submitting them to the Council of Graduate Programs;
- c) appointing professors to the position of advisors of the Program;

- d) organizing instructions, standards, plans or projects related to the Program and submitting them to the analysis of competent bodies;
- e) proposing to the competent departments the creation of the disciplines required for the Program;
- f) opining about the analytical program of the disciplines of the area of concentration or mandatory, suggesting modifications, when necessary, to achieve the objectives of the Program;
- g) selecting qualified candidates for admission into the program;
- h) establishing standards for the operation of Seminars;
- i) proposing or opining about the exclusion of students from the Program due to academic or disciplinary reasons;
- j) nominating candidates for scholarship granting;
- l) assessing or proposing agreements or cooperative arrangements, either academic or financial, for the support or development of the Program;
- m) receiving, assessing, resolving or referring, as appropriate, suggestions, complaints, representations or resources, from students or professors, related to any scientific-educational issue involving the Program; and
- n) taking the appropriate actions attributed to an information and consulting organ related to the Technical Board of Graduate Studies.

Art. 20 - Coordinators have the following specific duties:

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## CHAPTER V

### ADMISSION TO THE PROGRAMS

Art. 21 - Candidates who have graduated from a higher education institution may be admitted at Graduate Programs, since their curricula contain disciplines relevant to the intended Program.

§ 1 - In the case of undergraduate curricula without sufficient basis for the program claimed, students should take disciplines offered at undergraduate level, at the discretion of the Coordinator of the Program.

§ 2 - Candidates that have been disconnected from any Graduate Program of the Universidade Federal de Viçosa, due to low academic performance, abandonment or lapse of time cannot be admitted to the same level of graduate program, for the periods of 2 (two) or 4 (four) years for master's and doctoral degrees, respectively.

§ 3 - Candidates who have been disconnected from any Graduate Program of the Universidade Federal de Viçosa due to disciplinary reasons cannot be admitted to the Graduate Program.

§ 4 - The Registrar's Office is in charge of ensuring compliance with the restrictions set out in paragraphs 2 and 3, by means of their records of students disconnected from graduate programs of the Universidade Federal de Viçosa.

22 - A Master's degree will be required for admission in the doctoral program.

§ - Sole paragraph - On a reasoned proposal by the Coordinating Committee, the Council of Graduate Studies may waive this requirement.

Art. 23 – Candidates must present the following documents for application:

- a) Enrollment form (two copies);
- b) a certified copy of the certificate or statement of completion of undergraduate degree (for doctoral program, the certificate of conclusion of the master's degree program is also required);
- c) a certified copy of the academic transcript of the undergraduate program explaining the evaluation system (the academic transcript of the master's degree program is also required for doctoral degree);
- d) Curriculum vitae, one copy (with proof);
- e) One 3 x 4 photograph;
- f) Copy of Certificate of Birth or Marriage;
- g) Copy of the ID card;
- h) Copy of the proof of military service; (Brazilian citizens)
- i) Copy of Voter Registration; (Brazilian citizens)
- j) Copy of the CPF;
- k) three letters of reference, at the discretion of the Program; and
- l) proof of payment of enrollment fee, which shall be stipulated by the Universidade Federal de Viçosa.

§ - Sole paragraph - If applicants have only the certificate of course completion, upon enrollment, they will be obliged to present certified copy of their diploma to the Registrar's Office.

Art. 24 - The date of submission of application for enrollment shall be divulged in the Academic Calendar of the Universidade Federal de Viçosa.

Art. 25 - Besides the analysis of the documents required in the application process, the Coordinating Committees may adopt other criteria they deem appropriate for the selection of candidates.

Art. 26 - The selection will be valid only for enrollment in the school year for which it was approved or the subsequent period, after consultation with the Program Coordination.

27 - The coordinators will inform the candidates of the result of the selection.

## CHAPTER VI

### ENROLLMENT

Art. 28 - Every semester, on the date fixed by the School Calendar, all students must apply for renewal of enrollment.

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Art. 30 - Failure to renew enrollment in due season will mean abandonment of the Program and automatic disconnection, if, on the date specified in the academic calendar, students do not require from the School Board of Enrollment a special leave, which will be valid for the respective semester and granted one (1) time.

Art. 31 - When authorized to conduct activities outside the institution, students are dismissed from enrollment renewal while their period of leave lasts.

Art. 32 - Students may request cancellation of enrollment in one or more disciplines, if their advisors agree.

§ - Cancellation of enrollment will only be granted once for each discipline.

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## CHAPTER VII

### TEACHING REGIME

Art. 34 - Regular teaching will be organized in the form of courses, with lectures, seminars, directed studies, practical classes and other teaching methods.

§ Sole paragraph - The disciplines will be classified into three levels, codes 600, 700 and 800, according to the content and focus of their respective analytical programs (syllabus).

Art. 35 - Seminars, Special Problems, Special Topics, Research and Internship in Teaching will be encoded as 700-level disciplines.

§ - Sole paragraph- Seminars should be specific to each program.

Art. 36 – Credit is the basic unit for assessing the intensity and duration of disciplines. 1 (one) credit is equivalent to fifteen (15) hours of lecture or thirty (30) hours of practical classes.

Art. 37 – Academic performance examination will be carried out through practical work, oral tests, written tests and final exam, at the discretion of professors. Specifically for the discipline Teaching Internship, performance will be evaluated by the coordinator of the discipline and the professors that tutored students in the execution of the planned activities.

Art. 38 - The system used for assessing disciplines will be concept-grade expressed by a letter, according to the following equivalence of relative performance:

CONCEPT-GRADE SYMBOLS	PERFORMANCE PERCENTAGE
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Excellente A	from 90% to 100%
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Good B	From 75% to 89%
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Fair C	From 60% to 74%
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Failure R	Below 60%
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Incomplete I	
--------------	--

Cancellation of enrollment in Discipline J	
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Cancellation of Enrollment K	
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Satisfactory S	
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Non-Satisfactory N	
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Ongoing Q	
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§ 1 - In the disciplines Special Problems and Internship in Teaching, students may use the maximum of three (3) credits at each level to complete their study plan.

§ 2 - The Analytical Programs of Special Problems and Special Topics and a list with the names of the students approved to attend these disciplines should be forwarded to the Board of School Registration, which will create a class for each specific analytical program, in the same school term.

§ 3 - The discipline Seminar will grant, in each level, 1 (one) or 2 (two) credits, which will not be counted in the performance coefficient, but may be considered to complete the minimum credits required by the program at the discretion of the Coordinating Committee.

§ 4 - The provisional concept I (incomplete) will be attributed to students that discontinue, force majeure, part of their their academic work, and have obtained a performance proportionally sufficient for approval in the evaluations applied. Proof of the hindrances should be given to the professors of the disciplines attended. The concept I (incomplete) will be transformed into R (failure) if the works are not completed and a new concept is not assigned and sent to the Registrar's Office, before the deadline set by the School Calendar.

§ 5 - The concept J (cancellation of enrollment in discipline) refers to the effective cancellation of enrollment.

§ 6 - The concept K (suspension of enrollment) refers to the effective suspension of enrollment.

Article 39 - The requirements that do not give credit or are not counted in the credits provided for in Art. 83 or Art. 84 of this regiment will be evaluated by the following concepts:

Q - Ongoing;

S - Satisfactory; and

N - Non-Satisfactory.

Art. 40 - At the end of each term, the performance coefficient is calculated, based on the sum of the number of credits in each discipline, which will be multiplied by 3, 2, 1 and 0, assigned to the concepts A, B, C and R, respectively, and divided by the total number of credits of the respective disciplines.

§ 1 - To calculate the accumulated performance coefficient, the value will be represented with a decimal point, which will be rounded to the next higher figure if the second decimal point is greater than or equal to 5 (five).

§ 2 - The performance coefficient is achieved by dividing the sum of the points obtained by the sum of credits of the disciplines taken in each term, which have received concepts A, B, C or R.

§ 3 - The accumulated performance coefficient is obtained for all terms students were enrolled.

Art. 41 - Students that obtain concept R in a discipline should attend it again. The last concept obtained should be the final result, with the exception of the disciplines Special Problems and Special Topics.

Art. 42 - The disciplines whose concepts are R, I, J or K shall not be used in the counting of the credits required in the program.

Art. 43 - The title will only be awarded to students who met the other requirements and were approved in all disciplines listed in their academic transcript, excepting the disciplines Special Problems and Special Topics.



Art. 44 - For all purposes under this Statute, students that do not achieve frequency of at least 75% in the teaching activities scheduled will fail.

Art. 45 - Students that fall into one or more of the conditions specified below will be disconnected from the program, except if they are enrolled in disciplines which are not included in the calculation of the performance coefficient:

- a) obtaining, in their first term, performance coefficient below 1.3 (one and three tenths);
- b) obtaining, in their second term, accumulated performance less than 1.7 (one and seven tenths);
- c) obtaining, in their second term, accumulated performance coefficient less than 2.0 (two), having completed the minimum number of credits required by the program;
- d) obtaining, in their third term and in the subsequent terms, an accumulated performance coefficient of less than 2.0 (two);
- e) obtaining grade R (failure) in any discipline for the second time, either in undergraduate or graduate program, except in the case of specific disciplines, to meet the requirements of foreign language;
- f) obtaining two concept-grades N (Non-Satisfactory), either consecutive or not, in Research; and
- g) failing to complete all requirements of the program within the prescribed period.

§ - Sole paragraph - The concept "R" will be counted in the calculation of the performance coefficient, while another concept is not attributed to the discipline taken twice.

## CHAPTER VIII

### ADVICE TO STUDENTS

Art. 46 - The didactic orientation to students will be exercised by advisors or, alternatively, by co-advisors.

§ - Sole paragraph - Advisors will be appointed by the Coordinating Committee, subject to the provisions of the Internal Statute of the program.

Art. 47 - Research for writing dissertation or thesis will be supervised individually by an advisor or, optionally, by an Advisory Committee formed by an advisor and co-advisor(s).

Art. 48 – Advisors are specifically in charge of:

- a) organizing students' study plan;
- b) proposing the names of co-advisors who will take part in the Advisory Committee;
- c) conducting research, object of the dissertation or thesis of students, and assigning the concept obtained in assessments;
- d) promoting regular meetings with the participation of students and the Advisory Committee;
- e) approving the application for renewal of enrollment as well as requests for replacement, cancellation and enrollment for disciplines and suspension of enrollment;
- f) assisting students in issues related to current academic standards and processes;
- g) chairing the Board of Defense of Dissertation or Thesis or the Board of the Qualification Examination.

Art. 49 - The average number of students under orientation of a professor cannot exceed (6), for each Graduate Program.

## CHAPTER IX

### STUDY PLAN

Art. 50 - The Study Plan will necessarily contain the courses of the area of concentration and related field, as well as seminars, foreign language and area of research for the dissertation or thesis.

§ 1 - The courses attended out of the Universidade Federal de Viçosa will be classified as belonging to the area of concentration, related field or out of the program, at the discretion of the Coordinating Committee of the Program.

§ 2 - Enrollment in the course "Internship in Teaching" can only be made by students enrolled in the Graduate Program of the Universidade Federal de Viçosa, subject to availability of vacancy, to be defined by the respective department, and consent from students' advisors and the coordinator of the discipline

Art. 51 - After being approved by advisors and students, the Study Plan will be analyzed by the Coordinator of the Program and the Chairman of the Council of Graduate Studies, by the end of the first term attended by students at the University.

§ 1 - Without an approved Study Plan, students cannot be enrolled in the second term.

§ 2 - The Study Plan may be changed by suggestion from advisors.

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## CHAPTER X

### FOREIGN LANGUAGE REQUIREMENT

Art. 53 - Students will have three alternatives to meet the foreign language requirement:

- a) approval in a foreign language proficiency examination applied by the Department of Languages or the Coordination of Graduate Program;
- b) approval in disciplines recognized by the Technical Board of Graduate Studies as sufficient; and
- c) approval in standardized foreign language examinations.

Art. 54 - The proficiency examinations, prepared by the Department of Languages, will be applied on dates mutually agreed with the School Calendar.

Art. 55 - The concept "N" obtained in a foreign language discipline will be automatically replaced by the concept "S" when students are successful in a foreign language proficiency examination.

## CHAPTER XI

### USE OF CREDITS

Art. 56 - credits of course taken at the Universidade Federal de Viçosa may be used, provided that they are consistent with the content of the program in which students are enrolled.

§ - Sole paragraph - Credits obtained in disciplines specific to the *Lato Sensu* program cannot be used.

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## CHAPTER XII

### TRANSFER OF CREDITS OBTAINED OUTSIDE THE UFV

Art. 62 - The Universidade Federal de Viçosa may accept the transfer of credits obtained at other education institutions, for disciplines consistent with the Program to which students are bound, up to 50% (fifty percent) of the number required in Art. 83 or 84 of this Statute.

§ 1 - Only disciplines with concept A and B can be transferred.

§ 2 - Credits obtained in disciplines specific to Lato Sensu Programs cannot be transferred.

§ 3 - Credits obtained in disciplines taken at double level condition, as undergraduate students, cannot be transferred.

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Art. 65 – Credit transfer must be recommended by the Coordinating Committee of the Program and approved by the Council of Graduate Studies.

## CHAPTER XIII

### QUALIFYING EXAM

Art. 67 - Every candidate for the title of *Doctor Scientiae* should undergo a qualifying examination.

§ - The qualifying examination aims to assess whether students have the scientific and cultural training expected for a contender for the title of *Doctor Scientiae*.

Art. 68 - Only students who have obtained all credits demanded in their study plan can take the qualifying examination.

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Art. 70 - The Examination Board shall be composed of five (5) members who hold Doctoral degree.

Sole Paragraph - The Board shall have five (5) full members and two (2) alternates.

Art. 72 - The qualifying examination will consist of two stages, one written and another oral, and will address areas of knowledge relevant to students' training.

Art. 73 – Students who obtain the unanimous positive indication from the members of the Examining Board shall be considered approved.

74 - The test results should be reported to the Dean of Research and Graduate Studies, in proper form, within ten (10) days after its completion.

Art. 75 – Students who failed the qualifying examination will be given another chance, after a maximum of six (6) months from the date of realization.

## CHAPTER XIV

### THE RESEARCH PROJECT

Art. 76 - Every graduate student should prepare a compulsory research project for the development of their dissertation or thesis.

Art. 77 - The research project shall be prepared under the supervision of the Advisory Committee, approved by the head of the department and the director of the Center for Sciences and registered in the office of the Dean of Research and Graduate Studies.

Art. 78 - The research projects of students applying for the title of *Magister Scientiae* or *Doctor Scientiae* will be delivered mandatorily for registration in the office of the Dean of Research and Graduate studies up to the last day of the disclosure of the concepts for the third and fifth terms, established in the School Calendar, respectively.

§ 1 - All students applying to the titles of *Magister Scientiae* or *Doctor Scientiae* will be required to enroll in the discipline Research, after the payment of due fees, in the second and fourth renewal of enrollment, respectively.

§ 2 - If students fail to meet the deadlines established in the caput of this article, they will be given concept 'N' in Research.

## CHAPTER XV

### DISSERTATION OR THESIS

Art. 79 - All graduate students who are candidates for the title of *Magister Scientiae* or *Doctor Scientiae* shall prepare and defend a dissertation or thesis, respectively, and be approved in it.

§ 1 - The dissertation or thesis may be written in English, Portuguese or Spanish, at the discretion of the Advisory Committee.

§ 2 - Candidates, the Advisory Committee and the Examining Board are in charge of the formatting, language and content of the dissertation or thesis.

§ 3 - The dissertation or thesis, under the supervision of the Advisory Committee, should be based on original research work that really contributes to scientific knowledge on the subject.

§ 4 - The results of the research carried out for obtaining the Master's degree or Doctoral degree are subject to current laws, rules or resolutions related to intellectual property of the Universidade Federal de Viçosa.

Art. 80 - The dissertation or thesis will be defended before a board formed by holders of doctoral degree, under the chairmanship of the respective advisors.

§ 1 - The dissertation board will include at least 3 (three) full members and 2 (two) alternates.

§ 2 - The Board of thesis will be appointed with at least five (5) members and two (2) alternates.

§ 3 - The members of the Board, proposed by the Advisory Committee and indicated by the Coordinator of the Program, will be appointed by the President of the Technical Board of Graduate Studies.

§ 4 - At least 1 (one) of the full members of the dissertation board should not belong to the Program or to students' Advisory Committee.

§ 5 - At least 1 (one) of the full members of the thesis board should not belong to the Program and 1 (one) member should not belong to the Universidade Federal de Viçosa, and none of these two should belong to the Advisory Committee of the respective student.

§ 6 – After the designation of the board of thesis or dissertation defense, a minimum period of 10 (ten) days shall be observed for the defense. Advisors should set the date, time and place of the defense and inform the members of the board and students.

§ 7 - The defense of the dissertation or thesis should also include assessment of the knowledge acquired by the applicant during the development of the program.

§ 8 - Candidates receiving the unanimous indication from the members of the board will be approved.

§ 9 – Candidates disapproved can be submitted to another defense, at the discretion of the Examining Board.

§ 10 - The result of the defense should be reported to the Dean of Research and Graduate Studies, in proper form, within 10 (ten) days after its completion.

§ 11 – If advisors are unable to attend, by force majeure, the Coordinating Committee of the Program will indicate one of the members of the Examining Board to preside, as alternate, with knowledge of advisors.

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## CHAPTER XVI

### ACADEMIC TITLE

Art. 83 - The title of *Magister Scientiae* will be granted to students that:

- a) complete at least 24 (twenty-four) credits in disciplines of the Graduate Program to which they are bound, in accordance with the provisions of this Statute, with an accumulated performance coefficient equal to or higher than 2 (two);
- b) meet the foreign language requirements;
- c) meet the requirements of the discipline Seminar; and
- d) submit the text of their duly approved dissertation and copies of its final version to the Dean of Research and Graduate Studies.

Art. 84 - The title of *Doctor Scientiae* will be granted to students that:

- a) complete at least 24 (twenty-four) credits, if they have a title of *Master's* or *Magister Scientiae*, or 48 (forty-eight) credits, if they have only a bachelor's degree in disciplines of the Graduate Program to which they are bound, according to the provisions of this Statute, with accumulated performance coefficients equal to or higher than 2 (two);
- b) meet the foreign language requirements;
- c) meet the requirements of the discipline Seminar; and
- d) submit the text of the duly approved thesis and copies of its final version to the Dean of Research and Graduate Studies.

Art. 85 - The Technical Board of Graduate Studies or the Coordinating Commission may establish other requirements for the Program, besides those already specified.

## CHAPTER XVII

### THE ISSUANCE OF A CERTIFICATE OF SPECIALIZATION FOR MASTER'S DEGREE STUDENTS

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## CHAPTER XVIII

## CO-TUTELAGE AND GRADUATE DUAL PROGRAMS IN PARTNERSHIP WITH FOREIGN INSTITUTIONS OF HIGHER EDUCATION

Art. 90 - Co-tutelage is understood as academic cooperation in *stricto sensu* graduate studies agreed between the UFV and foreign institutions, in which students in training receive shared guidance of faculty members of the institutions involved.

§ 1 Definitions: a) dual/joint title - two or more degrees conferred by two or more institutions for the same study program developed separately and implemented in each of the participating institutions; b) joint degree - degree jointly awarded by institutions or degree conferred by each institution participating of a program developed and recognized by the institutions concerned.

§ 2 For each thesis and/or dissertation developed in co-tutelage, a specific agreement should be signed between UFV and the foreign institution. This agreement must be approved by the Technical Board of Graduate Studies.

§ 3 - The agreement for co-tutelage will be signed between the higher courts of the institutions, with agreement of the coordinators of the graduate programs involved.

§ 4 - International graduate dual programs, in association with foreign institutions recognized by CAPES, are considered as co-tutelage.

Art. 91 - Students developing thesis and/or dissertation under co-tutelage agreement will graduate from the partner institutions.

§ 1 - The board of examiners of the defense of thesis/dissertation must have at least one representative from each institution.

§ 2 - The session for defense of thesis/dissertation will not require the presence of the assessors and students in the same location. Technological resources can be used to communicate in real time.

§ 3 - Theses/dissertations can be written and defended in the languages mentioned in Art. 79, § 10, as defined in the agreement of co-tutelage.

Art. 92 - The protection of the theme of the thesis/dissertation, as well as publication, exploitation and protection of research results which are common to both institutions should be ensured in accordance with the provisions of the cooperation agreement signed between the parties and specific legislation of each country involved in the co-tutelage agreement.

Art. 93 - Applicants must comply with all requirements of the agreement between the institutions to obtain the title in co-tutelage.

## CHAPTER XIX

## OFFSHORE GRADUATE STUDIES

Article 94 - The UFV will offer graduate programs abroad to other institutions through agreements. The degree conferred to these programs, either master's or doctoral degree, will be in offshore degree mode.

§ 1 - The offshore degree mode will be held in co-tutelage. In this case, the provisions of Chapter XVIII are applied.

## TITLE III

## NON-BOUND STUDENTS

Art. 95 - The Universidade Federal de Viçosa may accept non-bound students who are interested in improving their knowledge without pursuing, however, a graduate title.

Art. 96 - Applicants must submit the following documents upon enrollment:

- a) due enrollment form (two copies);
- b) a certified copy of the diploma or statement of completion of undergraduate degree;
- c) a certified copy of the academic transcript of the undergraduate program, declaring the evaluation system adopted;
- d) a 3 x 4 photo;
- e) Copy of Birth or Marriage Certificate;
- f) copy of Identification Card;
- g) copy of proof of Military Service;
- h) copy of Voter Registration Card; and
- i) copy of CPF.

§ - Candidates must specify the disciplines they want to attend, in the application form.

Art. 97 - The application period will close thirty (30) days prior to the offer of the discipline (s) and must be approved by the coordinator of each discipline and the head of each department that offers these disciplines.

§ 1 - The application shall be made in each department that offer disciplines and shall meet the criteria established above.

§ 2 - Non-bound students may enroll in up to 3 (three) disciplines per regular term, in the maximum of two (2) terms.

Art. 98 - Admission of non-bound students will be valid for one semester.

§ 1 - The enrollment fee will correspond to the value of the enrollment of students who are starting the Graduate Program, according to the rates set by the Universidade Federal de Viçosa.

§ 2 - The granting of new enrollment as non-bound student will be conditional on the approval in discipline (s) previously attended

Art. 99 - Non-bound students may request cancellation of enrollment in disciplines, respecting the dates specified in the academic calendar.

## TITLE IV

## STUDENTS ENROLLED IN OTHER INSTITUTIONS (BOUND STUDENTS)

Art. 100 - The Universidade Federal de Viçosa may accept graduate students regularly enrolled in stricto sensu Graduate Programs from other Higher Education Institutions who wish to take disciplines of the UFV stricto sensu Graduate Programs.

Art. 101 - Upon enrollment, applicants must submit to the Dean of Research and Graduate Studies the following documents:

- a) certified copy of the academic transcript of the Graduate Program in which they are enrolled;
- b) request for enrolling in the discipline (s) they wish to attend;
- c) request from the institution they are bound to.

Art. 102 - The period for application will terminate thirty (30) days before the start of the classes of the discipline(s) required. The application for enrollment must be analyzed and approved by the Coordination of the respective Graduate Program of the Universidade Federal de Viçosa and by the coordinator of each discipline and the head of each department that offers these disciplines.

§ - Sole paragraph - Bound students may attend a maximum of twelve (12) credits.

Art. 103 - Admission of bound students will be valid for one semester.

§ 1 - The enrollment fee will be equivalent to the rate for renewal of enrollment in Graduate Programs, as established by the Universidade Federal de Viçosa.

§ 2 - The granting of new enrollment as bound student will be conditioned to approval (s) in the discipline (s) previously taken.

Art. 104 - Bound students may request cancellation of enrollment in one or more disciplines, within the dates specified in the academic calendar.

...

## TITLE VI

### ACCREDITATION OF PROFESSORS AND RESEARCHERS

Art. 107 – UFV higher education professors holding a doctorate degree will be accredited for the exercise of graduate activities.

§ Sole paragraph – graduate activities are understood as teaching, research, co-advising and advising.

Art. 108 – The exercise of orientation activities in a graduate program will require the accreditation of faculty members specifically for the program.

§ 1 - The criteria for accreditation of professors as advisors will be established by the respective Coordinating Committee and approved at a regular meeting of the Technical Board of Graduate Studies.

§ 2 - The Coordinating Committee, considering the criteria in § 1, indicates the accreditation of the professors that request it to the Dean of Research and Graduate Studies.

§ 3 - At intervals of no more than 5 (five) years, professors will forward to the Coordinating Commission their request for re-accreditation as advisors in the program. Based on the criteria established in § 1, the Coordinating Committee shall decide whether the professors who require re-accreditation will be re-accredited or not by the Dean of Research and Graduate Studies.

§ 4 - If a professor is not re-accredited as advisor, he/she must complete his/her advisory work still in progress.

Art. 109 – High school teachers and technicians from the Universidade Federal de Viçosa who hold a doctoral degree may be accredited as co-advisors and advisors.

Art. 110 - The accreditation of researchers or faculty members from other institutions that hold doctoral degree should be carried to allow them to become co-advisors and advisors specifically of master's and doctorate students.



§ - The accreditation of professors/researchers outside the Universidade Federal de Viçosa will not imply employment of any nature by the University, nor entail any liability on its part.

Article 111 - The request for accreditation must be submitted in the form of process, to the Dean of Research and Graduate Studies, by the department to which the respective professor/technician belongs, after analysis by the Coordinating Commission of the Program, where the professor/technician will perform most activities. Requests from researchers or professors from other institutions will be submitted only by the Coordinating Committee of the Program.

§ - Sole Paragraph - The process should include reasoned justification, curriculum of the candidates, proof of the title achieved and authorization from their immediate boss, for researchers or professors from other institutions.

Article 112 - The chairman of the Technical Board of Graduate Studies is responsible for probating the process and authorizing the enrollment of advisor professors; and the Technical Board of Graduate Studies is responsible for approving the accreditation of professors who do not teach in higher education programs and technicians of the Universidade Federal de Viçosa, as well as professors and technicians from other institutions.

## TITLE VII

### FINAL PROVISIONS

Art. 113 - The Graduate Programs at the Universidade Federal de Viçosa shall be governed by the provisions of this regiment, without prejudice to specific provisions of the Statute, General Rules of the University and other standards, Acts and Resolutions established by the competent Governing Bodies.

Art. 114 - The provisions of this regiment for Postgraduate studies may be modified by the competent authorities, where necessary, even during the school year.

Art. 115 - Contrary provisions are therefore revoked, in particular, Resolution No. 1/2006-CEPE.

Art. 116 - These Rules shall enter into force on the date of their publication.

### SPECIAL SUMMER PERIOD

The Special Summer Period, which lasts for a minimum of 45 (forty-five) days, takes place in the months of January and February and offers disciplines at undergraduate and graduate levels. Enrollment is open to students admitted to regular graduate programs, non-bound students, or students enrolled in other higher education institution.

### COEFFICIENT OF PERFORMANCE

1. COEFFICIENT OF PERFORMANCE (CR) is achieved by dividing the sum of the points obtained during a term by the sum of credits of the disciplines in which students are enrolled. For example:

Calculation of the Coefficient of Performance

Disciplines	Credits	Concepts	Values
Points			

CTP 710 4 C 1 4

CTP 600 3 B 2 6

CTP 602 3 R 0 0

CTP 634 4 C 1 4

CTP 671 3 A 3 9

Sum 17 - - 23

Coefficient of Performance (CR)  $23:17 = 1,4$

2. ACCUMULATED COEFFICIENT OF PERFORMANCE is achieved by dividing the sum of all points already obtained, from the first regular period, by the sum of all credits in disciplines in which a student is effectively enrolled.

\* Rules altered by Resolutions 05/2007, 03/2008, 05/2008, 03/2009, 10/2010, 09/2011 and 08/2012 of the CEPE.

## **APPENDIX 4**

Letter from the Director (Coordinator) of Graduate Studies at UFV.



**UNIVERSIDADE FEDERAL DE VIÇOSA  
CENTRO DE CIÊNCIAS AGRÁRIAS  
DEPARTAMENTO DE FITOPATOLOGIA**

**Viçosa, August 01 2014**

Dear Prof. Lisa J. Vaillancourt:

I would like to inform you that the U.S. graduate students will take their tests and write their papers in English when taking the laboratory courses of Mycology, Bacteriology, Nematology and Virology regarding the Dual Degree Program to be celebrated between our Plant Pathology Program at Viçosa Federal University, Brazil, with the Plant Pathology Department at University of Kentucky.

Best Regards,

Prof. Fabrício de Ávila Rodrigues  
Graduate Coordinator of the Plant Pathology  
Program at Viçosa Federal University

**ADDITIONAL TERM OF AGREEMENT**

**STUDENT EXCHANGE BETWEEN  
FEDERAL UNIVERSITY OF VIÇOSA  
AND  
UNIVERSITY OF KENTUCKY**

**SELECTION OF PARTICIPANTS:**

The selection procedure by which reciprocal exchange candidates are nominated is the responsibility of the sending university. The candidates may be either undergraduate or graduate students. The number of students sent by each university, each year, will be up to ten, and reciprocity will be based on student credit hours.

Each institution reserves the right to require candidates to present the necessary documentation for selection and to provide the results of any required admission examinations.

Each institution reserves the right to accept or reject a candidate on the basis of regular academic selection criteria and to assign each student appropriate status at the time of admission. It is also understood that certain candidates may be rejected on account of shortage of faculty, lack of student places or other resources.

Selection of students shall be without regard to race, sex, color, religion, sexual orientation, marital status, national origin, age, or beliefs.

The acceptance of exchanges is conditional on the obtaining the necessary immigration and travel clearance. The receiving university will endeavor to assist students in obtaining the proper documents.

At least three months prior to the planned arrival of students, each university will send to the other full information on the students nominated to fill the allocated places.

**TERMO ADITIVO AO CONVÊNIO**

**INTERCÂMBIO DE ESTUDANTES ENTRE  
A UNIVERSIDADE FEDERAL DE VIÇOSA  
E A  
UNIVERSIDADE DE KENTUCKY**

**SELEÇÃO DOS PARTICIPANTES:**

O processo de seleção pelo qual os candidatos ao intercâmbio deverão passar, será de responsabilidade da instituição que está enviando. Os candidatos poderão estar cursando graduação ou pós-graduação. O número de alunos a ser enviado por cada universidade anualmente sera de ate dez, e a reciprocidade será com base no número de horas/créditos.

A cada instituição é reservado o direito de exigir aos candidatos documentação pertinente para a seleção, bem como os resultados obtidos nos testes de seleção,

Cada instituição tem o direito de aceitar ou rejeitar o candidato com base nos critérios normais de rendimento acadêmico, competindo-lhe atribuir ao estudante o status adequado no momento da admissão. Fica, ainda, esclarecido que alguns candidatos poderão não ser aceitos devido ao número reduzido de vagas, à falta de espaço ou de outros recursos.

A seleção de candidatos será sem distinção de raça, sexo, cor, religião, orientação sexual, estado civil, nacionalidade, idade ou crenças.

A aceitação dos candidatos estará condicionada pelas exigências relativas a vistos e autorizações de viagem de acordo com as leis de imigração. A universidade receptora deverá auxiliar os estudantes no processo de obtenção da documentação necessaria.

Pelo menos três meses antes da chegada prevista dos estudantes, cada universidade enviará à outra informações completas sobre os estudantes selecionados para completar



## ACADEMIC PROGRAM

The University of Kentucky will enroll accepted Federal University of Viçosa exchanges as full-time special non-degree classification students for up to two regular semesters of the academic year, this is for a period of twelve months. Federal University of Viçosa students may enroll in regular University of Kentucky courses for which they have the appropriate prior study and which are adequate to the needs of the Federal University of Viçosa curriculum.

At the end of the academic semester, the University of Kentucky will send to the Federal University of Viçosa a report on the academic achievement of the exchange students. This report will take the form of an official transcript.

The Federal University of Viçosa will enroll accepted University of Kentucky exchanges as full-time special non-degree classification students for up to two regular semesters of the academic year, this is for twelve months. The University of Kentucky students may enroll in regular Viçosa courses for which they have the appropriate prior study and which are adequate to the needs of the University of Kentucky curriculum.

At the end of the academic semester, the Federal University of Viçosa will send to the University of Kentucky a report on the academic achievement of the exchange students. This report will take the form of an official transcript.

## STUDENT FINANCES

All students will pay tuition and fees to their home university.

as vagas oferecidas.

## PROGRAMA ACADEMICO

A Universidade de Kentucky irá matricular os estudantes do intercâmbio provenientes da Universidade Federal de Viçosa como estudantes em tempo integral, em caráter especial, não graduados, por até dois semestres letivos, ou seja, por um período de doze meses. Os estudantes da Universidade Federal de Viçosa poderão matricular-se em cursos da Universidade de Kentucky, em matérias para as quais tenham os necessários pré-requisitos e que sejam adequadas ao currículo da Universidade Federal de Viçosa.

No final do semestre acadêmico a Universidade de Kentucky enviará à Universidade Federal de Viçosa um relatório relativo ao aproveitamento acadêmico dos estudantes. Este relatório, terá o formato de um histórico escolar oficial.

A Universidade Federal de Viçosa irá matricular os estudantes do intercâmbio provenientes da Universidade de Kentucky na condição de estudantes em tempo integral, em caráter especial, não graduados, por um período de até dois semestres letivos, ou seja de doze meses. Os estudantes da Universidade de Kentucky poderão se matricular em cursos da Universidade Federal de Viçosa, em matérias para as quais tenham os necessários pré-requisitos e que sejam adequadas ao currículo da Universidade de Kentucky.

No final do semestre acadêmico a Universidade Federal de Viçosa enviará à Universidade de Kentucky um relatório relativo ao aproveitamento acadêmico dos estudantes. Este relatório, terá o formato de um histórico escolar oficial.

## TAXAS ESCOLARES

Todos os estudantes deverão pagar as taxas estudantis devidas às suas universidades de origem.



Room and meal costs, travel, health and accident insurance, books and supplies, and incidental expenses are the responsibility of the individual exchange students, except if the receiving university determines otherwise.

The receiving institution will reserve appropriate university housing for each exchange. Arrangements for other than university housing must be negotiated on an individual basis.

The receiving institution will provide to the students, in advance, a list of estimated living expenses. The exchanges will be entitled to the use of all host university facilities on the same basis as home students.

#### EXCEPTIONS AND AMENDMENTS

For conditions of the exchange not covered by this memorandum of agreement or for problems which may arise during the course of the exchange agreement, both parties agree to refrain from unilateral action and to consult and negotiate mutually agreeable decisions.

Amendments to the agreement may be made at any time by agreement of the parties through the exchange of documents. Such amendments shall be added in the form of appendices.

This agreement is initially for a five-year period, renewable at the end of this period by mutual agreement.

The balance of exchanges will be reviewed annually. As a result of this review, student numbers exchanged in subsequent years will be adjusted based on an expected balance in terms of student credit hours.

If the number of exchanges is not equal for both sides at the end of five years, the agreement will continue until a balance in the

Hospedagem, alimentação, seguro de saúde e de acidentes, livros e material escolar, bem como despesas não programadas são da responsabilidade do estudante, exceto, se a instituição receptora determinar o contrário.

A instituição receptora fará reserva de hospedagem adequada para os alunos do intercâmbio, em residências universitárias. Outro tipo de alojamento deverá ser negociado pelo próprio estudante.

A instituição receptora fornecerá de antemão aos estudantes, uma estimativa de custos. Os estudantes do intercâmbio poderão utilizar todas as instalações da universidade receptora da mesma forma que os estudantes locais.

#### EXCEÇÕES E OUTRAS CONSIDERAÇÕES

Para situações do intercâmbio não previstas neste acordo, ou problemas que possam surgir quando o programa estiver em curso, ambas as partes se comprometem a evitar ações unilaterais, e a consultar e negociar decisões de comum acordo.

Acréscimos ao acordo poderão ser feitos a qualquer momento desde que sejam de comum acordo entre as partes e expostos em documentos escritos. Estes acréscimos deverão ser acrescidos na forma de termo aditivo.

Este acordo terá inicialmente a duração de cinco anos, podendo vir a ser renovado, de comum acordo, no final deste período.

O balanço do intercâmbio será revisto anualmente. Em resultado desta revisão, o número de estudantes será ajustado nos anos subsequentes de forma a garantir um equilíbrio esperado em termos de número de horas/créditos.

Se o número de estudantes que participaram do intercâmbio não for o mesmo para ambas as partes no final de cinco anos, o acordo



number of students exchanged is reached.

continuará até que um equilíbrio em nú seja alcançado.

**University of Kentucky**

**Universidade Federal de Viçosa**

*Susan Carvalho*

*Soares*

**Susan Carvalho**  
**Associate Provost for International Programs**

**Prof. Nilda de Fatima Ferreira Soares**  
**Reitor**

Date *01/03/13*

Date *03/01/13*

*M. Scott Smith*

**M. Scott Smith**  
**Dean, College of Agriculture**

Date *01/03/13*

*John Walz*

**John Walz**  
**Dean, College of Engineering**

Date *01/03/13*





Processo nº. 008353/2001

Convênio nº. 002/2013

**ACADEMIC INTERCHANGE AGREEMENT  
BETWEEN  
UNIVERSITY OF KENTUCKY  
AND  
UNIVERSIDADE FEDERAL DE VIÇOSA**

The University of Kentucky and the Federal University of Viçosa, wishing to develop cooperative relations on the basis of established contacts and mutual understandings, especially to develop academic and cultural interchange through mutual assistance in the areas of teaching and research, agree as follows:

**FIRST CLAUSE**

**Area of Cooperation**

The area of cooperation includes, subject to mutual consent and appropriate conditions, any program offered at either University and proposed by either as desirable, feasible, and contributory to the fostering and development of the cooperative relationship between the two universities.

**SECOND CLAUSE**

**Methods**

All understandings and assistance shall be subject to availability of funds and the specific approval of the President of the University of Kentucky and the President of the Federal University of Viçosa, through such activities or programs as:

1. Exchange of faculty members and

**CONVENIO DE INTERCAMBIO J  
ACADEMICO ENTRE  
UNIVERSIDADE DE KENTUCKY  
E  
UNIVERSIDADE FEDERAL DE VIÇOSA**

A Universidade de Kentucky e a Universidade Federal de Viçosa, no intuito de desenvolver relações de cooperação com base no estabelecimento de contatos e entendimentos mútuos, enfatizando desenvolver intercâmbio acadêmico e cultural através de cooperação mútua nas áreas de ensino e pesquisa, acordam o seguinte:

**CLÁUSULA PRIMEIRA**

**Área de Cooperação**

A área de cooperação inclui, sob consentimento mútuo e existência de condições apropriadas, qualquer programa oferecido e proposto por qualquer das Universidades como desejável, executável, e contributivo ao fomento e desenvolvimento de relações de cooperação entre as duas Universidades.

**CLÁUSULA SEGUNDA**

**Métodos**

Todos os entendimentos e assistências estarão condicionados à disponibilidade de fundos e à aprovação específica dos Reitores da Universidade de Kentucky e da Universidade Federal de Viçosa, através de atividades e programas tais como:

1. Intercâmbio de membros do corpo



technical staff

2. Exchange of students

3. Conduct joint research activities

4. Participation in seminars and academic meetings

5. Special short-term academic programs

6. Cultural exchange activities

7. Joint participation in international training courses

8. Provide for undergraduate training with coursework at the University of Kentucky and the Federal University of Viçosa

9. Provide opportunities for staff development for both universities and other personnel development programs

10. Engage in consultancies

11. Other activities as deemed mutually appropriate.

The terms of such mutual assistance and necessary budget for each program and activity shall be mutually discussed and agreed upon in writing by both parties prior to the initiation of the particular activity or program. Each University will designate a Liaison Officer to develop specific activities or programs for the approval of the respective presidents.

### THIRD CLAUSE

decente e do quadro de técnicos de nível superior

2. Intercâmbio de estudantes

3. Elaboração de atividades conjuntas de pesquisa

4. Participação em seminários e encontros acadêmicos

5. Programas acadêmicos especiais de curta duração

6. Atividades de intercâmbio cultural

7. Participação conjunta em cursos internacionais de treinamento

8. Proporcionar treinamento em nível de graduação com cursos realizados na Universidade de Kentucky e na Universidade Federal de Viçosa

9. Proporcionar oportunidades para desenvolvimento do quadro funcional de ambas Universidades e de outros programas de aprimoramento de pessoal

10. Exercer consultorias

11. Outras atividades julgadas mutuamente apropriadas.

Os termos de tal assistência mútua e o orçamento necessário para cada programa e atividade devem ser mutuamente discutidos e postos em acordo escrito por ambas as partes antes do início de atividades ou programas particulares. Cada Universidade designará um coordenador responsável para desenvolver atividades específicas ou programas para aprovação dos respectivos reitores.

### CLÁUSULA TERCEIRA



**Effective Date & Length of Agreement**

This agreement will remain in force for a period of five years subject to the availability of funds, and any amendment and/or modification of this agreement requires a written approval of the President of the University of Kentucky and that of the President of the Federal University of Viçosa appended hereto. After the initial five-year period, this agreement may be renewed by mutual consent.

Either party reserves the right to terminate this agreement upon six (6) months written notice to the other. Any individual activities to be continued will be specifically identified and provided for at the time of termination.

Nothing contained herein or in the activities conducted hereunder shall constitute either party the agent, servant or employee of the other party. Each party shall be fully and solely responsible for its own actions and obligations.

This agreement shall take effect on the date indicated below and IN WITNESS HEREOF, the parties hereto have offered their signatures:



**Eli Capilouto**  
President

Date 01/03/2013

Examined for Form & Legality  
Office of Legal Counsel  
University of Kentucky

By:   
Attorney at Law

**Data de Início e Duração do Convênio**

Este convênio será válido por cinco anos, mediante a disponibilidade de recursos, e qualquer emenda e, ou, modificação do acordo requer aprovação escrita do Reitor da Universidade Kentucky e do Reitor da Universidade de Viçosa e deve ser anexada a este documento. Terminado o período inicial de cinco anos, O convênio pode ser renovado sob consentimento mútuo.

As partes reservam-se o direito de denunciar o convênio sob comunicação escrita com seis (6) meses de antecedência. Quando do término do convênio, a prorrogação de qualquer atividade individual será identificada e providenciada.

O conteúdo deste documento ou as atividades conduzidas sob o mesmo não devem constituir qualquer das partes em agente, servidor ou empregado da outra parte. Cada parte deve ser total e unicamente responsável por suas próprias ações e obrigações.

Este convênio entrará em vigor na data abaixo discriminada, e EM TESTEMUNHO DA VERDADE, as partes o consignam:



**Prof. Nilda de Fatima Ferreira Soares**  
Reitor

Data 03/01/2013



**From:** Schroeder, Margaret <m.mohr@uky.edu>  
**Sent:** Tuesday, February 03, 2015 9:07 AM  
**To:** Brothers, Sheila C  
**Subject:** Proposed New Dual Degree Program: PhD in Plant Pathology with Universidade Federal de Vicosa

**Proposed New Dual Degree Program: PhD in Plant Pathology with Universidade Federal de Vicosa**

This is a recommendation that the University Senate approve, for submission to the Board of Trustees, the establishment of a new Dual Degree Program: PhD in Plant Pathology with Universidade Federal de Vicosa, in the Department of Plant Pathology within the College of Agriculture, Food, and Environment.

Best-

Margaret

-----  
Margaret J. Mohr-Schroeder, PhD | Associate Professor of Mathematics Education | [STEM PLUS Program Co-Chair](#)  
| [Department of STEM Education](#) | [University of Kentucky](#) | [www.margaretmohrschroeder.com](#)



**UK**  
UNIVERSITY OF  
**KENTUCKY**  
College of Agriculture,  
Food and Environment

RECEIVED

NOV 26 2014

OFFICE OF THE  
SENATE COUNCIL

Department of Plant Pathology  
University of Kentucky  
201F Plant Science Building  
1405 Veterans Drive  
Lexington, KY 40546

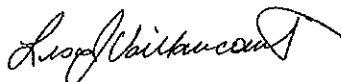
October 13, 2014

Dear Colleagues,

This is a proposal for a dual degree program between the University of Kentucky (UK) Department of Plant Pathology and the Departamento de Fitopatologia at the Universidade Federal de Viçosa (UFV) in Brazil. Both are ranked among the top five similar departments in their respective countries. Students in the dual degree program will earn Doctoral degrees in Plant Pathology from both institutions by simultaneously completing the requirements of both programs. The advantages to the students include the unique ability to obtain advanced practical training and to develop cultural and language fluency in both the United States and Brazil, while the advantages to our respective departments include the ability to recruit academically superior students from both countries, and facilitation of research collaborations to focus on plant disease problems of mutual interest. Our departmental strengths are complementary, with UK specializing in the molecular and cellular biology of plant-microbe interactions, and UFV focused primarily on applied pathology and sustainable approaches to plant disease management. The participating faculty at UFV are fluent in English, and received their higher educations primarily in the US and Europe so they are uniquely suited for this type of collaborative educational endeavor.

To my knowledge, this is the first dual degree proposal at UK. Given this, we anticipate that there may be many questions. We have spent the past several years in continuous discussion with our colleagues at UK and at UFV, as well as with representatives of the UK Graduate School and also the UK International Center, and we hope at this point that we have addressed all of the major issues and obstacles. We are willing to listen to any questions or concerns, and hope sincerely that you will be able to help us to address them expeditiously, so that this proposal can become a reality. Having this program in place will put UK at the forefront of a new revolution in the internationalization of higher education. Already UFV has many such agreements with European universities, but so far there have been none brought to fruition with a US university. I sincerely hope that UK can be the first. Thank you for your attention to the enclosed document.

With best regards  
Lisa Vaillancourt



Professor of Plant Pathology  
Director of Graduate Studies

## **DUAL DOCTORAL DEGREE IN PLANT PATHOLOGY BETWEEN THE UNIVERSITY OF KENTUCKY AND THE UNIVERSIDADE FEDERAL DE VIÇOSA**

### **Program Goal**

This is a proposal for a dual Doctoral degree program between the University of Kentucky (UK) and the Universidade Federal de Viçosa (UFV) in Brazil. Students will acquire academic credits and develop part of the research for their Doctoral dissertations at the partner university. A stay of at least 12 consecutive months at the partner university will be required for the program. Students in the program will obtain Doctoral degrees in Plant Pathology from both UK and UFV. Students in the program will develop language skills in English and Portuguese, and become familiar with norms of the discipline in both countries. Students will fulfill the academic requirements of both institutions in order to obtain degrees from both. The goal is to prepare students to work across borders, in academic, government, or industry settings. Graduates of the program will be able to leverage resources from both countries to solve problems of mutual interest at the highest level.

### **Background and Rationale**

Diseases of plants cause significant crop losses worldwide. Many plant diseases are cosmopolitan in their distribution, and many others are introduced to new regions and initiate epidemics each year. Plant Pathology (the study and management of plant disease) is, consequently, a global activity, and graduate education in this discipline should promote the development of a workforce that is diverse and globally-engaged. Employees that can function effectively across borders are in demand by business, academia, and government agencies. Graduate Plant Pathology programs in the United States (U.S.) attract talented students from all over the world. Fluency in English is an important goal for these international students, because English is the international language of science, and most scientists at the top levels are expected to communicate and publish in English and to follow the norms of scientific practice and inquiry that are emphasized in U.S. graduate programs. The participation of international students in U.S. Plant Pathology graduate programs certainly helps their U.S. counterparts to develop an expanded worldview. However, the U.S. graduate students typically have few opportunities to engage in the extended periods of study abroad that are necessary to develop practical fluency in another language and culture. Our goal is to strengthen and deepen the educational experiences of both U.S. and Brazilian Plant Pathology graduate students by instituting this dual degree program.

Brazil is a major agricultural producer and international supplier of agricultural commodities. It also represents a huge market for U.S. agricultural products and technology. Brazil is one of the rapidly growing BRIC economies, and it has invested heavily in biotechnological innovation, including in the area of biofuels where it is a recognized world leader. Most of the major multinational agricultural corporations have significant presences in Brazil, and the U.S. government is increasingly involved in partnerships with the country to promote our common interests. Brazil has an active research community working in support of its agricultural enterprise. The state sponsored universities and research institutes are extremely well equipped and staffed with a highly educated workforce. Brazil is a geographically, culturally, and economically diverse country that offers a unique international experience for U.S. students. Educational exchanges are likely to be mutually beneficial for U.S. and Brazilian researchers, and to lead to faster progress in solving problems of mutual interest.

UFV was established in 1926 based on the U.S. land grant college model, and its educational system is similar to that of U.S. universities. Its first president was Dr. Peter Henry Rolfs, originally from the University of Florida, who established UFV's long tradition of collaboration with international institutions. UFV has played a major role in the development of Brazilian agriculture. It has trained several generations of plant and agricultural scientists now working at other universities and at Embrapa, Brazil's largest agricultural research institution. UFV is consistently ranked as one of the top agricultural schools in Brazil. Furthermore, UFV provides a welcoming environment for international students: students from dozens of countries in North and South America, Europe, and Asia study there each year. UK already has an extensive history of collaboration with UFV, and the UK International Center recently selected UFV as one of only nine foreign universities worldwide, and the only one in the Western hemisphere, to be a key partner in future internationalization initiatives. In addition to individual faculty research collaborations that have included graduate student visits of up to one year in duration and visiting faculty exchanges, undergraduate students from the Department of Biosystems and Agricultural Engineering (BAE) at UK have been traveling to UFV for nearly a decade to take classes and to obtain cultural exposure during a semester abroad. Their experience has been uniformly excellent.

The Department of Plant Pathology (Departamento de Fitopatologia) at UFV consists of 18 faculty members engaged in a broad range of basic and applied research (<http://www.dfp.ufv.br/>). The faculty has an excellent international reputation, and a collective research focus on disease management, particularly via sustainable methods e.g. biological control. Abbreviated CVs for faculty who would be involved in the dual degree program are included in **APPENDIX 1**. Note that most of the faculty earned their Ph.D. degree at a U.S. or European university, and all

participating faculty have research experience in the U.S. or Europe and are fluent in English. The department is housed in a modern building on the UFV campus that is well equipped for all types of research, including access to some facilities (e.g. an electron microscopy unit) that Plant Pathology researchers at UK lack. The curriculum offered by the department is very traditional, including foundational laboratory courses (i.e. applied plant mycology, nematology, virology, and bacteriology) that have been discontinued (primarily due to limitations in funds and teaching lab space) at UK and many other U.S. universities. These laboratories offer an opportunity for our dual degree students to obtain a level of practical training in Plant Pathology that is currently unavailable at UK.

The Department of Plant Pathology at UK has consistently been ranked among the top five departments for Plant Pathology research in the United States (<http://www2.ca.uky.edu/agcollege/plantpathology/index.html>). It is a relatively small department (11 faculty members), split between basic research and extension. Both groups participate in graduate teaching. Coursework in the department is focused on developing critical thinking, research, and communication skills. The research faculty members are internationally known for their basic studies of the mechanisms of plant-microbe interactions, and they attract talented graduate students from all over the world. The outstanding extension faculty members are engaged mostly in applied disease management research that is focused on the needs of Kentucky growers, and some of them have extensive international experience in their own right. Their ability to advise graduate students is limited because their extension duties require significant amounts of travel and time devoted to grower and agent training. As a result, the department currently serves students interested in basic molecular or cellular research extremely well, but it is not as well equipped for students who are more interested in applied research and disease management.

These two strong departments complement one another very well in their respective strengths and resources. The dual degree student would be able to draw on the particular strengths of both in order to obtain a well-rounded education in Plant Pathology, as well as a working familiarity with a broad range of crops and diseases, and with both cultures and languages. We anticipate that graduates of this program would be highly competitive for jobs in both the U.S. and Brazil.

## **Curriculum**

The recommended core curriculum for the dual degree program provides a rigorous and comprehensive education in both basic and applied Plant Pathology, with an emphasis on critical thinking, communication, and research methodologies. Brazilian students will be required to have an M.S. degree in Plant Pathology before entering the program (this is already the requirement for



entering Ph.D. students there). M.S. programs in Plant Pathology are rare in the U.S. and more than 95% of our domestic students come directly to our program from an undergraduate major in one of the natural sciences. Thus, an M.S. will not be required for the U.S. students. As a result, courses other than the core will vary somewhat for each student in the program. Additionally, individual dissertation advisory committees may choose (by majority vote) to waive some of these core requirements and replace them with other courses, if that seems to fit the student's background and goals better.

**Core Courses for the Dual Degree: 24-25 hours** (PPA are courses at UK, FIP are courses at UFV). Syllabi for these courses are included in **APPENDIX 2**.

Population Biology (1-3 credits) (PPA 641 (1 credit<sup>1</sup>) **OR**<sup>2</sup> FIP 680 (3 credits)

Disease Diagnosis (3 credits) (PPA 640)

Critical Research Methods (3 credits<sup>3</sup>) (PPA 600)

Physiology of Plant Health and Disease (3-4 credits) (FIP 701, **OR**<sup>2</sup> PPA 500 (3) **and** PPA 673 (1))

Mycology (3 credits) (FIP 610<sup>4</sup>)

Bacteriology (3 credits) (FIP 640<sup>4</sup>)

Virology (3 credits) (FIP 630<sup>4</sup>)

Nematology (3 credits) (FIP 620)

Seminar (1 credit) (PPA 799)

A three-credit statistics course is a pre-requisite to the program, and can be taken concurrently.

1. The PPA course is currently listed at only one credit, based on class-meeting time per week, **HOWEVER**, it includes a substantial amount of work that is done outside the regular class period, and after review, UFV faculty agreed that it is equivalent in depth of coverage to FIP 680. An application will be made in the near future to increase the credits for this course.
2. After review by both UK and UFV Plant Pathology faculty, these courses or course combinations have been accepted as equivalent.
3. This course is currently listed at 2 credits but an application will be made in the near future to increase it to 3 credits, because of the significant amount of independent work it requires outside of class.
4. There are three courses that are currently offered for the UK degree (at least two of the three are required) that were not considered equivalent by UFV for their degree, because they do not include laboratories. These courses are PPA 650 (Mycology), PPA 670 (Plant Bacteriology) and PPA 671 (Advanced Plant Virology). The corresponding UFV courses (FIP 610, 630, and 640) contain similar lecture material **PLUS** laboratory exercises, and thus we consider them to be acceptable substitutes for our own courses in these areas for the dual degree students. Because our degree is a more research-intensive degree than the typical UFV (non-dual) degree, our **non-dual** degree students are able to obtain sufficient laboratory experience and training during the process of conducting their dissertation research.

Typical (existing) program for a **non-dual degree** U.S. student entering with a B.S. in Plant Science:

Yr:Semester	1:1	1:2	2:1	2:2	3:1	3:2	4:1	4:2
Classes	PPA 400G <sup>1</sup>	PPA 600	PPA 640	PPA 650	Electives	QUALS	PPA 767	PPA 767
	PPA 500	PPA 794	PPA 641	PPA 670 OR PPA 671	PPA 794	PPA 767		
	PPA 794	PPA 799	PPA 673	PPA 794				
			PPA 794					
Total Graduate Credit	6	9	9	9	9	2	2	2

1. If the student has taken a Plant Pathology course previously they will not need to take PPA 400G. PPA 400G does not count toward the total required credits for the PhD degree.

An example of the program for a U.S. student entering the **dual degree** program with a B.S. in Plant Science. Shaded boxes indicate time spent at UFV.

Yr:Semester	1:1	1:2	2:1	2:2 <sup>3</sup>	3:1	3:2	4:1	4:2
Classes	PPA 400G <sup>1</sup>	PPA 600	PPA 640	FIP 630	FIP 610	QUALS	PPA 767 <sup>6</sup>	PPA 767
	PPA 500	A&S 103 <sup>2</sup>	PPA 641	FIP 640	FIP 620	PPA 767		
	PPA 794	PPA 794	PPA 673	PPA 794 <sup>4</sup>	PPA 794			
		PPA 799	A&S 104 <sup>2</sup>					
			PPA 794					
Total Graduate Credit	6	9	9	9 <sup>5</sup>	9	2	2	2

1. If the student has taken a Plant Pathology course previously they will not need to take PPA 400G. PPA 400G does not count toward the total required credits for the PhD degree.
2. Portuguese levels 1 and 2: These courses are currently being offered by the Department of Hispanic Studies on a trial basis. In addition to taking these courses if available, the students will improve their conversational abilities by engaging with their visiting Brazilian counterparts in the dual degree program. If the courses are not available, the students would benefit from taking Spanish language courses instead.
3. The student will enroll in a noncredit six-week intensive Portuguese course upon arrival in Brazil in January.
4. PPA 794 is Dissertation Research. The student will receive credit for this course based on their independent research performed in the host laboratory. This research will be part of a collaborative project between the host laboratory and the student's home laboratory, and will comprise part of the student's dissertation.
5. Nine credits for the FIP courses will be transferred, the maximum allowable.
6. Post-qualifying research credit.

Typical (existing) program for a **non-dual degree** Brazilian student entering UFV with a M.S. in Plant Pathology: **Guidelines for the Ph.D. degree at UFV are included in APPENDIX 3.**

Yr:Semester	1:1	1:2	2:1	2:2	3:1	3:2	4:1	4:2
Classes	FIP 701	FIP 630	FIP 610	PPA 680	FIP 797 <sup>4</sup>	QUALS	Research	Research
	FIP 603 <sup>2</sup>	FIP 640	FIP 620	FIP 704 <sup>3</sup>	Research <sup>5</sup>	Research		
Total Graduate Credit	8	6	6	6	2	0	0	0

1. A total of at least 24 credits is required for completion of the degree at UFV for a student who enters with an M.S. (APPENDIX 3).
2. FIP 603: Clinica de Doencas de Plantas, Plant Disease Clinic (Disease Diagnosis).
3. FIP 704: Metodos em Fitopatologia Molecular (Methods in Molecular Phytopathology). This class covers techniques that are also discussed in PPA 660, but with much less emphasis on critical analysis of publications.
4. Student seminar. Analogous to our PPA 799.
5. Dissertation research. Not associated with a course number and not awarded credits at UFV. Analogous to our PPA 794 and PPA 767.

An example of the **dual degree** program for a Brazilian student<sup>1</sup>. Shaded boxes indicate time spent at UK.

Yr:Semester	1:1	1:2	2:1	2:2	3:1	3:2	4:1	4:2
Classes	FIP 701	FIP 630	FIP 610	PPA 600	PPA 640	QUALS	PPA 749	Research
	PPA 680	FIP 640	FIP 620	PPA 794	PPA 794	PPA 767		PPA 767
				Elective	PPA 799	Research		
Credit				9 UK credit	9 UK credit	2 UK credit	0 UK credit	2 UK credit

1. UFV students will be required to have completed a M.S. before beginning the dual degree Doctoral program. This will substitute for one year of the required pre-qualifying residency for the UK degree. Prior to coming to UK they would need to achieve a score of 79 or higher on the TOEFL.

### Student Learning Outcomes for the Dual Degree

1. Students will demonstrate technical mastery of the core information and principles of the discipline, including essential factual information, historical context, current literature and issues, practical applications, and professional ethics.
2. Students will demonstrate abilities to think critically, solve problems, work collaboratively, use technology (including information technology) effectively, and develop and carry out high quality, hypothesis driven research.

3. Students will demonstrate mastery of oral and written scientific communication in English.

### Student Learning Outcomes As Addressed in Core Courses

<b>Title</b>	<b>Course</b>	<b>Objective</b>
Population Biology	PPA 641, OR FIP 680	Describe how plants and associated microorganisms behave and evolve in populations, including concepts of selection and gene flow. <b>1,2</b>
Disease Diagnosis	PPA 640	Be able to diagnose diseases caused by major groups of pathogens including fungi, viruses, bacteria, nematodes, and abiotic causes, using the scientific method. <b>1,2,3</b>
Critical Research Methods	PPA 600	Be able to access information from the literature, and critically evaluate and apply that information. Be able to design statistically valid experiments and interpret the data from those experiments. Be able to write persuasively and make logically sound arguments in scientific papers in English. <b>1,2,3</b>
Physiology of Plant Health and Disease	PPA 500 and PPA 673, OR FIP 701	Explain and predict how disease affects the normal physiology of the host plant. Describe the genetics and physiology of plant resistance to pathogens, and predict the performance of resistance sources over time when they are deployed in the field. <b>1,2</b>
Mycology	FIP 610	Be able to identify major groups of fungi in culture and/or <i>in planta</i> , describe the major types of diseases caused by fungi, explain how fungal life cycles and structures relate to their pathogenicity to plants and to disease management. <b>1,2</b>
Bacteriology	FIP 640	Be able to identify major groups of bacteria in culture and/or <i>in planta</i> , describe the major types of diseases caused by bacteria, explain how bacterial life cycles, traits and behaviors relate to their pathogenicity to plants and to disease management. <b>1,2</b>
Nematology	FIP 630	Be able to identify major groups of plant-pathogenic nematodes. Describe the major types of diseases caused by nematodes, explain how nematode life cycles, traits, and behaviors relate to their pathogenicity to plants and to disease management. <b>1,2</b>
Virology	FIP 620	Be able to identify major groups of viruses, describe the major types of diseases caused by viruses, explain how viral traits and behaviors relate to their pathogenicity to plants and to disease management. <b>1,2</b>
Seminar	PPA 799	Display oral communication skills in the English language, including organization and presentation of background information and research findings, and delivery of a logical, evidence-based argument. <b>1,2,3</b>

Research	PPA 794	Develop and carry out high quality, hypothesis driven research. <b>1,2,3</b>
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### **Doctoral Advisory Committee**

The doctoral advisory committee will include one or more members from the partner institution, who will host the student in their laboratory(s) during their exchange. The student will have annual committee meetings, with all committee members attending either in person or via the internet, e.g. Skype. During the first committee meeting, a plan of coursework and travel will be presented, as well as a general overview of the research to be undertaken. For the second committee meeting, the student will prepare a literature review (in English) that will eventually form the first chapter of their dissertation. UFV faculty members who participate on these joint advisory committees will be added to the faculty roster of the UK Graduate School, after their credentials have been verified accordingly. Likewise, UK faculty participating in the dual degree program will be designated as adjunct faculty of UFV in accordance with their established process. This has already been successfully achieved for several faculty in Biosystems and Agricultural Engineering from UFV and from UK.

### **Graduate Degree Requirements**

#### *Qualifying Examination*

Each student will be required to pass a written and an oral qualifying examination before he or she may be admitted to candidacy for the dual doctoral degree. The existing process for the qualifying examination at both institutions is similar. The qualifying examination for the dual degree students will be administered jointly by all the members of the student's advisory committee, and will take place in the student's home department. The qualifying examination will emphasize knowledge in the discipline contained within the core courses, as well as critical thinking and logic, and oral and written communication. Members of the committee from the partner institution will attend the oral examination in person, if possible, but if not possible they may attend the examination via Skype or similar electronic means. The examination will be given primarily in English, although it will be permissible for Brazilian committee members to translate questions and answers for the Brazilian students and for the UK professors participating, as necessary, to ensure that the questions and answers are clear to all parties.

*Doctoral Dissertation*

Each student must write a dissertation based on original research. It is anticipated that dual degree students will be involved in joint research projects between laboratories at both universities. Thus, some of the work for the dissertation will be completed at the partner university and some at the home university. The dissertation will be written in English, with summaries written in both English and Portuguese. The dissertation will be defended at the home institution, in the presence of all members of the joint advisory committee, and it must meet or exceed the usual expectations for dissertations, in terms of both quantity and quality of research, at both institutions. Members of the committee from the partner institution will attend in person, if possible, but if not possible they may attend the examination via Skype or similar electronic means. For Brazilian students defending in Brazil, UK will appoint an outside examiner, consistent with UK Graduate School policy, and the outside examiner may also attend the examination via Skype or similar electronic means. All students will be expected to defend their dissertation in English.

It may not be clear why the dissertation should be written and defended in English, which seems to disadvantage the Brazilian students relative to the U.S. students. This is because an important goal of the dual degree program is to have the Brazilian students develop their skills in English to a level that is sufficient to engage readily in both oral and written scholarly communication in our discipline. English is the international language of science, and it will be very important and advantageous for the Brazilian students to have the high level of English language skill that is demonstrated by writing their dissertation and defending it in English. The Department of Plant Pathology at UFV has already been moving in the direction of having all their students write their dissertations in English. Since all of the participating UFV faculty members have an excellent command of the English language, this will not be a problem. Although it would be desirable for the U.S. students to achieve a similar level of ability in Portuguese, this will not be a requirement of the degree. Some of the U.S. students may already have Portuguese, or more commonly Spanish language skills, when enrolling. They will take one or more introductory Portuguese language courses at UK if these are available (there are two, A&S 103 and A&S 104, currently being offered on a trial basis through the Department of Hispanic Studies). UFV also offers a noncredit six-week “immersion” course in the Portuguese language and Brazilian culture for all new international students each January. The dual degree U.S. students will be required to take this class when they arrive in Brazil for their 12-month exchange. The U.S. students at UFV will be permitted to conduct all of their formal course assessments (tests, written papers) in English (confirmed by the letter from the UFV Director of Graduate Studies, **APPENDIX 4**). Because the participating faculty and many of the Brazilian graduate students speak English well, we don’t anticipate that our U.S. students will

have significant language difficulties with their class or laboratory work. Even a relatively modest level of language proficiency achieved by our U.S. students will be highly advantageous when competing for jobs that involve travel to Brazil and/or collaboration with Brazilian counterparts.

The U.S. and Brazilian dual degree students will fulfill all of the existing requirements for the Plant Pathology degree at UK. These requirements include: completion of four residency semesters prequalifying and two residency semesters postqualifying; successful completion of all core course requirements (unless waived by the student's committee); passing a written and oral qualifying examination, presentation of three seminars, one of which will be graded as PPA 799; and completion and defense of a dissertation based on original independent research. U.S. students will transfer a total of 9 credits from UFV toward their degree. According to Graduate School regulations, up to 25% of the total pre-qualifying credits earned can be transferred. As UK allows, the M.S. will replace two of the four prequalifying semesters for the Brazilian students. Brazilian students will obtain the other two prequalifying semesters during their stay at UK. They will do one of their three required seminars, in English, during their stay at UK. This is the seminar that will be graded for the required PPA 799 course. They will do the other two seminars (one of which will be their exit seminar) in Brazil, and these seminars will be broadcast over the internet so that all committee members and interested department members at UK can attend. Their final seminar will be in English, but the first seminar could be in either Portuguese or English. Brazilian students will register in absentia for at least two postqualifying semesters of PPA 767, including the semester they take their qualifying exams and the semester they defend, and they will register in PPA 749 for 0 credits for the remainder so that they will not need to pay tuition. In Brazil, students are fully supported by the government for up to four years and they attend school tuition-free during that time. Unlike UK, UFV does not have specific residency requirements. UFV will consider that the U.S. students have met their requirements for their Doctoral degree if they complete the core courses (unless waived by the student's committee), and complete and defend a dissertation based on original independent research.

With the exception of the transfer courses, and the co-supervision of doctoral theses, the program of study for Brazilian students at UK contains exactly the same elements as for current doctoral students in Plant Pathology who enter with a Masters degree or the equivalent.

### **Additional procedures, requirements and policies**

#### *Selection procedures*

Admission requirements for each university will be the same as those for regular (non-dual degree) students. Brazilian students will be required to have a M.S. in Plant Pathology or a related discipline before embarking on Doctoral studies. Most U.S. students probably will not have a M.S., as this is less common in the U.S. English proficiency will be required for Brazilian candidates, who will need to receive a score of 79 or higher on the Test of English as a Foreign Language (TOEFL) in order to enroll in the UK graduate program. A similar level of Portuguese proficiency is not required by UFV for U.S. candidates, but these candidates would be expected to enroll in Portuguese language classes at UK, if available, (e.g. A&S 103, 104), and spend some time improving their conversational abilities with their Brazilian dual degree colleagues and by self-study prior to traveling to Brazil. Once in Brazil, the U.S. students will be required to enroll in the accelerated language course offered for all international students by that University.

#### *Attendance at the partner university*

Each student must spend at least one continuous year (12 months) of their program at the partner institution prior to their qualifying examinations. During this year they will engage in a combination of course work and research. The research will usually be part of their dissertation research. Students may also travel to the other country for shorter periods post-qualifying, as funds allow, in order to perform parts of their own research in a field or lab setting there.

It is anticipated that the majority of students in the program will be involved in joint research projects between labs at UK and UFV. There are many areas of potential collaboration between the respective faculties, and various sources of funding from U.S. and Brazilian agencies that could be applied for. In this regard, it is important to point out that plant diseases that are common in Brazil, with its much greater diversity of climates, biodiversity, and cropping systems, have the potential to seriously impact U.S. agriculture if they are introduced here. One good example is soybean rust, which has been a serious problem in Brazil for many years before it was introduced to the southern U.S. Another example is wheat blast, which is causing significant damage in Brazil currently and was detected in the U.S. for the first time right here in Kentucky last year. U.S. funding agencies or private companies should be willing to fund joint research if it involves pathogens that are currently present in Brazil and that threaten U.S. agriculture in the future. It is hoped that the presence of the dual degree program will result in increased levels of research funding for both institutions from both governments.



**APPENDIX 1**

Abbreviated CVs (in English) of UFV Faculty who would be involved in the dual degree.

List of Faculty:

Robert Weingart Barreto  
Sérgio Hermínio Brommonschenkel  
Claudine Márcia de Carvalho  
Leandro Grassi de Freitas  
Eduardo Seiti Gomide Mizubuti  
José Rogério de Oliveira  
Emerson Medeiros del Ponte  
Fabrício de Ávila Rodrigues  
Francisco Murilo Zerbini Júnior

## *Curriculum Vitae*

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### **Robert Weingart Barreto**

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Department of Plant Pathology	Tel. (Lab): +51 3 899 2625
Laboratory of Mycology	Fax: +55 31 3 899 2240
Viçosa, Minas Gerais, Zip Code 36570-900, Brazil	Email: <a href="mailto:rbarreto@ufv.br">rbarreto@ufv.br</a>

### **Education and Training**

M.Sc. In Pure and Applied Taxonomy, University of Reading, Berkshire, U.K., 1986

Ph.D., Botany, University of Reading, Berkshire, U.K., 1996

Post Ph.D, Centraalbureau voor Schimmelcultures, Utrecht, NL, 2011

### **Publications in Refereed Journals (from 2010 to 2014)**

Coutinho FMF, Macedo DM, Barreto RW (2014) First report of gray mold (*Amphobotrys ricini*) on copperleaf (*Acalypha wilkesiana*) in Brazil. *Plant Disease* 98:276-276.

Miranda BC, Cardoso A, Barreto RW (2014). First Report of *Rhizoctonia solani* AG-1-IB causing leaf blight of sorrel (*Rumex acetosa*) in Brazil. *Plant Disease* 98:278-278.

Duarte LL, Choi Y-J, Soares DJ, Barreto RW (2014) *Plasmopara invertifolia* sp. nov. causing downy mildew on *Helichrysum bracteatum* (Asteraceae). *Mycological Progress* 13:285-289.

Guatimosim E, Pinto HJ, Barreto RW, Prado J (2014) *Rhagadolobiosis*, a new genus of Parmulariaceae from Brazil with a description of the ontogeny of its ascospores. *Mycologia* 106:276-281.

Colman A, Silva RA, Alves R, Silva M, Barreto RW (2014) First report of causing leaf spots on in Brazil. *Plant Disease* 98:849-849.

Guatimosim E, Schwartsburd PB, Barreto RW (2014) A new *Inocyclus* species (Parmulariaceae) on the neotropical fern *Pleopeltis astrolepis*. *IMA Fungus* 5:51-55.

Colman A, Macedo DM, Barreto RW (2014) First report of downy mildew (*Hyaloperonospora lunariae*) on white mustard (*Sinapis alba*) in Brazil. *Plant Disease* 98:1007-1007.

Lima RD, Santin AM, Seni DJ, Dietrich A, Salazar LA, Subbotin AS, Mundo-Ocampo M, Goldenberg R, Barreto RW (2013) *Ditylenchus gallaeformans* sp. n. (Tylenchida: Anguinidae) a neotropical nematode with biocontrol potential against weedy Melastomataceae. *Nematology* 15:179-196.

## *Curriculum Vitae*

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### **Sérgio Hermínio Brommonschenkel**

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Viçosa, Minas Gerais, Zip Code 36570-900, Brazil	Email: <a href="mailto:shbromo@ufv.br">shbromo@ufv.br</a>

### **Education and Training**

B.A., Agronomy, Viçosa Federal University, 1984

M.Sc. Plant Pathology, Viçosa Federal University, 1988

Ph.D., Plant Breeding and Genetics, Cornell University, Cornell, U.S.A., 1995

### **Publications in Refereed Journals (from 2010 to 2014)**

Myburg AA, Grattapaglia D, Tuskan GA, Hellsten U, Hayes RD, Grimwood J, Jenkins J, Lindquist E, Tice H, Bauer D, Goodstein DM, Dubchak I, Poliakov A, Mizrachi E, Kullán ARK, Hussey SG, Pinard D, Merwe KV-D, Singh P, Jaarsveld IV, Silva-Junior OB, Togawa RC, Pappas MR, Faria DA, Sansaloni CP, Petroli CD, Yang X, Ranjan P, Tschaplinski TJ, Ye C-Y, *et al.* (2014) The genome of *Eucalyptus grandis*. *Nature* 510:356-362.

Pereira JF, Almeida APMM, Cota J, Pamphile JÁ, Ferreira-Silva G, Araujo EF, Gramacho KP, Brommonschenkel SH, Pereira GAG, Queiroz MV (2012) Boto, a class II transposon in *Moniliophthora perniciosa*, is the first representative of the PIF/Harbinger superfamily in a phytopathogenic fungus. *Microbiology* 159:112-125.

Alves AA, Faria DA, Grattapaglia D, Alfenas AC, Lau D, Guimarães, LMS, Brommonschenkel SH, Rosado CCG (2011) Genetic mapping provides evidence for the role of additive and non-additive QTLs in the response of inter-specific hybrids of *Eucalyptus* to *Puccinia psidii* rust infection. *Euphytica* 183:27-38.

Ruiz JCD, Silva V, Ali A, Pinto A, Santos AC, Rocha AR, Lopes AAMC, Dorella DO, Pacheco FA, Costa LGC, Turk MP, Seyffert MZ, Moraes N, Soares PMRO, Almeida SC, Castro SS, Abreu TLP, Trost VAC, Baumbach E, Tauch J, Schneider A, McCulloch MPC, Cerdeira J, Ramos LT, Rommel TJ, *et al.* (2011) Evidence for reductive genome evolution and lateral acquisition of virulence functions in two *Corynebacterium pseudotuberculosis* strains. *Plos One* 6:e18551.

Lourenço-Junior, V, Rodrigues TTMS, Campos AMD, Bragança CAD, Scheuermann KK, Reis A, Brommonschenkel SH, Maffia LA, Mizubuti ESG (2011) Genetic structure of the population of *Alternaria solani* in Brazil. *Journal of Phytopathology* 159:233-240.

## *Curriculum Vitae*

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### **Claudine Márcia de Carvalho**

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Viçosa, Minas Gerais, Zip Code 36570-900, Brazil	Email: <a href="mailto:claudine.carvalho@ufv.br">claudine.carvalho@ufv.br</a>

### **Education and Training**

B.A., Agronomy, Lavras Federal University, 1997  
M.Sc. Plant Pathology, Lavras Federal University, 1999  
Ph.D., Plant Virology, Wageningen University, Wageningen, NL, 2003  
Post Ph.D., Oxford Brookes University, Brookes, U.K., 2006  
Post Ph.D., Viçosa Federal University, 2008

### **Publications in Refereed Journals (from 2010 to 2014)**

Carvalho SL, Silva FN, Zanardo LG, Almeida AMR, Zerbini FM, Carvalho CM (2013) Production of polyclonal antiserum against *Cowpea mild mottle virus* coat protein and its application in virus detection. *Tropical Plant Pathology* 38:49-54.

Zanardo LG, Silva FN, Bicalho AAC, Urquiza GPC, Lima ATM, Almeida AM, Zerbini FM, Carvalho CM (2013) Molecular and biological characterization of *Cowpea mild mottle virus* isolates infecting soybean in Brazil and evidence of recombination. *Plant Pathology* 63:n/a-n/a.

Zanardo LG, Silva FN, Lima ATM, Milanesi DF, Castilho-Urquiza GP, Almeida AMR, Zerbini FM, Carvalho, C. M. . Molecular variability of *Cowpea mild mottle virus* infecting soybean in Brazil. *Archives of Virology* 158:1432-8798.

Souza NA, Silva FN, Bedendo IP, Carvalho CM (2013) A phytoplasma belonging to a 16SrIII-A subgroup and dsRNA virus associated with cassava frogskin disease in Brazil. *Plant Disease*: 98:771-779.

Osterrieder A, Hummel E, Carvalho CM, Hawes C (2010) Golgi membrane dynamics after induction of a dominant-negative mutant Sar1 GTPase in tobacco. *Journal of Experimental Botany* 61:405-422.

## *Curriculum Vitae*

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### **Publications in Refereed Journals (from 2010 to 2014)**

- Viggiano JR, Freitas LG, Lopes EA (2014) Use of *Pochonia chlamydosporia* to control *Meloidogyne javanica* in cucumber. *Biological Control* 69:72-77.
- Bontempo AF, Fernandes RH, Lopes J, Freitas LG, Lopes EA (2014) *Pochonia chlamydosporia* controls *Meloidogyne incognita* on carrot. *Australasian Plant Pathology* 43:421-424.
- Dallemole-Giaretta R, Freitas LG, Xavier DM, Zooca RJF, Ferraz S, Lopes EA (2014) Incorporação ao solo de substrato contendo micélio e conídios de *Pochonia chlamydosporia* para o manejo de *Meloidogyne javanica*. *Ciência Rural* 44:629-633.
- Kramer-Mello IN, Araújo JV, Braga FR, Avelar-Monteiro TS, Freitas LG, Araujo JM, Freitas-Soares FE (2013) Biological control of infective larvae of *Ancylostoma* spp. in beach sand. *Revista Iberoamericana de Micología* 30:1-10.
- Dallemole-Giaretta R, Freitas LG, Cavallin IC, Marmentini GA, Faria CMDR, Resende JTV (2013) Avaliação de um produto à base de *Pochonia chlamydosporia* no controle de *Meloidogyne javanica* em alface e cenoura no campo. *Nematropica* 43:131-137.
- Maciel AS, Freitas LG, Figueiredo LD, Campos AK, Mello INK (2012) Antagonistic activity of the fungus *Pochonia chlamydosporia* on mature and immature *Toxocara canis* eggs. *Parasitology* 1:1-12.
- Ferreira PA, Ferreira PA, Neves WS, Lopes EA, Freitas LG, Ferraz S (2012) Efeito da fertilização e da nutrição de plantas sobre doenças causadas por nematoides. *Revista Trópica - Ciências Agrárias e Biológicas* 6:33-42.

Dallemole-Giaretta R, Freitas LG, Lopes EA, Pereira OL, Zooca RJF, Ferraz S (2012) Screening of *Pochonia chlamydosporia* Brazilian isolates as biocontrol agents of *Meloidogyne javanica*. *Crop Protection* 42:102-107.

Viggiano JR, Freitas LG, Ferreira PA (2012) Resíduo da produção de *Pochonia chlamydosporia* no desenvolvimento de mudas e plantas de alface. *Pesquisa Agropecuária Brasileira* 47:983-990.

Neves WS, Freitas LG, Dallemole-Giaretta R, Coutinho MM, Ferraz S, Parreira DF (2012) Incorporação de farinha de semente de mamão ao solo para o controle de *Meloidogyne javanica*. *Nematologia Brasileira* 36:25-31.

Ferreira SR, Araújo JV, Braga FR, Araujo JM, Carvalho RO, Silva AR, Frassy LN, Freitas LG (2011) Ovicidal activity of seven *Pochonia chlamydosporia* fungal isolates on *Ascaris suum* eggs. *Tropical Animal Health and Production* 43:639-642.

Lopes EA, Ferraz S, Ferreira PA, Freitas LG, Dallemole-Giaretta R (2011) Soil amendment with chopped or ground dry leaves of six species of plants for the control of *Meloidogyne javanica* in tomato under greenhouse conditions. *Ciência Rural* 41:935-938.

Dallemole-Giaretta R, Freitas LG, Caixeta LB, Xavier DM, Ferraz S, Fabry CFS (2011) Produção de clamidósporos de *Pochonia chlamydosporia* em diferentes substratos. *Ciência e Agrotecnologia* 35, p. 314-321.

Dias-Arieira CR, Santana SM, Freitas LG, Cunha TPL, Biela F, Puerari HH, Chiamolera FM (2011) Efficiency of *Pochonia chlamydosporia* in *Meloidogyne incognita* control in lettuce crop (*Lactuca sativa* L.). *International Journal of Food, Agriculture and Environment* 9:561-563.

Bernardo JT, Freitas LG, Yamada JK, Almeida VS, Dallemole-Giaretta R, Ferraz S (2011) Efeito de adubos orgânicos sobre *Meloidogyne javanica* em tomateiro. *Nematologia Brasileira* 35:10-19.

Dallemole-Giaretta R, Ferraz S, Freitas LG, Podestá GS, Lopes EA, Agnes EL (2011) Cover crops and *Pochonia chlamydosporia* for the control of *Meloidogyne javanica*. *Nematology* 13:919-926.

Dallemole-Giaretta R, Freitas LG, Coutinho MM, Neves WS, Zooca RJF, Ferraz S (2011) Efeito de farinha de sementes de abóbora e de *Pochonia chlamydosporia* no controle de *Meloidogyne javanica*. *Nematologia Brasileira* 34:91-97.

Dallemole-Giaretta R, Freitas LG, Zooca RJF, Caixeta LB, Lopes EA, Ferraz S (2010) Controle de *Meloidogyne javanica* por meio de aplicação de palha de café colonizada por *Pochonia chlamydosporia* var. *chlamydosporia*. *Nematologia Brasileira* 34:137-140.

Dallemole-Giaretta R, Freitas LG, Zooca RJF, Podestá GS, Caixeta LB, Ferraz S, Lopes EA (2010) Associação de *Pochonia chlamydosporia*, *Bacillus cereus* e fibra de coco no controle de *Meloidogyne javanica* em tomateiro. *Nematologia Brasileira* 4:18-22.

Gardiano CG, Dallemole-Giaretta R, Lopes EA, Zooca RJF, Ferraz S, Freitas LG (2010) Atividade nematicida de extratos de sementes de espécies de crotalária sobre *Meloidogyne javanica*. *Revista Trópica - Ciências Agrárias e Biológicas* 4:3-7.

Maciel AS, Freitas LG, Campos AK, Lopes EA, Araújo JV (2010) The biological control of *Ancylostoma* spp. dog infective larvae by *Duddingtonia flagrans* in a soil microcosm. *Veterinary Parasitology* 173:262-270.

#### **Book and Book Chapters (from 2010 to 2014)**

Ferraz S, Freitas LG, Lopes EA, Dias-Arieira CR (2010) Manejo Sustentável de Fitonematoides. Vol. 1. Editora UFV, Viçosa, MG. 304p.

Ferreira PA, Ferraz S, Freitas LG (2012) Sintomas causados por fitonematoides. In: Zambolim L, Jesus Junior WC, Pereira OL (Eds.). *O Essencial da Fitopatologia - Agentes Causais*. Vol. 1. Suprema Gráfica e Editora Ltda., Visconde do Rio Branco, MG. pp. 203-222.

Freitas LG, Oliveira RDL, Ferraz S (2012) Nematoides como Patógenos de Plantas. In: Zambolim L, Jesus Júnior WC, Pereira OL (Eds.). *O Essencial da Fitopatologia - Agentes Causais*. Vol. 2. Suprema Gráfica e Editora Ltda., Visconde do Rio Branco, MG. pp. 89-128.

Oliveira RDL, Freitas LG (2012) Métodos Empregados em Fitonematologia. In: Zambolim L, Jesus junior WC, Pereira OL (Eds.). *O Essencial da Fitopatologia - Agentes Causais*. Vol. 1. Suprema Gráfica e Editora Ltda., Visconde do Rio Branco, MG. pp. 355-376.

Freitas LG, Oliveira RDL, Ferraz S (2012) Identificação de Fitonematoides. In: Zambolim L, Jesus Junior WC, Pereira OL (Eds.). *O Essencial da Fitopatologia - Agentes Causais*. Vol. 1. Suprema Gráfica e Editora Ltda., Visconde do Rio Branco, MG. pp. 377-416.

Paiva JAP, Prat E, Vautrin S, Santos MD, San-Clemente H, Brommonschenkel SH, Fonseca PGS Grattapaglia D, Song X, Ammiraju JSS, Kudrna D, Wing RA, Freitas AT, Bergès H, Grima-Pettenati J (2011) Advancing *Eucalyptus* genomics: identification and sequencing of lignin biosynthesis genes from deep-coverage BAC libraries. *BMC Genomics* 12:137.

Lopes FJF, Pauly M, Brommonschenkel SH, Lau EY, Diola V, Passos JL, Loureiro ME (2010) The EgMUR3 xyloglucan galactosyltransferase from *Eucalyptus grandis* complements the mur3 cell wall phenotype in *Arabidopsis thaliana*. *Tree Genetics & Genomes* 6:745-756.



Varejão EVV, Demuner AJ, Barbosa LCA, Barreto RW, Veira BS (2013) Toxicidade de filtrados de cultura de *Alternaria euphorbiicola* em folhas de *Euphorbia heterophylla*. *Planta Daninha* 31:1-9.

Macedo DM, Pereira OL, Wheeler GS, Barreto RW (2013) *Corynespora cassiicola* f. sp. *schinii*, a potential biocontrol agent for the weed *Schinus terebinthifolius* in the United States. *Plant Disease* 97:496-500.

Varejão EVV, Demuner AJ, Barbosa LCA, Barreto RW (2013) The search for new natural herbicides strategic approaches for discovering fungal phytotoxins. *Crop Protection* 48:41-50.

Morais EGF, Picanço MC, Lopes-Mattos KLB, Bouchier RS, Alves Meira RMS, Barreto RW (2013) *Diclidophlebia smithi* (Hemiptera: Psyllidae), a potential biocontrol agent for *Miconia calvescens* in the Pacific: Population dynamics, climate-match, host-specificity, host-damage and natural enemies. *Biological Control* 66:33-40.

Alves JL, Woudenberg JHC, Duarte LL, Crous PW, Barreto RW (2013) Reappraisal of the genus *Alternariaster* (Dothideomycetes). *Persoonia* 31:77-85.

Rocha FB, Hanada RE, Albuquerque ST, Barreto RW (2013) *Pseudocercospora piperis* associated with leaf spots on *Piper aduncum* in Brazil. *Australasian Plant Disease Notes* 1:1-3.

Evans HC, Bezerra JL, Barreto RW (2013) Of mushrooms and chocolate trees: a etiology and phylogeny of witch's broom and frosty pod diseases of cacao. *Plant Pathology* 62:728-740.

Quaedvlieg W, Verkley GJM, Shin H-D, Barreto RW, Alfenas AC, Swart WJ, Groenewald JZ, Crous PW (2013) Sizing up *Septoria*. *Studies in Mycology* 75:307-390.

Fernandes AF, Miranda BEC, Duarte LL, Barreto RW (2013) *Passalora stromatica* sp. nov. associated with leaf spots of *Tithonia diversifolia* in Brazil. *IMA Fungus* 4:201-204.

Augustin JO, Groenewald JZ, Nascimento RJ, Mizubuti ESG, Barreto RW, Elliot SL, Evans HC (2013) Yet more -weeds- in the garden: Fungal novelties from nests of leaf-cutting ants. *Plos One* 8:e82265.

Fowler SV, Barreto RW, Dodd S, Macedo DM, Paynter Q, Pedrosa-Macedo JH, Pereira OL, Peterson P, Smith L, Waipara N, Winks CJ, Forrester G (2013) *Tradescantia fluminensis*, an exotic weed affecting native forest regeneration in New Zealand: Ecological surveys, safety tests and releases of four biocontrol agents from Brazil. *Biological Control* 64:323-329.

Silva M, Freitas NM, Mendonca HL, Barreto RW (2013) First report of *Stagonosporiopsis cucurbitacearum* causing fruit rot of *Luffa cylindrica* in Brazil. *Plant Disease* 97:1120-1121.

Miranda BEC, Barreto RW, Crous PW, Groenewald JZ (2012) *Pilidiella tibouchinae* sp. nov. associated with foliage blight of *Tibouchina granulosa* (quaresmeira) in Brazil. *IMA Fungus* 3:1-7.

Costa LC, Macedo DM, Barreto RW (2012) Reappraisal and neotypification of *Phyllachora feijoa*. *IMA Fungus* 3:9-14.

Silva M, Barreto RW, Pereira OL (2012) Fungal pathogens of “cat’s claws” from Brazil for biocontrol of *Macfadyena unguis-cati*. Mycotaxon 119:181-195.

Silva M, Castañeda-Ruiz RF, Pereira OL, Barreto RW (2012) *Alveariospora*, a new anamorphic genus from trichomes of *Dimorphandra mollis* in Brazil. Mycotaxon 119:109-116.

Morais EGF, Picanço MC, Semeão AA, Barreto RW, Rosado JF, Martins JC (2012). Lepidopterans as potential agents for the biological control of the invasive plant, *Miconia calvescens*. Journal of Insect Science 12:1-17.

Schoch CL, Seifert KA, Huhndorf S, Robert V, Spouge JL, Levesque CA, Chen W, Bolchacova E, Voigt K, Crous PW, Miller AN, Wingfield MJ, Aime MC, An K-D, Bai F-Y, Barreto RW, Begerow D, Bergeron M-J, Blackwell M, Boekhout T, Bogale M, Boonyuen N, Burgaz AR, Buyck B, Cai L et al. (2012) From the Cover: Nuclear ribosomal internal transcribed spacer (ITS) region as a universal DNA barcode marker for Fungi. Proceedings of the National Academy of Sciences of the United States of America 109:6241-6246.

Passos JL, Barbosa LCA, Demuner AJ, Alvarenga ES, Silva CM, Barreto RW (2012) Chemical Characterization of volatile compounds of *Lantana camara* L. and *L. radula* Sw. and their antifungal activity. Molecules 17:11447-11455.

Barreto RW, Johnston PR, Crous PW, Evans HC (2012) A new species of the lenticel fungal genus *Claviradulomyces* (Ostropales) from the Brazilian Atlantic forest tree *Xylopia sericea* (Annonaceae). IMA Fungus 3:135-141.

Guatimosim E, Pinto HJ, Barreto RW (2012) *Passalora acrocomiae* sp. nov. and *Exosporium acrocomiae* from the palm *Acrocomia aculeata* in Puerto Rico. Mycotaxon 122:61-67.

Santana EA, Guatimosim E, Fuga CAG, Barreto RW (2011) First record of *Pyricularia grisea* causing leaf blight of *Costus spiralis* in Brazil. Australasian plant disease notes 5:1-8.

Soares DJ, Rocha FB, Duarte LL, Barreto RW (2011) *Pyriculariopsis calathea* sp. nov., a novel anamorphic hyphomycete from the Atlantic forest of Brazil causing leaf spots on *Calathea longifolia*. Mycological Progress 10:315-321.

Carvalho CR, Fernandes RC, Carvalho GMA, Barreto RW, Evans HC (2011) Cryptosexuality and the genetic diversity paradox in coffee rust, *Hemileia vastatrix*. Plos One 6:e26387.

Guatimosim E, Fuga CAG, Pinto HJ, Barreto RW (2011) First report of gray mold caused by on yellow cosmos (*Cosmos sulphureus*) in Brazil. Plant Disease 95:1588-1588.

Evans HC, Barreto RW (2011) Embracing invasives: a view of compromise. Science 331:1383, 2011.

Vieira BS, Barreto RW (2010) Liquid culture production of chlamydospores of *Lewia chlamidosporiformans* (Ascomycota: Pleosporales), a mycoherbicide candidate for wild poinsettia. Australasian Plant Pathology 39:154-160.

Alves JL, Barreto RW, Pereira OL, Soares DJ (2010) Additions to the mycobiota of the invasive weed *Miconia calvescens* (Melastomataceae). *Mycologia* 102:69-82.

Citações:4|4

Alves JL, Barreto RW (2010) *Pseudocercospora ixoricola* causing leaf spots on *Ixora coccinea* in Brazil. *Plant Disease* 94:278-278.

Morais EGF, Picanco MC, Barreto RW, Silva NR, Campos MR (2010) Biological performance of *Diclidophlebia smithi* (Hemiptera: Psyllidae), a potential biocontrol agent for the invasive weed *Miconia calvescens*. *Biocontrol Science and Technology* 20:107-116.

Passos JL, Demuner AJ, Barbosa LCA Barreto RW, King-Diaz B, Lotina-Hennsen B (2010) Effects of *Corynespora cassiicola* on *Lantana camara*. *Planta Daninha* 28:229-237.

Almeida DB, Macedo DM, Barreto RW (2010) Leaf spot on *Clerodendrum speciosus* in Brazil caused by *Pseudocercospora clerodendricola* sp. nov.. *Tropical Plant Pathology* 35:170-173.

Morais EGF, Picanço MC, Barreto RW, Silva GA, Moreno SC, Queiroz RB (2010) Biology of the leaf roller *Salbia lotanalis* and its impact on the invasive tree *Miconia calvescens*. *BioControl* 55:685-694.

Rocha FB, Barreto RW, Bezerra JL, Neto JAAM (2010) Foliar mycobiota of *Coussapoa floccosa*, a highly threatened tree of the Brazilian Atlantic forest. *Mycologia* 102:1240-1252.

Lima BV, Soares DJ, Barreto RW (2010) Inoculum density of *Plectosporium alismatis*, a potential mycoherbicide, in relation to control of the aquatic weed *Sagittaria montevidensis*. *Tropical Plant Pathology* 35:236-240.

Crous PW, Barreto RW, Alfenas AC, Alfenas RF, Groenewald JZ (2010) What is *Johansonia*? *IMA Fungus* 1:117-122.

Macedo DM, Pinho DB, Barreto RW, Pereira OL, Gusmão LFP, Cuda J (2010) Black mildew fungi (Meliolaceae) associated with *Schinus terebinthifolius* (Brazilian pepper tree) in Brazil. *Mycotaxon* 114:429-437.

### **Book and Book Chapters (from 2010 to 2014)**

Barreto RW, Ellison CA, Seier MK, Evans H (2012) Biological control of weeds with plant pathogens: Four decades on. In: Dharam P, Shankar AU (Eds.). *Integrated Pest Management Principles and Practice*. Vol. 1. CABI, Wallingford, UK. pp. 299-350.

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### **Publications in Refereed Journals (from 2010 to 2014)**

Santiago TR, Grabowski C, Mizubuti ESG (2014) First report of bacterial wilt caused by on sp. in Paraguay. *New Disease Reports* 29:2.

Paz-Carrasco LC, Castillo-Urquiza GP, Lima ATM, Xavier CAD, Vivas-Vivas LM, Mizubuti ESG, Zerbini FM (2014) Begomovirus diversity in tomato crops and weeds in Ecuador and the detection of a recombinant isolate of *Rhynchosia golden mosaic yucatan virus* infecting tomato. *Archives of Virology* 159:2127-2132.

Gomes LIS, Bibiano LBJ, Silva GF, Hanada RE, Mizubuti ESG (2014) Baseline sensitivity of brazilian *Mycosphaerella fijiensis* isolates to protectant and systemic fungicides. *Tropical Plant Pathology* 39:172-177.

Haddad F, Saraiva RM, Mizubuti ESG, Romeiro RS, Maffia LA (2014) Isolation and selection of *Hemileia Vastatrix* antagonists. *European Journal of Plant Pathology* 139: 763-772.

Pinho DB, Honorato Junior J, Firmino AL, Hora Junior BT, Mizubuti ESG, Pereira OL (2014) Reappraisal of the black mildews (Meliolales) on *Hevea brasiliensis*. *Tropical Plant Pathology* 39:89-94.

Correia KC, Mizubuti ESG, Silva EKC, Câmara MPS, Sales Junior R, Armengol J, Jimenez JG, Michereff SJ (2014) Fitness components of *Monosporascus cannonballus* isolates from northeastern Brazilian melon fields. *Tropical Plant Pathology* 39:217-223.

Santana MF, Silva JCF, Mizubuti ESG, Araújo EF, Condon BJ, Turgeon B, Queiroz MV (2014) Characterization and potential evolutionary impact of transposable elements in the genome of *Cochliobolus heterostrophus*. *BMC Genomics* 15:536.

Gomes LIS, Douhan GW, Bibiano LBJ, Maffia LA, Mizubuti ESG (2013) *Mycosphaerella musicola* Identified as the only pathogen of the Sigatoka Disease Complex present in Minas Gerais State, Brazil. *Plant Disease* 97:1537-1543.

Queiroz CB, Santana MF, Silva GF, Mizubuti ESG, Araújo EF, Queiroz MV (2013) Use of the IRAP marker to study genetic variability in *Pseudocercospora fijiensis* populations. *Current Microbiology* 68:358-364.

Duarte HSS, Zambolim L, Capucho AS, Nogueira Junior AF, Rosado AWC, Cardoso CR, Paul PA, Mizubuti ESG (2013) Development and validation of a set of standard area diagrams to estimate severity of potato early blight. *European Journal of Plant Pathology* 137:249-257.

Haddad F, Saraiva RM, Mizubuti ESG, Romeiro RS, Maffia LA (2013) Antifungal compounds as a mechanism to control *Hemileia vastatrix* by antagonistic bacteria. *Tropical Plant Pathology* 38:398-405.

Graça RN, Ross-Davis AL, Klopfenstein NB, Kim M-S, Peever TL, Cannon PG, Aun CP, Mizubuti ESG, Alfenas AC (2013) Rust disease of eucalypts, caused by *Puccinia psidii*, did not originate via host jump from guava in Brazil. *Molecular Ecology* 22:6033-6047.

Augustin JO, Groenewald JZ, Nascimento RJ, Mizubuti ESG, Barreto RW, Elliot SL, Evans HC (2013) Yet more -weeds- in the garden: fungal novelties from nests of leaf-cutting ants. *Plos One* 8:e82265.

Maia TA, Maciel-Zambolim E, Caixeta ET, Mizubuti ESG, Zambolim L (2013) The population structure of *Hemileia vastatrix* in Brazil inferred from AFLP. *Australasian Plant Pathology* 42:533-542.

Rocha CS, Castillo-Urquiza GP, Lima ATM, Silva FN, Xavier CAD, Hora Júnior BT, Beserra Junior JEA, Malta AWO, Martin DP, Varsani A, Alfenas-Zerbini P, Mizubuti ESG, Zerbini FM (2013) Brazilian Begomovirus populations are highly recombinant, rapidly evolving, and segregated based on geographical location. *Journal of Virology* 87:5784-5799.

Duarte HSS, Zambolim L, Mizubuti ESG, Pádua JG, Júnior JI, Ribeiro L, Carmo E, Nogueira Junior AF (2012) The field resistance of potato cultivars to foliar late blight and its relationship with foliage maturity type and skin type in Brazil. *Australasian Plant Pathology* 41:139-155.

Silva SJC, Castillo-Urquiza GP, Hora Junior BT, Assunção IP, Lima GSA, Pio-Ribeiro G, Mizubuti ESG, Zerbini FM (2012) Species diversity, phylogeny and genetic variability of begomovirus populations infecting leguminous weeds in northeastern Brazil. *Plant Pathology* 61:257-267.

Abadio AKR, Lima SS, Santana MF, Salomão TMF, Sartorato A, Mizubuti ESG, Araújo EF, Queiroz MV (2012) Genetic diversity analysis of isolates of the fungal bean pathogen *Pseudocercospora griseola* from central and southern Brazil. *Genetics and Molecular Research* 11:1272-1279.

Mizobutsi EH, Ferraz S, Mizubuti ESG, Dias-Arieira CR, Ribeiro RCF (2012) Viabilidade e sobrevivência do inóculo de *Heterodera glycines* raça 3 no solo. *Tropical Plant Pathology* 37:223-226.

Souza AGC, Maffia LA, Mizubuti ESG (2012) Cultural and aggressiveness variability of *Cercospora coffeicola*. *Journal of Phytopathology* 160:540-546.

Macedo PEF, Maffia LA, Maffia LA, Cota LV, Lourenço W, Mizubuti ESG (2012) Sensitivity of four isolates of *Clonostachys rosea* to pesticides used in the strawberry crop in Brazil. *Journal of Pesticide Science* 37:333-337.

Elsayed AY, Mizubuti ESG, Silva DJH, Pedrosa CE (2012) The inheritance of late blight resistance derived from *Solanum habrochaites*. *Crop Breeding and Applied Biotechnology* 12:199-205.

Santana MF, Araújo EF, Souza JT, Mizubuti ESG, Queiroz MV (2012) Development of molecular markers based on retrotransposons for the analysis of genetic variability in *Monilophthora perniciosa*. *European Journal of Plant Pathology* 134:497-507.

Souza AGC, Rodrigues FA, Maffia LA, Mizubuti ESG (2011) Infection Process of *Cercospora coffeicola* on Coffee Leaf. *Journal of Phytopathology* 159:6-11.

Lourenço Junior V, Rodrigues TTMS, Campos AMD, Bragança CAD, Scheuermann KK, Reis A, Brommonschenkel SH, Maffia LA, Mizubuti ESG (2011) Genetic structure of the population of *Alternaria solani* in Brazil. *Journal of Phytopathology* 159:233-240.

Alvarado ICM, Michereff SJ, Souza EB, Quezado-Duval AM, Resende LV, Cardoso E, Mizubuti ESG (2011) Characterization and variability of soft rot-causing bacteria in Chinese cabbage in north eastern Brazil. *Journal of Plant Pathology* 93:173-181.

Ferreira MA, Harrington TC, Alfnas AC, Mizubuti ESG (2011) Movement of Genotypes of *Ceratocystis fimbriata* within and among *Eucalyptus* plantations in Brazil. *Phytopathology* 101:1005-1012.

Grigolli JFJ, Kubota MM, Alves DP, Rodrigues GB, Cardoso CR, Silva DJH, Mizubuti ESG (2011) Characterization of tomato accessions for resistance to early blight. *Crop Breeding and Applied Biotechnology* 11:174-180.

Elsayed AY, Silva DJH, Mizubuti ESG, Carneiro PC (2011) Combing the monogenic and polygenic resistant genes to late blight in tomato. *Journal of Plant Breeding and Crop Science* 3:251-259.

Silva SJC, Castillo-Urquiza GP, Hora Junior BT, Assunção IP, Lima GSA, Pio-Ribeiro G, Mizubuti ESG, Zerbini FM (2011) High genetic variability and recombination in a begomovirus population infecting the ubiquitous weed *Cleome affinis* in northeastern Brazil. *Archives of Virology* 156:2205-2213.

Oliveira Costa VS, Michereff SJ, Martins RB, Gava CAT, Mizubuti ESG, Câmara MPS (2010) Species of Botryosphaeriaceae associated on mango in Brazil. *European Journal of Plant Pathology* 127: 509-519.

Alves MRR, Torres MCL, Soares NFF, Melo NR, Geraldine RM, Mizubuti ESG, Silveira MFA (2010) Efeito de soluções de enxágue na remoção de resíduos de mancozeb em tomates de mesa. *Pesquisa Agropecuária Tropical* 40:1-6.

Rodrigues TTMS, Berbee ML, Simmons EG, Cardoso CR, Reis A, Maffia LA, Mizubuti ESG (2010) First report of *Alternaria tomatophila* and *A. grandis* causing early blight on tomato and potato in Brazil. *New Disease Reports* 22:28.

Rodrigues TTMS, Maffia LA, Dhingra OD, Mizubuti ESG (2010) *In vitro* production of conidia of *Alternaria solani*. *Tropical Plant Pathology* 35:203-212.

Fiorini CVA, Silva DJH, Mizubuti ESG, Barros JS, Silva LJ, Milagres C, Zapparoli MR (2010) Caracterização de linhagens de tomateiro originadas de cruzamento interespecífico quanto à resistência à requeima. *Horticultura Brasileira* 28:197-202.

Marchi CE, Brommonschenkel SH, Queiroz MV, Borges MF, Mizubuti ESG (2010) Padrão de integração de pAN7-1 em mutantes de *Magnaporthe grisea* com patogenicidade alterada em arroz. *Summa Phytopathologica* 36:21-24.

Nascimento RJ, Mizubuti ESG, Câmara MPS, Ferreira MF, Maymon M, Freeman S, Michereff SJ (2010) First report of papaya fruit rot caused by *Colletotrichum magna* in Brazil. *Plant Disease* 92:1506-1506.

Fiorini CVA, Silva DJH, Silva FF, Mizubuti ESG, Alves DP, Cardoso TS (2010) Agrupamento de curvas de progresso de requeima, em tomateiro originado de cruzamento interespecífico. *Pesquisa Agropecuária Brasileira* 45:1095-1101.

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### **Publications in Refereed Journals (from 2010 to 2014)**

Andrade CCL, Andrade CCL, Resende RS, Rodrigues FA, Ferraz HGM, Moreira WR, Oliveira JR, Mariano RLR (2013) Silicon reduces bacterial speck development on tomato leaves. *Tropical Plant Pathology* 38:436-442.

Lima HE, Nechet KL, Halfeld-Vieira BA, Oliveira JR, Duarte HSS, Queiroz ES, Oliveira FL (2013) Elaboração e validação de escalas diagramáticas para avaliação da severidade da mancha bacteriana do feijão - caupi em cultivares com trifólios morfologicamente distintos. *Ciência Rural* 43:1735-1743.

Andrade CCL, Resende RS, Rodrigues FA, Silveira PR, Rios JÁ, Oliveira JR, Mariano RLR (2013) Indutores de resistência no controle da pinta bacteriana do tomateiro e na atividade de enzimas de defesa. *Tropical Plant Pathology* 38:28-34.

Moreira SI, Dutra DC, Rodrigues AC, Oliveira JR, Dhingra OD, Pereira OL (2013) Fungi and bacteria associated with post-harvest rot of ginger rhizomes in Espírito Santo, Brazil. *Tropical Plant Pathology* 38:218-226.

Furtado GQ, Guimarães LMS, Lisboa DO, Cavalcante GP, Arriel DAA, Alfenas AC, Oliveira JR (2012) First Report of *Enterobacter cowanii* causing bacterial spot on *Mabea fistulifera*, a native forest species in Brazil. *Plant Disease* 96:1576-1576.

Miguel-Wruck DS, Oliveira JR, Dias LAS (2010) Especificidade de hospedeiro nas interações *Xanthomonas campestris* pv. *campestris* - brássicas. *Summa Phytopathologica* 36:129-133.



**Book and Book Chapters (from 2010 to 2014)**

Silva IT, Rodrigues FA, Oliveira JR (2010) Silicon on the management of bacterial disease. In: Rodrigues FA (Ed.). Silício na Agricultura: anais do V Simpósio Brasileiro sobre Silício na Agricultura. Vol. 1. Editora UFV, Viçosa, MG, BRA. pp. 269-278.

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### **Publications in Refereed Journals (from 2010 to 2014)**

Spolti P, Del Ponte EM, Dong Y, Cummings JA, Bergstrom GC (2014) Assessment of triazole sensitivity in a contemporary population of *Fusarium graminearum* from New York wheat and competitiveness of a tebuconazole-resistant isolate. *Plant Disease* 98:607-613.

Spolti P, Del Ponte EM, Cummings J, Dong Y, Bergstrom GC (2014) Fitness attributes of *Fusarium graminearum* isolates from wheat in New York possessing a 3-ADON or 15-ADON trichothecene genotype. *Phytopathology* 104:513-519.

Gonzales-Dominguez E, Martins RB, Del Ponte EM, Michereff SJ, Garcia-Jimenez J, Armengol J (2014) Development and validation of a standard area diagram set to aid assessment of severity of loquat scab on fruit. *European Journal of Plant Pathology* 139:413-422.

Pagnussatt FA, Del Ponte EM, Garda-Bufferon J, Badiale-Furlong E (2014) Inhibition of *Fusarium graminearum* growth and mycotoxin production by phenolic extract from *Spirulina* sp.. *Pesticide Biochemistry and Physiology* 108:21-26.

Alves G, Spolti P, Nesi CN, Del Ponte EM, May de Mio LL (2014) Susceptibility levels and grouping of peach cultivars in relation to peach rust under field conditions. *Acta Scientiarum. Agronomy* 36:167-174.

Jahnke SM, Del Ponte EM, Redaelli LR, Rego DGP (2014) Spatial patterns and associations of *Anastrepha fraterculus* (Diptera: Tephritidae) and its parasitoid *Doryctobracon areolatus* (Hymenoptera: Braconidae) in organic orchards of *Psidium guajava* and *Acca sellowiana*. *The Florida Entomologist* 97:744-752.

Stumpf R, dos Santos J, Gomes LB, Silva CN, Tessmann DJ, Ferreira FD, Machinski Junior M, Del Ponte EM (2013) *Fusarium* species and fumonisins associated with maize kernels produced in Rio Grande do Sul State for the 2008/09 and 2009/10 growing seasons. *Brazilian Journal of Microbiology* 44:89-95.

Chevarria VV, Del Ponte EM, Jahnke SM (2013) Número de gerações de um percevejo e seu parasitoide e da severidade da ferrugem asiática em soja, simulados em cenários de clima e manejo no norte do RS. *Ciência Rural* 43:571-578.

Spolti P, Guerra DS, Badiale-Furlong Eliana, Del Ponte EM (2013) Single and sequential applications of metconazole alone or in mixture with pyraclostrobin to improve *Fusarium* head blight control and wheat yield in Brazil. *Tropical Plant Pathology* 38:85-96.

Kuhnem PR, Stumpf R, Spolti P, Del Ponte EM (2013) Características patogênicas de isolados do complexo *Fusarium graminearum* e de *Fusarium verticillioides* em sementes e plântulas de milho. *Ciência Rural* 43:583.

Spolti P, Del Ponte EM (2013) Agressividade diferencial de espécies do complexo *Fusarium graminearum* em interação com o fungicida tebuconazole na redução do rendimento de trigo. *Ciência Rural* 43:1569-1575.

Pagnussatt FA, Kupski L, Darley FT, Filoda PF, Del Ponte EM, Garda-Bufferon J, Badiale-Furlong E (2013) *Fusarium graminearum* growth inhibition mechanism using phenolic compounds from *Spirulina* sp.. *Ciência e Tecnologia de Alimentos* 33:75-80.

Guerra DS, Nickel O, Del Ponte EM, Sanhueza RMV, Fajardo TVM, Marodin GAB (2012) Development of *Glomerella* leaf spot (*Colletotrichum gloeosporioides*) is enhanced in virus-infected Maxi Gala apples. *Journal of Plant Pathology* 94:237-241.

Del Ponte EM, Garda-Bufferon J, Badiale-Furlong E (2012) Deoxynivalenol and nivalenol in commercial wheat grain related to *Fusarium* head blight epidemics in southern Brazil. *Food Chemistry* 132:1087-1091.

Wiebke-Strohm B, Pasquali G, Margis-Pinheiro M, Bencke M, Bucker-Neto L, Becker-Ritt AB, Martinelli AHS, Rechenmacher C, Polacco JC, Stolf R, Marcelino FC, Abdelnoor RV, Homrich MS, Del Ponte EM, Carlini CR, Carvalho MCG, Bodanese-Zanettini MH (2012) Ubiquitous urease affects soybean susceptibility to fungi. *Plant Molecular Biology* 79:75-87.

Astolfi P, Reynoso MM, Ramirez L, Chulze SN, Alves TCA, Tessmann DJ, Del Ponte EM (2012) Genetic population structure and trichothecene genotypes of *Fusarium graminearum* isolated from wheat in southern Brazil. *Plant Pathology* 61:289-295.

Spolti P, Valdebenito-Sanhueza RM, Laranjeira FF, Del Ponte EM (2012) Comparative spatial analysis of the sooty blotch and flyspeck disease complex, bull's eye and bitter rots of apples. *Plant Pathology* 61:271-280.

De Paula VA, Bergamaschi H, Del Ponte EM, Cardoso LS, Bosco LC (2012) Duração do período de molhamento foliar em pomares de macieira em céu aberto e sob tela antigranizo, em Vacaria, RS. *Revista Brasileira de Fruticultura* 34:504-514.

Spolti P, Barros NC, Gomes LB, dos Santos J, Del Ponte EM (2012) Phenotypic and pathogenic traits of two species of the *Fusarium graminearum* complex possessing either 15-ADON or NIV genotype. *European Journal of Plant Pathology* 133:621-629.

Spolti P, De Jorge BC, Del Ponte EM (2012) Sensitivity of *Fusarium graminearum* causing head blight of wheat in Brazil to tebuconazole and metconazole fungicides. *Tropical Plant Pathology* 37:419-423.

Spolti P, Schneider L, Sanhueza RMV, Batzer J, Gleason ML, Del Ponte EM (2011) Improving sooty blotch and flyspeck severity estimation on apple fruit with the aid of a diagrammatic scale. *European Journal of Plant Pathology* 129:21-29.

Del Ponte EM, Maia AHN, Santos TV, Martins EJ, Baethgen W (2011) Early-season warning of regional soybean rust epidemics using El Niño/Southern Oscillation information. *International Journal of Biometeorology* 55:575-583.

Gleason ML, Batzer JC, Sun G, Zhang R, Arias MMD, Sutton TB, Crous PW, Ivanović M, McManus PS, Cooley DR, Mayr U, Weber RWS, Yoder KS, Del Ponte EM, Biggs AR, Oertel B (2011) A new view of sooty blotch and flyspeck. *Plant Disease* 95:368-383.

Citações:17|20

Farias CRJ, Afonso APS, Pierobom CR, Del Ponte EM (2011) Regional survey and identification of *Bipolaris* spp. associated with rice seeds in Rio Grande do Sul State, Brazil. *Ciência Rural* 41:369-372.

Spolti P, Sanhueza RMV, Gleason ML, Del Ponte EM (2011) Inoculum and infection dynamics of the sooty blotch and flyspeck complex of apples in southern Brazil. *Journal of Plant Pathology* 93:497-501.

Astolfi P, dos Santos J, Schneider L, Gomes LB, Silva CN, Tessmann DJ, Del Ponte EM (2011) Molecular survey of tricothecene genotypes of *Fusarium graminearum* species complex from barley in Southern Brazil. *International Journal of Food Microbiology* 148:197-201.

Spolti P, Sanhueza RMV, Gleason ML, Del Ponte EM (2011) Sooty blotch and flyspeck control with fungicide applications based on calendar, local IPM, and warning system. *Pesquisa Agropecuária Brasileira* 46:697-705.

Spolti P, Sanhueza RMV, Del Ponte EM (2010) Meio semi-seletivo para recuperação e quantificação de *Cryptosporiopsis perennans* em maçãs. *Ciência Rural* 40:661-665.

Farias CRJ, Del Ponte EM, Corrêa CL, Afonso AP, Pierobom CR (2010) Infecção de sementes de trigo com *Bipolaris sorokiniana* pela técnica de restrição hídrica. *Tropical Plant Pathology* 35:253-257.

Valdebenito-Sanhueza RM, Spolti P, Del Ponte EM (2010) Controle do inóculo inicial para redução dos danos pela podridão: ‘olho-de-boi’ em macieiras. *Revista Brasileira de Fruticultura* 32:1044-1054.

Astolfi P, Santos J, Spolti P, Tessmann DJ, Del Ponte EM (2010) Complexo *Fusarium graminearum*: taxonomia, perfil toxigênico e genética populacional na era molecular. Revisão Anual de Patologia de Plantas 18:119-161.

### **Book and Book Chapters (from 2010 to 2014)**

Del Ponte EM, Tessmann DJ, Spolti P, Kuhnem PR, Silva CN (2013) Species identification, genetic diversity and phenotypic variation studies on the *Fusarium graminearum* complex populations from Brazil. In: Alconada Magliano TM, Chulze SN (Eds.). *Fusarium* Head Blight in Latin America. Vol. 1. Springer: Netherlands. pp. 15-29.

Del Ponte EM, Dalla Lana F (2012) Avaliação de risco de doenças de plantas: conceitos e aplicações para decisões táticas e estratégicas no manejo. In: Núcleo de Estudos em Fitopatologia. (Ed.). Avanços na otimização do uso de defensivos agrícolas no manejo fitossanitário. Vol. 1. Suprema Gráfica e Editora, São Carlos, SP, BRA. pp. 237-257.

Godoy CV, Del Ponte EM (2011) Roya de la soja (*Phakopsora pachyrhizi*, *P. meibomiae*). In: Margarita S, Roberto M (Eds.). Las enfermedades de la soja y su importancia en los países del Mercosur. Vol. 1. Hemisferio Sur, Buenos Aires, ARG. pp. 104-112.

Sanhueza RMV, Bogo A, Cantillano RFF, Stadnik M, Bartnicki VA, Becker WF, Castro LAS, Katsurayama Y, Del Ponte EM, Spolti P (2011) Caracterização e controle das doenças de verão. In: Gilmar RN (Ed.). Inovações tecnológicas para o setor da maçã - Inovamaçã: relatório técnico. Vol. 1. Embrapa Uva e Vinho, Bento Gonçalves, RS, BRA. pp. 23-106.

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### **Publications in Refereed Journals (from 2010 to 2014)**

Polanco LR, Rodrigues FA, Moreira EN, Duarte HSS, Cacique IS, Valente LA, Vieira RF, Paula Júnior TJ, Vale FXR (2014) Management of anthracnose in common bean by foliar sprays of potassium silicate, sodium molybdate, and fungicide. *Plant Disease* 98:84-89.

Lopes UP, Zambolim L, Souza Neto PN, Duarte HSS, Ribeiro JI, Souza AF, Rodrigues FA (2014) Silicon and Triadimenol for the Management of Coffee Leaf Rust. *Journal of Phytopathology* 162:124-128.

Cruz MFA, Rodrigues FA, Diniz APC, Moreira MA, Barros EG (2014) Soybean Resistance to *Phakopsora pachyrhizi* as affected by acibenzolar-S-methyl, jasmonic acid and silicon. *Journal of Phytopathology* 162:132-136.

Perez CEA, Rodrigues FA, Moreira WR, DaMatta FM (2014) Leaf Gas Exchange and chlorophyll *a* fluorescence in wheat plants supplied with silicon and infected with *Pyricularia oryzae*. *Phytopathology* 104:143-149.

Debona D, Rodrigues FA, Rios JA, Martins SCV, Pereira LF, DaMatta FM (2014) Limitations to photosynthesis in leaves of wheat plants infected by *Pyricularia oryzae*. *Phytopathology* 104:33-39.

Polanco LR, Rodrigues FA, Nascimento KJT, Cruz MFA, Curvelo CRS, DaMatta FM, Vale FXR (2014) Photosynthetic gas exchange and antioxidative system in common bean plants infected by *Colletotrichum lindemuthianum* and supplied with silicon. *Tropical Plant Pathology* 39:35-42.

- Dallagnol LJ, Rodrigues FA, Mielli MVB, Ma JF (2014) Rice grain resistance to brown spot and yield are increased by silicon. *Tropical Plant Pathology* 39:56-63.
- Carré-Missio V, Rodrigues FA, Schurt DA, Resende RS, Souza NFA, Rezende DC, Moreira WR, Zambolim L (2014) Effect of foliar-applied potassium silicate on coffee leaf infection by. *Annals of Applied Biology* 164:396-403.
- Debona D, Rodrigues FA, Rios JA, Nascimento KJT, Silva LC (2014) The effect of silicon on antioxidant metabolism of wheat leaves infected by *Pyricularia oryzae*. *Plant Pathology* 63:581-589.
- Rios JA, Rodrigues FA, Debona D, Silva LC (2014) Photosynthetic gas exchange in leaves of wheat plants supplied with silicon and infected with *Pyricularia oryzae*. *Acta Physiologiae Plantarum* 36:371-379.
- Guerra AMNM, Rodrigues FA, Lima TC, Berger PG, Barros AF, Silva YCR (2014) Capacidade fotossintética de plantas de algodoeiro infectadas por ramulose e supridas com silício. *Bragantia* 73:50-64.
- Fortunato AA, Da Silva WL, Rodrigues FA (2014) Phenylpropanoid Pathway Is Potentiated by Silicon in the Roots of Banana Plants During the Infection Process of *Fusarium oxysporum* f. sp. *cubense*. *Phytopathology* 104:596-603.
- Rios JA, Rodrigues FA, Debona D, Resende RS, Moreira WR, Andrade CCL (2014) Induction of resistance to *Pyricularia oryzae* in wheat by acibenzolar-S-methyl, ethylene and jasmonic acid. *Tropical Plant Pathology* 39:224-233.
- Domiciano GP, Duarte HSS, Moreira EM, Rodrigues FA (2014) Development and validation of a set of standard area diagrams to aid in estimation of spot blotch severity on wheat leaves. *Plant Pathology* 63:922-928.
- Araujo L, Bispo W, Cacique I, Moreira W, Rodrigues FA (2014) Resistance in mango against infection by *Ceratocystis fimbriata*. *Phytopathology* 104:820-833.
- Resende RS, Rodrigues FA, Costa RV, Silva DD (2013) Silicon and fungicide effects on anthracnose in moderately resistant and susceptible sorghum lines. *Journal of Phytopathology* 161:11-17.
- Dallagnol LJ, Rodrigues FA, Chaves ARM, Vale FXR, DaMatta FM (2013) Photosynthesis and sugar concentration are impaired by the defective active silicon uptake in rice plants infected with *Bipolaris oryzae*. *Plant Pathology* 62:120-129.
- Andrade CCL, Resende RS, Rodrigues FA, Silveira PR, Rios JA, Oliveira JR, Mariano RLR (2013) Indutores de resistência no controle da pinta bacteriana do tomateiro e na atividade de enzimas de defesa. *Tropical Plant Pathology* 38:28-34.
- Silva RV, Oliveira RDL, Ferreira OS, Ferreira AO, Rodrigues FA (2013) Defense responses to *Meloidogyne exigua* in resistant coffee cultivar and non-host plant. *Tropical Plant Pathology* 38:114-121.

Schurt DA, Rodrigues FA, Souza NFA, Reis RD (2013) Efeito de diferentes moléculas na redução dos sintomas da queima das bainhas em arroz e no crescimento de *Rhizoctonia solani* in vitro. *Revista Ceres* 60:221-225.

Resende RS, Rodrigues FA, Gomes RJ, Nascimento KJT (2013) Microscopic and biochemical aspects of sorghum resistance to anthracnose mediated by silicon. *Annals of Applied Biology* 63:114-123.

Rios JA, Debona D, Duarte HSS, Rodrigues FA (2013) Development and validation of a standard area diagram set to assess blast severity on wheat leaves. *European Journal of Plant Pathology* 136:603-611.

Curvelo CRS, Rodrigues FA, Silva LC, Nascimento KJT, Berger PG (2013) Mecanismos bioquímicos da defesa do algodoeiro à mancha de ramulária mediados pelo silício. *Bragantia* 72:41-51.

Schurt DA, Rodrigues FA, Missio VC, Soares NFF (2013). Silício alterando compostos derivados da pirólise de bainhas foliares de plantas de arroz infectadas por *Rhizoctonia solani*. *Bragantia* 72:52-60.

Domiciano GP, Rodrigues FA, Guerra AMN, Vale FXR (2013) Infection process of *Bipolaris sorokiniana* on wheat leaves is affected by silicon. *Tropical Plant Pathology* 38:258-263.

Moreira WR, Resende RS, Rodrigues FA, Andrade CCL, Nascimento CWA (2013) Influência do magnésio na resistência do arroz à mancha parda. *Bragantia* 72:154-161.

Cruz MFA, Rodrigues FA, Rodriguez LP, Curvelo CRS, Nascimento KJT, Moreira MA, Barros EG (2013) Inducers of resistance and silicon on the activity of defense enzymes in the soybean-*Phakopsora pachyrhizi* interaction. *Bragantia* 72:162-172.

Pereira AC, Cruz MFA, Paula Júnior TJ, Rodrigues FA, Carneiro JES, Vieira RF, Carneiro PCS (2013) Infection process of *Fusarium oxysporum* f. sp. *phaseoli* on resistant, intermediate and susceptible bean cultivars. *Tropical Plant Pathology* 38:323-328.

Dhingra OD, Schurt DA, Oliveira RDL, Rodrigues FA (2013) Potential of soil fumigation with mustard essential oil to substitute biofumigation by cruciferous plant species. *Tropical Plant Pathology* 38:337-342.

Moreira WR, Rodrigues FA, Duarte HSS (2013) Effect of zinc on the development of brown spot in rice. *Journal of Phytopathology* 161:749-751.

Guerra AMNM, Rodrigues FA, Berger PG, Barro AF, Rodrigues YC, Lima TC (2013) Resistência do algodoeiro à ferrugem tropical potencializada pelo silício. *Bragantia* 72:279-291.

Guerra AMNM, Rodrigues FA, Berger PG, Barros AF, Rodrigues YC, Lima TC (2013) Aspectos bioquímicos da resistência do algodoeiro à ramulose potencializada pelo silício. *Bragantia* 72:292-303.



Cacique IS, Domiciano GP, Moreira WR, Rodrigues FA, Cruz MFA, Serra NS, Catala AB (2013) Effect of root and leaf applications of soluble silicon on blast development in rice. *Bragantia* 72:304-309.

Andrade CCL, Resende RS, Rodrigues FA, Ferraz HGM, Moreira WR, Oliveira JR, Mariano RLR (2013) Silicon reduces bacterial speck development on tomato leaves. *Tropical Plant Pathology* 38:436-442.

Wordell Filho JA, Duarte HSS, Rodrigues FA, Efeito da aplicação foliar de silicato de potássio e de fungicida na severidade da ferrugem da folha e da mancha amarela do trigo. *Revista Ceres* 60:726-730.

Sousa RS, Rodrigues FA, Schurt DA, Souza NFA, Cruz MFA (2013) Cytological aspects of the infection process of *Pyricularia oryzae* on leaves of wheat plants supplied with silicon. *Tropical Plant Pathology* 38:472-477.

Dallagnol LJ, Rodrigues FA, Mielli MVB (2013) Silicon improves the emergence and sanity of rice seedlings obtained from seeds infected with *Bipolaris oryzae*. *Tropical Plant Pathology* 38:478-484.

Lopes UP, Zambolim L, Souza Neto PN, Souza AF, Capucho AS, Rodrigues FA (2013) Effect of foliar application of potassium silicate on the progress of coffee leaf rust. *Tropical Plant Pathology* 38:547-551.

Curvelo CRS, Rodrigues FA, Pereira LF, Silva LC, DaMatta FM, Berger PG (2013) Trocas gasosas e estresse oxidativo em plantas de algodoeiro supridas com silício e infectadas por *Ramularia areola*. *Bragantia* 72:346-359.

Schurt DA, Rodrigues FA, Colodette JL, Missio VC (2013) Efeito do silício nas concentrações de lignina e de açúcares em bainhas de folhas de arroz infectadas por *Rhizoctonia solani*. *Bragantia* 72:360-366.

Cruz MFA, Rodrigues FA, Diniz APC, Moreira MA, Barros EG (2013) Potassium silicate and calcium silicate on the resistance of soybean to *Phakopsora pachyrhizi* infection. *Bragantia* 72:373-377.

Silva IT, Rodrigues FA, Baroni JCP (2012) Effect of Soil-applied Zinc and Manganese on the Development of *Rhizoctonia* aerial blight of soybean. *Journal of Phytopathology* 160:135-138.

Dallagnol LJ, Rodrigues FA, Tanaka FAO, Amorim L, Camargo LEA (2012) Effect of potassium silicate on epidemic components of powdery mildew on melon. *Plant Pathology* 61:323-330.

Cruz MFA, Silva FS, Rodrigues FA, Araujo JM, Barros EG (2012) Silício no processo infeccioso de *Phakopsora pachyrhizi* em folíolos de plantas de soja. *Pesquisa Agropecuária Brasileira* 47:142-145.

Carré-Missio V, Rodrigues FA, Schurt DA, Rezende DC, Moreira WR, Korndorfer GH, Zambolim L (2012) Componentes epidemiológicos da ferrugem do cafeeiro afetados pela aplicação foliar de silicato de potássio. *Tropical Plant Pathology* 37:50-56.

- Schurt DA, Rodrigues FA, Dutra RR, Moreira WR, Souza NFA, Silva WA (2012) Resistência física de bainhas de plantas de arroz supridas com silício e infectadas por *Rhizoctonia solani*. *Tropical Plant Pathology* 37:281-285.
- Carré-Missio V, Rodrigues FA, Schurt DA, Moreira WR, Rezende DC, Korndörfer GH, Zambolim L (2012) Proteção local, não sistêmica, do silicato de potássio reduz os sintomas da ferrugem do cafeeiro. *Tropical Plant Pathology* 37:275-280.
- Rodriguez LP, Rodrigues FA, Nascimento KJT, Schulman P, Silva LC, Neves FW, Vale FXR (2012) Biochemical aspects of bean resistance to anthracnose mediated by silicon. *Annals of Applied Biology* 161:140-150.
- Resende RS, Rodrigues FA, Cavatte PC, Martins SCV, Moreira WR, Chaves GRM, DaMatta FM (2012) Leaf gas exchange and oxidative stress in sorghum plants supplied with silicon and infected by *Colletotrichum sublineolum*. *Phytopathology* 102:892-898.
- Cacique IS, Domiciano GP, Rodrigues FA, Vale FXR (2012) Silicon and manganese on rice resistance to blast. *Bragantia* 72:239-244.
- Fortunato AA, Rodrigues FA, Nascimento KJT (2012) Physiological and biochemical aspects of the resistance of banana plants to *Fusarium* wilt potentiated by silicon. *Phytopathology* 102:957-966.
- Fortunato AA, Rodrigues FA, Baroni JCP, Soares GCB, Rodriguez MAD, Pereira OL (2012) Silicon suppresses *Fusarium* wilt development in banana plants. *Journal of Phytopathology* 160:674-679.
- Detmann KC, Araújo WL, Martins SCV, Sanglard LMVP, Reis JV, Detmann E, Rodrigues FA, Nunes-Nesi A, Fernie AR, DaMatta FM (2012) Silicon nutrition increases grain yield, which, in turn, exerts a feed-forward stimulation of photosynthetic rates via enhanced mesophyll conductance and alters primary metabolism in rice. *New Phytologist* 196:752-762.
- Silva MRJ, Pereira SC, Rodrigues FA, Zanão Júnior LA, Fontes RLF, Oliveira MGA (2012) Silicon and manganese on the activity of enzymes involved in rice resistance against brown spot. *Tropical Plant Pathology* 37:339-345.
- Debona D, Rodrigues FA, Rios JA, Nascimento KJT (2012) Biochemical changes in the leaves of wheat plants infected by *Pyricularia oryzae*. *Phytopathology* 102:1121-1129.
- Prabhu AS, Barbosa Filho MP, Datnoff LE, Snyder GH, Berni RF, Rodrigues FA, Dallagnol LJ (2012) Silicon reduces brown spot severity and grain discoloration on several rice genotypes. *Tropical Plant Pathology* 37:409-414.
- Souza AGC, Rodrigues FA, Maffia LA, Mizubuti ESG (2011) Infection process of *Cercospora coffeicola* on coffee leaf. *Journal of Phytopathology* 159:6-11.
- Filha MSX, Rodrigues FA, Domiciano GP, Oliveira HV, Silveira PR, Moreira WR (2011) Wheat resistance to leaf blast mediated by silicon. *Australasian Plant Pathology* 40:28-38.

Dallagnol LJ, Rodrigues FA, DaMatta FM, Mielli MVB, Pereira SC (2011) Deficiency in silicon uptake affects cytological, physiological, and biochemical events in the rice interaction. *Phytopathology* 101:92-104.

Cruz MFA, Souza GA, Rodrigues FA, Sediyaama CS, Barros EG (2011) Reação de genótipos de soja à infecção natural por ferrugem asiática. *Pesquisa Agropecuária Brasileira* 46:215-218.

Dallagnol LJ, Rodrigues FA, DaMatta FM (2011) Brown spot of rice is affected by photon irradiance and temperature. *Journal of Phytopathology* 159:630-634.

Dallagnol LJ, Rodrigues FA, Martins SCV, Cavatte PC, DaMatta FM (2011) Alterations on rice leaf physiology during infection by *Bipolaris oryzae*. *Australasian Plant Pathology* 40:360-365.

Rodrigues FA, Carré-Missio V, Jham GN, Berhow M, Schurt DA (2011) Chlorogenic acid levels in leaves of coffee plants supplied with silicon and infected by *Hemileia vastatrix*. *Tropical Plant Pathology* 36:404-408.

Cruz MFA, Diniz APC, Rodrigues FA, Barros EG (2011) Aplicação foliar de produtos na redução da severidade da brusone do trigo. *Tropical Plant Pathology* 36:424-428.

Carvalho MP, Rodrigues FA, Silveira PR, Andrade CCL, Baroni JCP, Paye HS, Loureiro Junior JE (2010) Rice resistance to brown spot mediated by nitrogen and potassium. *Journal of Phytopathology* 158:160-166.

Silva IT, Rodrigues FA, Oliveira JR, Pereira SC, Andrade CCL, Silveira PR, Conceição MM (2010) Wheat resistance to bacterial leaf streak mediated by silicon. *Journal of Phytopathology* 158:253-262.

Domiciano GP, Rodrigues FA, Vale FXR, Xavier Filha MS, Moreira WR, Andrade CCL, Pereira SC (2010) Wheat resistance to spot blotch potentiated by silicon. *Journal of Phytopathology* 158:334-343.

Silva RV, Oliveira RDL, Nascimento KJT, Rodrigues FA (2010) Biochemical responses of coffee resistance against *Meloidogyne exigua* mediated by silicon. *Plant Pathology* 59:586-593.

Curvelo CRS, Rodrigues FA, Berger PG, Rezende DC, Microscopia eletrônica de varredura do processo infeccioso de *Ramularia areola* em folhas de algodoeiro. *Tropical Plant Pathology* 38:108-113.

French-Monar RD, Rodrigues FA, Korndorfer GH, Datnoff LE (2010) Silicon suppresses *Phytophthora* blight development on bell Pepper. *Journal of Phytopathology* 158:554-560.

Domiciano GP, Rodrigues FA, Moreira WR, Oliveira HV, Vale FXR, Xavier Filha MS (2010) Silício no progresso da mancha marrom na folha bandeira do trigo. *Tropical Plant Pathology* 35:186-189.

Carré-Missio V, Rodrigues FA, Schurt DA, Rezende DC, Ribeiro NB, Zambolim L (2010) Aplicação foliar de silicato de potássio, acibenzolar-S-metil e fungicidas na redução da mancha de *Pestalotia* em morango. *Tropical Plant Pathology* 35:182-185.

Rodrigues FA, Duarte HSS, Rezende DC, Wordell Filho JA, Korndorfer GH, Zambolim L (2010) Foliar spray of potassium silicate on the control of angular leaf spot on beans. *Journal of Plant Nutrition* 33:2082-2093.

### **Book and Book Chapters (from 2010 to 2014)**

Rodrigues FA, Fortunato AA, Resende RS (2012) Indução de Resistência em Plantas a Patógenos. Vol. 1. Suprema Gráfica e Editora Ltda, Visconde do Rio Branco, MG, BRA. 358p.

Rodrigues FA (2011) Silício na Agricultura - Anais do V Simpósio Brasileiro sobre Silício na Agricultura. Vol. 1. Suprema Gráfica e Editora Ltda, Visconde do Rio Branco, MG, BRA. 385p .

Dhingra OD, Silva Júnior GJ, Rodrigues FA (2013) Patologia de sementes. In: Tuneo S (Ed.). *Tecnologias de Produção de Sementes de Soja*. Vol. 1. Mecenas Ltda, Londrina, PR, BRA. pp. 135-162.

Rodrigues FA, Fortunato AA, Resende RS (2012) Silício no manejo integrado de doenças de Plantas. In: Podestá GS, Amora DX, Santiago TR, Nasu EGC, Machado PS, Guatimosim E, Fortunato AA (Eds.). *Nutrição no Manejo de Doenças de Plantas*. Vol. 1. Viçosa, MG, BRA. pp. 213-235.

Rodrigues FA, Resende RS, Fortunato AA (2012) Silício no manejo de doenças em culturas anuais e perenes. In: Silva LC, Moura Filho G, Moura AB, Albuquerque AW (Eds.). *Reunião Brasileira de Fertilidade do Solo e Nutrição de Plantas, Fertbio 2012 - A Responsabilidade Socioambiental da Pesquisa Agrícola*. Vol. 1. Sociedade Brasileira de Ciência do Solo, Viçosa, MG, BRA. pp. 1-17.

Rodrigues FA, Resende RS, Fortunato AA, Cruz MFA (2012) Silício na Resistência de Plantas à Patógenos. In: EMBRAPA Clima Temperado (Ed.). *Workshop Insumos para Agricultura Sustentável. 27 a 29 de novembro de 2012*. Embrapa Clima Temperado. Vol. 1. EMBRAPA Clima Temperado, Pelotas, RS, BRA. pp. 1-6.

Rodrigues FA, Resende RS, Dallagnol LJ, Silva IT, Domiciano GP (2011) A review of silicon's use on the monocots sorghum, rice and wheat. In: Pele L, Powell JJ, Kinrade S, Juddaohsingh R, Collery P, Maynard I, Badawi A (Eds.). *Metal in Biology and Medicine and Aqueous Chemistry and Biochemistry of Silicon*. Vol. 11. John Libbet: Paris, FRA. pp. 299-304.

Rodrigues FA, Silva IT, Dallagnol LJ, Domiciano GP, Resende RS, Rezende DC, Schurt DA (2010) The Use of silicon to control foliar diseases. In: Prado RM, Cecílio Filho AB, Correia MAR, Puga AP (Eds.) *Nutrição de Plantas - Diagnose Foliar em Hortaliças*. Vol. 1. Fundunesp, Jaboticabal, SP, BRA. pp. 91-108.

Rodrigues FA, Resende RS, Domiciano GP (2010) O potencial do silício para as fruteiras. In: Rodrigues FA (Ed.). *Silício na Agricultura - Anais do V Simpósio Brasileiro sobre Silício na Agricultura*. Vol. Suprema Gráfica e Editora Ltda, Visconde do Rio Branco, MG, BRA. pp. 171-181.

Rodrigues FA, Resende RS, Dallagnol LJ (2010) A review of silicon's use on the monocots rice and sorghum. In: Rodrigues FA (Ed.). *Silício na Agricultura - Anais do V Simpósio Brasileiro sobre Silício na Agricultura*. Vol. 1. Suprema Gráfica e Editora Ltda, Visconde do Rio Branco, MG, BRA. pp. 257-267.

Silva IT, Rodrigues FA, Oliveira JR (2010) Silicon on the management of bacterial diseases. In: Rodrigues FA (Ed.). *Silício na Agricultura - Anais do V Simpósio Brasileiro sobre Silício na Agricultura*. Vol. 1. Suprema Gráfica e Editora Ltda, Visconde do Rio Branco, MG, BRA. pp. 269-278.

Rodrigues FA, Resende RS (2010) Silício na potencialização da resistência de plantas a patógenos. In: Núcleo de Estudos em Fitopatologia da UFLA e Sociedade Brasileira de Fitopatologia (Ed.). *Anais da V Reunião Brasileira sobre Indução de Resistência em Plantas*. Vol. 1. Brasília, DF, BRA pp. 171-180.

## *Curriculum Vitae*

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### **Francisco Murilo Zerbini Júnior**

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### **Education and Training**

B.A., Agronomy, Viçosa Federal University, 1988

M.Sc. Plant Pathology, Viçosa Federal University, 1991

Ph.D., Plant Pathology, University of California, Davis, U.S.A., 1996

Sabbatical. Molecular Biology Applied to Virology, University of South Carolina, Columbia, U.S.A., 2002

### **Publications in Refereed Journals (from 2010 to 2014)**

Paz-Carrasco L, Castillo-Urquiza GP, Lima ATM, Xavier CAD, Vivas-Vivas L, Mizubuti ESG, Zerbini FM (2014) Begomovirus diversity in tomato crops and weeds in Ecuador and the detection of a recombinant isolate of rhynchosia golden mosaic Yucatan virus infecting tomato. *Archives of Virology* 159: 2127-2132.

Varsani A, Martin DP, Navas-Castillo J, Moriones E, Hernández-Zepeda C, Idris A, Zerbini FM, Brown JK (2014) Revisiting the classification of curtoviruses based on genome-wide pairwise identity. *Archives of Virology* 159: 1873-1882.

Varsani A, Navas-Castillo J, Moriones E, Hernández-Zepeda C, Idris A, Brown JK, Zerbini FM, Martin DP (2014) Establishment of three new genera in the family Geminiviridae: Becurtovirus, Eragrovirus and Turncurtovirus. *Archives of Virology* 159:2193-2203.

Silva FN, Lima ATM, Rocha CS, Castillo-Urquiza GP, Alves Junior M, Zerbini FM (2014) Recombination and pseudorecombination driving the evolution of the begomoviruses *Tomato severe rugose virus* (ToSRV) and *Tomato rugose mosaic virus* (ToRMV): two recombinant DNA-A components sharing the same DNA-B. *Virology Journal* 11:66.

Al-Shihi AAM, Khan AJ, Akhtar S, Lima ATM, Zerbini FM, Briddon R (2014) Occurrence of new recombinant begomovirus species infecting tomato in the Al Batinah region of Oman. *Plant Pathology*:n/a-n/a.

Ramos-Sobrinho R, Xavier CAD, Pereira HMB, Lima GSA, Assunção IP, Mizubuti ESG, Duffy S, Zerbini FM (2014) Contrasting genetic structure between two begomoviruses infecting the same leguminous hosts. *Journal of General Virology* 95:online-online.

Lima ATM, Ramos-Sobrinho R, Gonzalez-Aguilera J, Rocha CS, Silva SJC, Xavier CAD, Silva FN, Duffy S, Zerbini FM (2013) Synonymous site variation due to recombination explains higher variability in begomovirus populations infecting non-cultivated hosts. *Journal of General Virology* 94:418-431, 2013.

Carvalho SL, Silva FN, Zanardo LG, Almeida AMR, Zerbini FM, Carvalho CM (2013) Production of polyclonal antiserum against Cowpea mild mottle virus coat protein and its application in virus detection. *Tropical Plant Pathology* 38:49-54.

Rocha CS, Castillo-Urquiza GP, Lima ATM, Silva FN, Xavier CAD, Hora Junior BT, Beserra Junior JEA, Malta AWO, Martin DP, Varsani A, Alfenas-Zerbini P, Mizubuti ESG, Zerbini FM (2013) Brazilian begomovirus populations are highly recombinant, rapidly evolving, and segregated based on geographical location. *Journal of Virology* 87:5784-5799.

Melgarejo T, Kon T, Rojas MR, Paz-Carrasco L, Zerbini FM, Gilbertson RL (2013) Characterization of a New World monopartite begomovirus causing leaf curl disease of tomato in Ecuador and Peru reveals a new direction in geminivirus evolution. *Journal of Virology* 87:5397-5413.

Quiñones-Pantoja M, Martínez-Zubiaur Y, Arana F, Martínez MA, Zamora L, Miranda I, Zerbini FM (2013) Coexistencia de potyvirus y begomovirus en el cultivo del pimiento (*Capsicum annuum* L.) en Cuba. *Revista de Protección Vegetal* 28:36-44.

Lima JS, Lima ATM, Castillo-Urquiza GP, Silva SJC, Assunção IP, Michereff SJ, Zerbini FM, Lima GSA (2013) Variabilidade genética de isolados de badnavírus infectando inhame (*Dioscorea* spp.) no nordeste do Brasil. *Tropical Plant Pathology* 38:349-353.

Gonzalez-Aguilera J, Hurtado FD, Almeida VS, Tavares SS, Ramos-Sobrinho R, Nick C, Soares, MO, Xavier CAD, Freitas RD, Gil MA, Zerbini FM, Silva DJH (2013) Response of tomato (*Solanum* L. section *Lycopersicon* Mill.) germplasm to begomovirus inoculation under controlled and field conditions. *Genetic Resources and Crop Evolution* 61:435-450.

Zanardo LG, Silva FN, Lima ATM, Milanesi DF, Castilho-Urquiza GP, Almeida AMR, Zerbini FM, Carvalho CM (2013) Molecular variability of cowpea mild mottle virus infecting soybean in Brazil. *Archives of Virology* 159:727-737.

Muhire B, Martin DP, Brown JK, Navas-Castillo J, Moriones E, Zerbini FM, Rivera-Bustamante R, Malathi VG, Briddon RW, Varsani A (2013) A genome-wide pairwise-identity-based proposal for the classification of viruses in the genus Mastrevirus (family Geminiviridae). *Archives of Virology* 158:1411-1424.

Zanardo LG, Silva FN, Bicalho AAC, Urquiza GPC, Lima ATM, Almeida AMR, Zerbini FM, Carvalho CM (2013) Molecular and biological characterization of *Cowpea mild mottle virus* isolates infecting soybean in Brazil and evidence of recombination. *Plant Pathology* 63:n/a-n/a.

Daltro CB, Pereira AJ, Cascardo RS, Alfenas-Zerbini P, Beserra Junior JEA, Lima JAA, Zerbini FM, Andrade EC (2012) Genetic variability of papaya lethal yellowing virus isolates from Ceará and Rio Grande do Norte states, Brazil. *Tropical Plant Pathology* 37:37-43.

Tavares SS, Ramos-Sobrinho R, Gonzalez-Aguilera J, Assunção IP, Lima GSA, Zerbini FM (2012) Further molecular characterization of weed-associated begomoviruses in Brazil, with emphasis on *Sida* spp.. *Planta Daninha* 30:305-315.

Pereira AJ, Alfenas-Zerbini P, Cascardo RS, Andrade EC, Zerbini FM (2012) Analysis of the full-length genome sequence of *Papaya lethal yellowing virus* (PLYV), determined by deep sequencing, confirms its classification in the genus Sobemovirus. *Archives of Virology* 157:2009-2011.

Silva SJC, Castillo-Urquiza GP, Hora Junior BT, Assunção IP, Lima GSA, Pio-Ribeiro G, Mizubuti ESG, Zerbini FM (2012) Species diversity, phylogeny and genetic variability of begomovirus populations infecting leguminous weeds in northeastern Brazil. *Plant Pathology* 61:457-467.

González-Aguilera J, Tavares SS, Ramos-Sobrinho R, Xavier CAD, Dueñas-Hurtado F, Lara-Rodrigues RM, Silva DJH, Zerbini FM (2012) Genetic structure of a Brazilian population of the begomovirus *Tomato severe rugose virus* (ToSRV). *Tropical Plant Pathology* 37:346-353.

Dueñas-Hurtado Francisco, Gil MA, Martinez-Zubiaur Y, González-Aguilera J, Xavier CAD, Zerbini FM, Silva DJH (2012) Fontes de resistência em tomateiro aos begomovírus bissegmentados *Tomato yellow spot virus* e *Tomato severe rugose virus*. *Horticultura Brasileira* 30:639-644.

Rodriguez-Pardina P, Hanada K, Graciela-Laguna I, Zerbini FM, Ducasse DA (2011) Molecular characterization and relative incidence of bean- and soybean-infecting begomoviruses in northwestern Argentina. *Annals of Applied Biology* 158:69-78.

Barros DR, Alfenas-Zerbini P, Beserra Junior JEA, Antunes TFS, Zerbini FM (2011) Comparative analysis of two isolates of *Cowpea aphid-borne mosaic virus* (CABMV) obtained from different hosts. *Archives of Virology* 156:1085-1091.

Beserra Junior JEA, Carvalho MG, Barguil BM, Zerbini FM (2011) Partial genome sequence of a Potyvirus and of a virus in the order Tymovirales found in *Senna macranthera* in Brazil. *Tropical Plant Pathology* 36:116-120.

Aguilera GAH, Dueñas-Hurtado F, Xavier CAD, Laurindo BS, Nick C, Gil MA, Silva DJH, Zerbini FM (2011) Identificação dos genes Ty-2 e Ty-3 de resistência a begomovírus em genótipos de tomateiro. *Pesquisa Agropecuária Brasileira* 46:772-775.

Aguilera GAH, Malta AWO, Flores MP, Almeida VS, Nick C, Xavier CAD, Silva DJH, Zerbini FM (2011) Characterization of the resistance of tomato accessions from the BGH-UFV to the geminivírus *Tomato yellow spot virus*. *Revista Brasileira de Agropecuária Sustentável* 1:66-70.

Quiñones M, Arana F, Alfenas-Zerbini P, Soto M, Ribeiro D, Diaz A, González D, Carbonell J, Depestre T, Zerbini FM (2011) First report of in sweet pepper in Cuba. *New Disease Reports* 24:16.



Silva SJC, Castillo-Urquiza GP, Hora Junior BT, Assunção IP, Lima GSA, Mizubuti ESG, Zerbini FM (2011) High genetic variability and recombination in a begomovirus population infecting the ubiquitous weed *Cleome affinis* in northeastern Brazil. Archives of Virology 156:2205-2213.

Fernandes FR, Albuquerque LC, Oliveira CL, Cruz ARR, Rocha WB, Pereira TG, Naito FYB, Dias NM, Nagata T, Faria JC, Zerbini FM, Aragão FJL, Inoue-Nagata AK (2011) Molecular and biological characterization of a new Brazilian begomovirus, *Euphorbia yellow mosaic virus* (EuYMV), infecting *Euphorbia heterophylla* plants. Archives of Virology 156:2063-2069.

Rocha CS, Xavier CAD, Lima ATM, Silva FN, Zerbini FM (2011) Molecular characterization of the begomovirus *Tomato mottle leaf curl virus* (TMoLCV). Virus Reviews and Research 16:online.

Ferreira SS, Barros DR, Almeida MR, Zerbini FM (2010) Characterization of Passion fruit severe leaf distortion virus, a novel begomovirus infecting passion fruit in Brazil, reveals a close relationship with tomato-infecting begomoviruses. Plant Pathology 59:221-230.

#### **Book and Book Chapters (from 2010 to 2014)**

Zerbini FM, Silva FN, Castillo-Urquiza GP, Basso MF (2014) Transgenic plants. In: Borém A, Fritsche-Neto R (Eds.). Biotechnology and Plant Breeding: Applications and Approaches for Developing Improved Cultivars. Vol.1. Elsevier Academic Press, New York, NY, USA. pp. 179-199.

Zerbini FM, Silva FN, Castillo-Urquiza GP, Basso MF (2013) Plantas Transgênicas. In: Borém A, Fritsche-Neto R (Eds.). Biotecnologia Aplicada ao Melhoramento de Plantas. Vol. 1. Suprema Gráfica e Editora, Viçosa, MG, BRA. pp. 229-265.

Zerbini FM, Alfenas-Zerbini P (2013) Supressores de RNAi. In: Pereira TC (Ed.). Introdução à Técnica de Interferência por RNA - RNAi. Vol. 1. Sociedade Brasileira de Genética, Ribeirão Preto, SP, BRA. pp. 101-116.

Brown J, Fauquet CM, Briddon R, Zerbini FM, Moriones E, Navas-Castillo J (2012) Family Geminiviridae. In: King AMQ, Adams MJ, Carstens EB, Lefkowitz EJ (Eds.). Virus Taxonomy. Ninth Report of the International Committee on Taxonomy of Viruses. Vol. 1. Elsevier Academic Press, Londres, UK. pp. 351-373.

Adams MJ, Zerbini FM, French R, Rabenstein F, Stenger DC, Valkonen JPT (2012) Family Potyviridae. In: King AMQ, Adams MJ, Carstens EB, Lefkowitz EJ (Eds.). Virus Taxonomy. Ninth Report of the International Committee on Taxonomy of Viruses. Vol. 1. Elsevier Academic Press, Londres, UK. pp. 1069-1089.

Silva FN, Lima ATM, Zerbini FM (2012) Sintomas induzidos por vírus, viroides, fitoplasmas e espiroplasmas em plantas. In: Zambolim L, Jesus Júnior WC, Pereira OL (Eds.). O Essencial da Fitopatologia - Agentes Causais. Vol. 1. Suprema Gráfica e Editora, Viçosa, MG, BRA. pp. 161-176.

**APPENDIX 2**

Syllabi for courses included in the dual-degree required curriculum  
List of courses included:

PPA 500  
PPA 600  
PPA 640  
PPA 641  
PPA 673  
FIP 610  
FIP 620  
FIP 630  
FIP 640  
FIP 680  
FIP 701

**PPA (PLS 640) – Identification of Plant Diseases, Fall Semester, 2014**  
***Syllabus and Course Requirements***

**INSTRUCTOR**

Sladana Bec, Dept. of Plant Pathology, 211 Plant Science Building

Telephone: (859) 536-2554; e-mail: [sladanabec@gmail.com](mailto:sladanabec@gmail.com)

Nicole Ward Gauthier, Dept. of Plant Pathology, 204 Plant Science Building

Telephone: (859) 218-0720; e-mail: [Nicole.ward@uky.edu](mailto:Nicole.ward@uky.edu)

Office hours: please contact for arrangements

**PURPOSE**

PPA (PLS) 640 is intended to give graduate students practical exposure to plant pathology and science-based diagnostics. The objectives of PPA (PLS) 640 are to learn the processes involved in diagnosing plant diseases and making control recommendations, recognize common diseases found on various hosts in Kentucky, understand the workings of Extension plant pathology, and be exposed to the Kentucky agricultural industry.

**PREREQUISITES**

The students are required to have taken PPA 400G (Principles of Plant Pathology) or its equivalent from another institution. Students are expected to be familiar with microbiology, including mycology, and microscopy.

**CLASS MEETINGS**

Class will be held in the Ag North Greenhouse Teaching Classroom / Laboratory. The classroom portion of PPA/PLS 640 will meet once or twice per week from June 9 through August 12, and we will hold two class meetings after the beginning of the Fall 2014 semester.

Each class will consist of lectures, demonstrations, diagnosis of specimens, and discussion. We will also take field trips to view diseases and agricultural production around Kentucky. Date, duration, and location of these trips will be listed in the class schedule to be distributed on the first day of class.

Classroom space and supplies will be provided for students to examine specimens and make cultures. Basic reference materials will be provided in the class library. Additional reference materials may be used in the Plant Disease Diagnostic Laboratory; however, these references are not to be removed from the laboratory. Students will be allotted space in the Greenhouse Teaching Classroom/Laboratory walk-in cold room for storage of specimens. *Students are encouraged, but not required, to bring a digital camera to each session.*

Students will be expected to read the Kentucky Pest News (KPN) newsletter. Issues of KPN can be obtained by subscribing to the KPN Listserv at [www.uky.edu/kpn](http://www.uky.edu/kpn). From the main menu, select 'Subscribe' and follow instructions. Past issues of KPN are available under 'Previous Issues' at [www.uky.edu/kpn](http://www.uky.edu/kpn).

**STUDENT RESPONSIBILITIES**

**General.** Using specimens provided by the instructors, students will diagnose samples during lab sessions. Students will work on samples in groups of 2-3, and a brief, written report will be expected for each sample (example format will be provided). Disease reports are to be kept in a

lab notebook that will serve as a study guide for later exams, so each student will be expected to complete a report for each diagnosis. Each group will be responsible for presenting their findings to the class for ONE of the assigned samples (selected by the instructor), so that all samples are discussed before the end of the lab session. Each group member must participate in the presentation to the class.

**Disease Collection.** Each student must collect and diagnose 10 specimens of disease on different types of plants over the summer, as follows:

2 – field crops

2 – vegetable crops

2 – ornamentals and landscape/forest trees

2 – fruits

2 – turf and forages

**The disease collection must be turned in by August 15.** A complete collection will consist of fresh or preserved specimens along with supporting materials (illustrations of pathogen signs or digital images, diagnostic tests, etc.). A **brief** written report also is required that identifies each disease and its importance, the causal agent, symptoms and signs, disease cycle, and control measures. Diseases that have been diagnosed during class may be included in the disease collection; however, students must use materials that they have collected on their own or during field trips (not specimens provided during lab).

## **EXAMINATIONS**

Students will be expected to understand and apply the general principles and practices of plant disease diagnosis. In addition, they will recognize or know how to diagnose the diseases of samples with which they have worked **plus** important diseases of other crops discussed by the instructor and other students. Students will also be expected to be familiar with information presented in the weekly Kentucky Pest News and other practical plant disease information introduced during class-related activities. **All examinations are 'open book' - the use of class notes is permitted.**

## **CRITERIA FOR GRADING STUDENTS IN PPA (PLS) 640**

First examination: 100 points

Second examination: 100 points

Final examination: 100 points

Disease collection: 100 points

*Score will be based on quality of specimens, accuracy of diagnoses, and quality of written reports (clear documentation of importance, disease cycles, symptoms, signs, identification, and management practices).*

Class Participation: 100 points

*Score will be based on class attendance (two excused absences are permitted during the semester; each additional absence will result in a loss of 10 class participation points), oral diagnostic reports, and participation in discussions during class or field trips.*

**PPA 654: Advanced Plant Disease Resistance****Semesters taught:** Every fall.**Credit hours:** 1**Prerequisites:** PPA 400G, PPA 500, PPA 600**Requirement:** Option to fulfill the requirement for two courses in Advanced Plant Pathology (PPA 65x)**Organizer and Instructor:** Pradeep Kachroo**Major Teaching Objectives:** Give student an in-depth understanding of the interaction between host and pathogen. Emphasis is on the host defense signaling.**Readings:** At least 1 week before each lecture, students will be assigned one review paper and one recent research paper for that lecture.**Topics:**

- Lecture 1 Genetic analysis of plant disease interactions  
Gene for Gene interaction
- Lecture 2 Mapping, map based cloning of genes,
- Lecture 3 R gene structure and function
- Lecture 4 Hypersensitive response, Lesion mimics
- Lecture 5 Downstream signaling, signal transduction
- Lecture 6 Signaling and disease resistance
- Lecture 6 SA and disease resistance
- Lecture 7 JA/ethylene and disease resistance
- Lecture 8 **Midterm exam**
- Lecture 9 FA signaling and disease resistance
- Lecture 10 NO and disease resistance
- Lecture 11 Cross talk and comparison of R signaling pathways against virus,  
bacterial, oomycete and fungal pathogens
- Lecture 12 Virus-induced gene silencing
- Lecture 13 Virus-induced gene silencing
- Lecture 14 Resistance via tolerance

**Assignments, Exams and Grades:**

Participation: 40 pts

Midterm exam: 30 pts

Final exam: 30 pts

Grades: 90-100%, A; 80-89%, B; 70-79%, C; &lt;70%, D



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FEDERAL DE  
VIÇOSA

COURSE PROGRAM

Nº

SHEET:

INITIALS:

IDENTIFICATION

COURSE: <b>PHYTOMYCOLOGY (Fitomicologia)</b>		CODE: <b>FIP 610</b>	
DEPARTMENT: <b>PLANT PATHOLOGY (Fitopatologia)</b>		ADMINISTRATIVE UNIT CODE: <b>CCA</b>	
DURATION IN WEEKS <b>15</b>	NUMBER OF HOURS PER WEEK		TOTAL NUMBER OF HOURS <b>90</b>
LECTURES: <b>02</b>	LABORATORIES: <b>04</b>	TOTAL: <b>06</b>	
CREDIT NUMBER: <b>04</b>	SEMESTER: <b>1</b>		
PRE-REQUISITES		PRE OR CO-REQUISITES	

CONTENT

Evolution, systematics and classification of the fungi. Fungal genetics. Fungal physiology. Fungi of the Kingdom Protista. Fungi of the Kingdom Chromista / Straminipila. Fungi of the Kingdom Fungi. Control of fungal diseases.

OFFERED TO THE FOLLOWING PROGRAMS (ONLY FOR UNDERGRADUATE LEVEL COURSES)

1.	( )	7.	( )
2.	( )	8.	( )
3.	( )	9.	( )
4.	( )	10.	( )
5.	( )	11.	( )
6.	( )	12.	( )

(OB)= OBLIGATORY

(OP)= OPTIONAL

Nº DA ATA DA REUNIÃO:

DATA DE APROVAÇÃO:

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CHEFE DO DEPARTAMENTO

ALTERAÇÃO

APROVADA  
PELO



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Nº DA ATA DA REUNIÃO

DATA DE APROVAÇÃO:

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PRESIDENTE DO CONSELHO

APROVAÇÃO

DA COORDENAÇÃO DE ENSINO,  
PESQUISA E EXTENSÃO - CEPE

Nº DA ATA DA REUNIÃO

DATA DE APROVAÇÃO

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SECRETÁRIO DE ÓRGÃOS COLEGIADOS



UNIVERSIDADE  
FEDERAL DE  
VIÇOSA

COURSE PROGRAM (continued)

Nº

SHEET:

INITIALS:

COURSE:

**PHYTOMYCOLOGY**

CODE:

**FIP 610**

**UNITS AND TOPICS**



LECTURES



LABORATORY  
SESSIONS

NUMBER OF  
HOURS PER WEEK

1. Evolution, systematics and classification of the fungi.			02
2. Fungal genetics.			02
3. Fungal physiology.			02
4. Fungi of Kingdom Protista.			01
5. Fungi of the Kingdom Chromista / Straminipila			03
6. Fungi of the Kingdom Fungi:			16
6.1. Phylum Chytridiomycota;			
6.2. Phylum Zygomycota;			
6.3. Phylum Ascomycota;			
6.4. Phylum Basidiomycota.			
7. Controle de doenças fúngicas			04

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UNIVERSIDADE  
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VIÇOSA

COURSE PROGRAM (continued)

N<sup>o</sup>

SHEET:

INITIALS:

COURSE:

**PHYTOMYCOLOGY**

CODE:

**FIP 610**

UNITS AND TOPICS



LECTURES



LABORATORY  
SESSIONS

NUMBER OF HOURS PER  
WEEK

01. Basic methods in mycology: collection and processing, microscopy and literature.		04
02. Fungal genetics lab: isolation, cultivation, and conservation of cultures.		04
03. Fungal genetics lab.		04
04. Observation of mixomycetes		02
05. Genera <i>Pythium</i> and <i>Phytophthora</i> .		02
06. Peronosporales		04
07. Chytridiomycota.		02
08. Zygomycota.		02
09. Anamorphs.		16
10. Ascomycota.		08
11. Basidiomycota		08
12. Control of fungal diseases.		04

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VIÇOSA

BIBLIOGRAPHIC  
REFERENCES

Nº

SHEET:

INITIALS:

CODE:

**PHYTOMYCOLOGY**

CODE:

**FIP 610**

- ALEXOPOULOS, C.J., MIMS, C.W. & BLACKWELL, M. 1996. *Introductory Mycology*. John Wiley & Sons, New York.
- CARLILE, M.J., WATKINSON, S.C. & GOODAY, G.W. 2001. *The Fungi*. Academic Press.
- DIGHTON, J. 2001. *Fungi in Ecosystem Processes*. Marcel Dekker.
- HOLLYDAY, P. 1980. *Fungus Diseases of Tropical Crops*. Cambridge University Press.
- GAMS, W., HOEKSTRA, E.S. & APTROOT, A. 1998. *CBS Course of Mycology*. Centraalbureau voor Schimmelcultures.
- HENNEN, J. et al. 2005. *Catalogue of the Species of Plant Rust Fungi (Uredinales) of Brazil*. Jardim Botânico do Rio de Janeiro (disponível on-line <http://www.jbrj.gov.br/>).
- KIRK, P.F., CANNON, P.F., MINTER, D.W. & STALPERS, J.A. 2008 *Dictionary of the Fungi*. CAB INTERNATIONAL MENDES et al. 1998. *Fungos em Plantas no Brasil*. EMBRAPA.
- MUELLER, G.M., BILLS, G.F. & FOSTER, M.S. 2004. *Biodiversity of fungi: inventory and monitoring methods*. Elsevier Academic Press.
- WALLER, J. M., LENNÉ, J.M., WALLER, S.J. (Eds). 2001. *Plant Pathologist's Pocketbook*. Oxford University Press.
- WEBSTER, J. & WEBER, R.W.S. 2007. *Introduction to Fungi*. Cambridge University Press.

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VIÇOSA

COURSE PROGRAM

Nº

SHEET:

INITIALS:

IDENTIFICATION

COURSE: <b>PHYTONEMATOLOGY (Fitonematologia)</b>		CODE: <b>FIP 620</b>	
DEPARTMENT: <b>PLANT PATHOLOGY (Fitopatologia)</b>		ADMINISTRATIVE UNIT CODE: <b>CCA</b>	
DURATION IN WEEKS <b>15</b>	NUMBER OF HOURS PER WEEK		TOTAL NUMBER OF HOURS <b>60</b>
LECTURES: <b>02</b>	LABORATORIES: <b>02</b>	TOTAL: <b>04</b>	
CREDIT NUMBER: <b>03</b>	SEMESTER: <b>1</b>		
PRE-REQUISITES		PRE OR CO-REQUISITES	

CONTENT

History and importance. Morphological and biological characteristics of the nematodes. Ecological relationships. Pathogenic relationships. Interaction of nematodes with other pathogens. Basic considerations for the control of nematodes. Prevention of the spread. Reducing nematode populations through soil management and cultural practices. Control by heat. Biological control of nematodes. Control by chemicals. Use of resistant varieties.

OFFERED TO THE FOLLOWING PROGRAMS (ONLY FOR UNDERGRADUATE LEVEL COURSES)

1. ( )	7. ( )
2. ( )	8. ( )
3. ( )	9. ( )
4. ( )	10. ( )
5. ( )	11. ( )
6. ( )	12. ( )

(OB)= OBLIGATORY

(OP)= OPTIONAL

Nº DA ATA DA REUNIÃO:

DATA DE APROVAÇÃO:

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CHEFE DO DEPARTAMENTO

ALTERAÇÃO

APROVADA  
PELO



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DATA DE APROVAÇÃO:

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PESQUISA E EXTENSÃO - CEPE

Nº DA ATA DA REUNIÃO

DATA DE APROVAÇÃO

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VIÇOSA

COURSE PROGRAM (continued)

Nº

SHEET:

INITIALS:

COURSE:

**PHYTONEMATOLGY**

CODE:

**FIP 620**

UNITS AND TOPICS	<input checked="" type="checkbox"/> LECTURES	<input type="checkbox"/> LABORATORY SESSIONS	NUMBER OF HOURS PER WEEK
1 History and significance. 1.1. History of nematology. 1.2. Importance of nematodes to agriculture. 1.3. The nematological literature: books, manuals, journals and other references.			02
2. Morphological and biological characteristics of nematodes: 2.1. Anatomy and morphology; 2.2. Types of nematodes and general eating habits; 2.3. Life cycle of parasitic plant species.			06
3 Ecological Relations.: 3.1. Vertical and horizontal distribution of nematodes in the soil; 3.2. Populations and survival; 3.3. Soil environment; 3.4. Plant environment.			02
4 Pathogenic Relations.: 4.1. Symptoms of diseases caused by nematodes; diagnosis; 4.2. Histopathology of plants parasitized by nematodes; 4.3. Biochemical Aspects of diseases caused by nematodes; 4.4. The verification of the plant pathogenic nematodes. Terminology, Methodology.			02
5 Interaction of nematodes with other pathogens: 5.1. Fungi, bacteria and nematodes; 5.2. Transmission of viruses.			04
6 Basic considerations for the control of nematodes: 6.1. Economic aspect; 6.2. Integrated control; 6.3. Annual crops and perennial crops; 6.4. Eradication versus coexistence.			01
7 Prevention of spread: 7.1. Dissemination processes; 7.2. Natural barriers; 7.3. Practices to restrict the spread. Quarantine. Treatment of plants or plant organs with hot water and chemicals. Use of healthy seedlings.			01

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VIÇOSA

COURSE PROGRAM (continued)

Nº

SHEET:

INITIALS:

COURSE:

**PHYTONEMATOLOGY**

CODE:

**FIP 620**

UNITS AND TOPICS	<input checked="" type="checkbox"/> LECTURES	<input type="checkbox"/> LABORATORY SESSIONS	NUMBER OF HOURS PER WEEK
8 Reduction of nematode population through soil management practices and cultures: 8.1. Fallow; 8.2. Organic fertilization; 8.3. Crop rotation; 8.4. Antagonistic plants; 8.5. Flooding; 8.6. Planting date; 8.7. Destruction or removal of infected plants; 8.8. Other practices.			04
9 Control by heat: 9.1. Heat transfer in the soil; 9.2. Methods and equipments; 9.3. Solar thermotherapy (soil solarization); 9.4. Effects of heat on soil properties.			02
10. Biological control of nematodes: Nematophagous fungi. General characteristics. Main genera and species; Other organisms (bacteria, viruses, nematodes, protozoa, etc.). Current situation and future prospects.			02
11. Control by chemicals: Characteristics of the major nematicides; Techniques and dosages of application; Ecological considerations; Problems of residues in food.			02
12 Use of resistant varieties: Development of new varieties; The nature of resistance; The genetic basis for resistance.			02

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VIÇOSA

COURSE PROGRAM (continued)

Nº

SHEET:

INITIALS:

COURSE:

**PHYTONEMATOLOGY**

CODE:

**FIP 620**

UNITS AND TOPICS	<input type="checkbox"/> LECTURES	LABORATORY SESSIONS	NUMBER OF HOURS PER WEEK
01 Sample collection and extraction of nematodes: 1.1. Sampling techniques; 1.2. Methods of extraction of nematodes from soil; 1.3. Methods of extraction of nematodes from plant tissue.			04
02 Preparation of slides for examination under a microscope: 2.1. Temporary mounts; 2.2. Permanent mounts; 2.3. Staining of nematodes "in situ" in plant tissues.			04
03 The soybean cyst nematode ( <i>Heterodera glycines</i> ): 3.1. Techniques for the extraction of larvae, cysts and eggs; 3.2. Resistance of soybean cultivars to nematode; 3.3. Race identification.			04
04 The root-knot nematodes ( <i>Meloidogyne</i> spp.): 4.1. Techniques for the extraction of eggs and inoculation of plants. Staining of egg masses; 4.2. Preparation of perineal cuts; 4.3. Polyacrylamide gel electrophoresis for species identification; 4.4. Identification of races.			04
05. Important nematodes: features and significance: 5.1. <i>Pratylenchus</i> and <i>Radopholus</i> ; 5.2. <i>Ditylenchus</i> , <i>Anguina</i> , <i>Bursaphelenchus</i> and <i>Aphelenchoides</i> ; 5.3. <i>Rotylenchulus</i> and <i>Tylenchus</i> ; 5.4. <i>Criconemella</i> , <i>Paratylenchus</i> , <i>Hemicycliophora</i> and <i>Hemicriconemoides</i> ; 5.5. <i>Helicotylenchus</i> , <i>Rotylenchus</i> , <i>Hoplolaimus</i> , <i>Scutellonema</i> , <i>Aorolaimus</i> and <i>Tylenchorhynchus</i> ; 5.6. <i>Longidorus</i> , <i>Paralongidorus</i> , <i>Trichodorus</i> , <i>Paratrichodorus</i> and <i>Xiphinema</i>			14

DEPARTMENT CHAIR



UNIVERSIDADE  
FEDERAL DE  
VIÇOSA

BIBLIOGRAPHIC  
REFERENCES

Nº

SHEET:

INITIALS:

CODE:

**PHYTONEMATOLOGY**

CODE:

**FIP 620**

CHEN, Z. X.; CHEN, S. Y. & DICKSON, D. W. 2004. (ed.) Nematology: Advances and Perspectives Vol 1: Nematode Morphology, Physiology and Ecology. CABI Publishing. Cambridge, MA, USA. 640 p.

CHEN, Z. X.; CHEN, S. Y. & DICKSON, D. W. 2004. (ed.) Nematology: Advances and Perspectives Vol II: Nematode Management and Utilization. CABI Publishing. Cambridge, MA, USA. 608 p.

GAUGLER, R. & BILGRAMI, A. L. 2004. (Editors) Nematode Behaviour. CABI. 432 p.

LUC, M., SIKORA, R. A. & BRIDGE, J. 2005. (ed.) Plant parasitic nematodes in subtropical and tropical agriculture. 2<sup>nd</sup> edition. CABI. 871 p.

MAI, W. F. & MULLIN, P. G. 1996. Plant-Parasitic nematodes: a pictorial key to genera. 5th. Edition. Cornell Univ. Press. Ithaca. 277 p.

PERRY, R. N. & Moens, M. 2006. (ed.) Plant Nematology. CABI. 480 p.

REGNAULT-ROGER, C., PHILOGÈNE, B. J. R. & VINCENT, C. 2005. (ed.) Biopesticides of Plant Origin. Lavoisier 310 p.


SIDDIQI, M. R. 2000. Tylenchida: parasites of plants and insects. 2<sup>nd</sup> edition. CABI. 833 p.

SOUTHEY, J. F. (ed.) 1986. Laboratory Methods for work with Plant and Soil Nematodes. Ministry of Agriculture, Fisheries and Food, London, England. 193 p.

ZUCKERMAN, B. M., MAI, W. F. & KRUSBERG, L. R. 1990. Plant Nematology Laboratory Manual. The University of Massachusetts Agricultural Experiment Station. Massachusetts, USA. 252 p.

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DEPARTMENT CHAIR

 <b>UNIVERSIDADE FEDERAL DE VIÇOSA</b>	<b>COURSE PROGRAM (continued)</b>	N <sup>o</sup>	
		SHEET:	INITIALS:


COURSE: <b>PLANT VIROLOGY</b>	CODE: <b>FIP 630</b>
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UNITS AND TOPICS	<input checked="" type="checkbox"/> LECTURES	<input type="checkbox"/> LABORATORY SESSIONS	NUMBER OF HOURS PER WEEK
1. History and importance of plant virology.			02
2. Symptoms induced by plant viruses in their hosts: 2.1. Macroscopic alterations; 2.2. Microscopic alterations.			02
3. Morphology and structure: 3.1. Morphology; 3.2. Chemical composition and structure of the capsid; 3.3. Nomenclature and taxonomy.			02
4. Strategies of viral replication: 4.1. Stages of the process of establishment of systemic infection; 4.2. Virus replication: Positive RNA viruses; 4.3. Virus replication: Negative RNA viruses; 4.4. Virus replication: DNA genome.			10
5. Cell-to-cell and long-distance movement: 5.1. Cell-to-cell movement via tubules; 5.2. Cell-to-cell movement via increase of plasmodesmal SEL; 5.3. Long-distance movement.			02
6. Subviral infectious agents: 6.1. Viroids; 6.2. Satellite viruses; 6.3. Satellite RNAs.			02
7. Natural transmission: 7.1. Transmission by contact and by seeds; 7.2. Transmission by vectors.			04
8. Control of plant virus diseases. 8.1. Vector control; 8.1. Use of virus-free propagation material; 8.2. Natural resistance; 8.3. Pathogen-derived resistance.			06

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 <b>UNIVERSIDADE FEDERAL DE VIÇOSA</b>	<b>COURSE PROGRAM (continued)</b>	<b>Nº</b>	
		SHEET:	INITIALS:
<b>COURSE: PLANT VIROLOGY</b>		<b>CODE: FIP 630</b>	
<b>UNITS AND TOPICS</b>	<input type="checkbox"/> LECTURES	LABORATORY SESSIONS	NUMBER OF HOURS PER WEEK
01. Artificial transmission of plant viruses; host range.			02
02. Purification of a rod-shaped virus.			04
03. Purification of an isometric virus.			04
04. Optical and electronic microscopy: Observation of cytoplasm inclusions and viral particles.			02
05. Cloning a fragment of a viral genome:			14
5.1. Extraction and whole-genome amplification of a begomovirus.			
5.2. Extraction of viral RNA.			
5.3. RT-PCR: Amplification of fragments of a viral genome.			
5.4. Ligation of amplified products into plasmid vector.			
5.5. Transformation of <i>E. coli</i> .			
5.6. Extraction and electrophoretic analysis of recombinant plasmids.			
06. Analysis of viral sequences.			02
07. Identification of viral suppressors of RNA silencing.			02
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 <b>UNIVERSIDADE FEDERAL DE VIÇOSA</b>	<b>BIBLIOGRAPHIC REFERENCES</b>	<b>Nº</b> SHEET:   INITIALS:
CODE: <b>PLANT VIROLOGY</b>	CODE: <b>FIP 630</b>	
<p>FAUQUET, C.M., MAYO, M.A., MANIOFF, J., DESSELBERGER, U. &amp; BALL, L.A. (Eds.) Virus Taxonomy. Eighth Report of the International Committee on Taxonomy of Viruses. San Diego, EUA: Elsevier Academic Press. 1259p. 2005.</p> <p>HOGENHOUT, S.A., AMMAR, E.D., WHITFIELD, A.E. &amp; REDINBAUGH, M.G. Insect vector interactions with persistently transmitted viruses. Annu. Rev. Phytopathol. 46:327-359. 2008.</p> <p>HULL, R. Matthew's Plant Virology (4a ed.). Londres, Inglaterra: Academic Press. 1001p. 2002.</p> <p>LEWIN, B. Genes VIII. Upper Saddle River, EUA: Pearson Prentice Hall. 1027p. 2004.</p> <p>NG, J.C.K. &amp; FALK, B.W. Virus-vector interactions mediating nonpersistent and semipersistent transmission of plant viruses. Annual Review of Phytopathology 44:183-212. 2006.</p> <p>ROJAS, M.R., HAGEN, C., LUCAS, W.J. &amp; GILBERTSON, R.L. Exploiting chinks in the plant's armor: Evolution and emergence of geminiviruses. Annual Review of Phytopathology 43:361-394. 2005.</p> <p>SAMBROOK, J. &amp; RUSSEL, D. Molecular Cloning - A Laboratory Manual (3a ed.). Cold Spring Harbor, EUA: Cold Spring Harbor Laboratory Press. 2344p. 2001.</p> <p>SIMON, A.E., ROOSSINCK, M.J. &amp; HAVELDA, Z. Plant virus satellite and defective interfering RNAs: New paradigms for a new century. Annual Review of Phytopathology 42:415-437. 2004.</p> <p>ZERBINI, F.M. &amp; ALFENAS-ZERBINI, P. Métodos em virologia vegetal. pp. 293-358 In: Alfenas, A.C. &amp; Mafia, R.G. (Eds.) Métodos em Fitopatologia. Viçosa, MG: Editora UFV. 2007.</p> <p>ZERBINI, F.M., ALFENAS, P.F. &amp; ANDRADE, E.C. O silenciamento de RNA como um mecanismo de defesa de plantas a vírus. Revisão Anual de Patologia de Plantas 13:191-246. 2005.</p>		
DEPARTMENT CHAIR		

Excluído: ¶



Excluído: ¶



UNIVERSIDADE  
FEDERAL DE  
VIÇOSA

COURSE PROGRAM

Nº

SHEET:

INITIALS:

IDENTIFICATION

COURSE: <b>PLANT PATHOGENIC BACTERIA (Bactérias Fitopatogênicas)</b>		CODE: <b>FIP 640</b>	
DEPARTMENT: <b>PLANT PATHOLOGY (Fitopatologia)</b>		ADMINISTRATIVE UNIT CODE: <b>CCA</b>	
DURATION IN WEEKS <b>15</b>	NUMBER OF HOURS PER WEEK		TOTAL NUMBER OF HOURS <b>60</b>
LECTURES: <b>02</b>	LABORATORIES: <b>02</b>	TOTAL: <b>04</b>	
CREDIT NUMBER: <b>03</b>	SEMESTER: <b>2</b>		
PRE-REQUISITES		PRE OR CO-REQUISITES	

CONTENT

History and economic importance. Anatomy and morphology of the bacterial cell: physiology, bacterial metabolism and growth and main recombination processes. Taxonomy of plant pathogenic bacteria. Symptomatology. Penetration, colonization, movement and multiplication of bacteria during plant infection and histopathological aspects of the colonization process. Seed pathology of plant pathogenic bacteria. Survival and spread of plant pathogenic bacteria: life cycle and its implications to spread and survival. Control methods for bacterial plant diseases.

OFFERED TO THE FOLLOWING PROGRAMS (ONLY FOR UNDERGRADUATE LEVEL COURSES)

1.	( )	7.	( )
2.	( )	8.	( )
3.	( )	9.	( )
4.	( )	10.	( )
5.	( )	11.	( )
6.	( )	12.	( )

(OB)= OBLIGATORY

(OP)= OPTIONAL

Nº DA ATA DA REUNIÃO:

DATA DE APROVAÇÃO:

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CHEFE DO DEPARTAMENTO

ALTERAÇÃO

APROVADA  
PELO



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Nº DA ATA DA REUNIÃO

DATA DE APROVAÇÃO:

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PRESIDENTE DO CONSELHO

APROVAÇÃO

DA COORDENAÇÃO DE ENSINO,  
PESQUISA E EXTENSÃO - CEPE

Nº DA ATA DA REUNIÃO

DATA DE APROVAÇÃO

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UNIVERSIDADE  
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VIÇOSA

COURSE PROGRAM (continued)

Nº

SHEET:

INITIALS:

COURSE:

**PLANT PATHOGENIC BACTERIA**

CODE:

**FIP 640**

UNITS AND TOPICS	<input checked="" type="checkbox"/> LECTURES	<input type="checkbox"/> LABORATORY SESSIONS	NUMBER OF HOURS PER WEEK
1. History and economic importance: 1.1. Introduction; 1.2. General recommendations; 1.3. Bacteriology as a science; 1.4. Economic importance of plant bacterial diseases; 1.5. Plant bacteriologists in Brazil and in the world.			02
2. Anatomy and morphology of the bacterial cell: physiology, bacterial metabolism and growth and main recombination processes			05
3. Taxonomy of plant pathogenic bacteria: 3.1. Positioning of the bacteria in the world of living beings; 3.2. Procaryotes and eucaryotes; 3.3. Taxonomy of the plant pathogenic genera and species; 3.4. The concept of pathovar.			05
4. Symptomatology: 4.1. Main types of symptoms; 4.2. Elementary concepts of physiology of parasitism; 4.3. Primary and secondary factors of pathogenesis; 4.4. Compatible and incompatible associations; 4.5. Hypersensitivity.			04
5. Penetration, colonization, movement and multiplication of bacteria during plant infection and histopathological aspects of the colonization process.			02
6. Seed pathology of plant pathogenic bacteria: 6.1. Association of bacteria with seeds and its plant pathological and epidemiological significance; 6.2. Seed treatment as eradication measure; 6.3. Methods of detection of plant pathogenic bacteria in seeds.			04
7. Survival and spread of plant pathogenic bacteria: life cycle and its implications to spread and survival.			04
8. Control methods of bacterial plant diseases: 8.1. General measures; 8.2. Chemical and biological control; 8.3. Seed certification; 8.4. Antibiotics; 8.5. Induced resistance and its implications; 8.6. Plant growth promoting rhizobacteria as biological control agents.			04



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VIÇOSA

COURSE PROGRAM (continued)

Nº

SHEET:

INITIALS:

COURSE:

**PLANT PATHOGENIC BACTERIA**

CODE:

**FIP 640**

UNITS AND TOPICS	<input type="checkbox"/> LECTURES	LABORATORY SESSIONS	NUMBER OF HOURS PER WEEK
01. Dilution of colonies.			02
02. Isolation of plant pathogenic bacteria from infected plant organs.			02
03. Hypersensitivity test.			02
04. Artificial inoculation.			02
05. Bacterial growth curve.			04
06. Preservation of bacterial cultures by different methods.			02
07. Visualization of bacterial cell and of some structures.			02
08. Seed pathology – rapid detection.			02
09. Determination of a plant pathogenic genus.			02
10. Determination of a plant pathogenic species.			04
11. Bioassays with antibiotics and their application in plant pathology.			02
12. Bacteriocins – bioassays for synthesis detection.			02
13. Bacteriophages – isolation, detection and specificity.			02

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BIBLIOGRAPHIC  
REFERENCES

Nº

SHEET:

INITIALS:

CODE:

**PLANT PATHOGENIC BACTERIA**

CODE:

**FIP 640**

BRENNER, D. J.; KRIEG, N. R. & STALEY, J. T. (Eds.). *Bergey's Manual of Systematic Bacteriology, Vol. 2, The Proteobacteria (Parts A, B & C)*, 2nd ed. Springer, 2005. 2816p.

CROSA, J.H. & KADO, C. I. (eds.). *Molecular mechanisms of bacterial virulence (Developments in Plant Pathology, Vol 3)*. Boston, Kluwer Academic Publishers, 2002. 704p.

GNANAMANICKAM, S. S. (Ed.) *Plant-Associated Bacteria*, Dordrecht, Springer, 2006. 724p.

HAMPTON, R.; BALL, E.; DeBOER, S. (eds.). *Serological methods for detection and identification of viral and bacterial plant pathogens - a laboratory manual*. St. Paul, APS Press, 1990. 387p.

JACKSON, R. W. (Ed.). *Plant Pathogenic Bacteria: Genomics and Molecular Biology*. Norfolk, Caister Academic Press, 2009. 330p.

JANSE, J. D. *Phytobacteriology: Principles and Practice*. Wallingford, Cabi Publishing, 2006. 360p.

KLEMENT, Z.; RUDOLPH, K.; SANDS, D.C. (eds.). *Methods in phytobacteriology*. Budapest, Akadémiai Kiadó, 1990. 568p.

MADIGAN, M. M.; MARTINKO, J. DUNLAP, P.V. & CLARK, D.P. *Brock biology of microorganisms*. 12th ed. Upper Saddle River, Benjamin Cummings, 2008. 1168p.


NESTER, E.; GORDON, M. P. & KERR, A (Eds.). *Agrobacterium Tumefaciens: From Plant Pathology To Biotechnology*. St. Paul, APS Press, 2005. 319p.

ROSSELLÓ-MORA, R. & AMANN, R. The species concept for prokaryotes. *FEMS Microbiology Reviews*, 25: 39-67, 2001.

SCHAAD, N.W.; JONES, J.B. & CHUN, W. (eds). *Laboratory guide for identification of plant pathogenic bacteria*. 3rd ed. St. Paul, APS Press, 2001. 373p.

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DEPARTMENT CHAIR

 <b>UNIVERSIDADE FEDERAL DE VIÇOSA</b>	<b>COURSE PROGRAM</b>	N <sup>o</sup>	
		SHEET:	INITIALS:

IDENTIFICATION				
COURSE: <b>POPULATION BIOLOGY OF PLANT PATHOGENS (Biologia de Populações de Fitopatógenos) *</b>			CODE: <b>FIP 680</b>	
<b>* THIS COURSE IS TAUGHT IN ENGLISH</b>				
DEPARTMENT: <b>PLANT PATHOLOGY (Fitopatologia)</b>			ADMINISTRATIVE UNIT CODE: <b>CCA</b>	
DURATION IN WEEKS	NUMBER OF HOURS PER WEEK			TOTAL NUMBER OF HOURS
<b>15</b>	LECTURES: <b>02</b>	LABORATORIES: <b>02</b>	TOTAL: <b>04</b>	<b>60</b>
CREDIT NUMBER: <b>03</b>		SEMESTER: <b>1 (even years)</b>		
PRE-REQUISITES		PRE OR CO-REQUISITES		

CONTENT
Concepts of population biology. Basic concepts of evolution. Quantifying genetic diversity. Recombination and variability of populations. Genetic drift and variability of populations. Mutations and variability of populations. Migration and population structure. Selection and variability of populations.

OFFERED TO THE FOLLOWING PROGRAMS (ONLY FOR UNDERGRADUATE LEVEL COURSES)				
1.	( )	7.	( )	
2.	( )	8.	( )	
3.	( )	9.	( )	
4.	( )	10.	( )	
5.	( )	11.	( )	
6.	( )	12.	( )	
(OB)= OBLIGATORY (OP)= OPTIONAL				

N <sup>o</sup> DA ATA DA REUNIÃO:	DATA DE APROVAÇÃO:	
____/____/____	____/____/____	_____
CHEFE DO DEPARTAMENTO		

<b>ALTERAÇÃO</b> APROVADA PELO <input type="checkbox"/> CTP <input type="checkbox"/> CTG
N <sup>o</sup> DA ATA DA REUNIÃO _____ DATA DE APROVAÇÃO: _____ _____ PRESIDENTE DO CONSELHO

<b>APROVAÇÃO</b> DA COORDENAÇÃO DE ENSINO, PESQUISA E EXTENSÃO - CEPE
N <sup>o</sup> DA ATA DA REUNIÃO _____ DATA DE APROVAÇÃO _____ _____ SECRETÁRIO DE ÓRGÃOS COLEGIADOS



UNIVERSIDADE  
FEDERAL DE  
VIÇOSA

COURSE PROGRAM (continued)

Nº

SHEET:

INITIALS:

COURSE:

**POPULATION BIOLOGY OF PLANT PATHOGENS**

CODE:

**FIP 680**

UNITS AND TOPICS	<input checked="" type="checkbox"/> LECTURES	<input type="checkbox"/> LABORATORY SESSIONS	NUMBER OF HOURS PER WEEK
01. Concepts of population biology: 1.1 Terminology 1.2 Introduction to population biology: history, names and concepts			02
02. Evolution: basic concepts			04
03. Quantifying genetic diversity			04
04. Recombination: 4.1. Hardy-Weinberg equilibrium; 4.2. Finite populations, panmictic populations, sexual x clonal; 4.3. How to detect and quantify recombination.			04
05. Genetic drift and variability of populations: 5.1. Finite populations and genetic drift; 5.2. Identity by descent and endogamy; 5.3. How to detect genetic drift.			04
06. Mutation and variability: 6.1. Mutation models; 6.2. Quantification of mutation rates.			04
07. Migration and population structure. 7.1. Migration models; 7.2. Migration and genetic drift; 7.3. How to estimate migration between populations.			04
08. Selection: 8.1. Selection models 8.2. The concept of fitness, 8.3. Selection x (drift, recombination, mutation and gene flow), 8.4. Selection estimates in populations.			04

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UNIVERSIDADE  
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VIÇOSA

COURSE PROGRAM (continued)

N<sup>o</sup>

SHEET:

INITIALS:

COURSE:

**POPULATION BIOLOGY OF PLANT PATHOGENS**

CODE:

**FIP 680**

UNITS AND TOPICS	<input type="checkbox"/> LECTURES	LABORATORY SESSIONS	NUMBER OF HOURS PER WEEK
01. Critical analysis of scientific articles – exercise.			04
02. Quantification of genetic diversity using R (RStudio) and DNAsp			02
03. Recombination detection and quantification methods			04
04. Genetic drift			04
05. Quantitative methods to estimate mutation			04
06. Quantitative methods to estimate migration rates			04
07. Detecting and quantifying selection			04
08. Coalescent-based methods			04

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VIÇOSA

BIBLIOGRAPHIC  
REFERENCES

Nº

SHEET:

INITIALS:

CODE:

**PHYTOPATHOGENIC BACTERIA**

CODE:

**FIP 640**

- Charlesworth, B. Fundamental concepts in genetics: effective population size and patterns of molecular evolution and variation. *Nat. Rev. Genet.* 10:195-205. 2009
- Garrett, K. A., Hulbert, S. H., Leach, J. E. & Travers, S. E. Ecological genomics and epidemiology. *Eur. J. Plant Pathol* 115:31-51. 2006.
- Hartl, D. L. & Clark, A. G. Principles of population genetics. 4th Sinauer Associated, Inc, Sunderland. 2007.
- Nei, M. & Kumar, S. Molecular evolution and phylogenetics. Oxford University Press, New York. 2000.
- Meeûs, T. D., McCoy, K. D., Prugnolle, F., Chevillon, C., Durand, P., Hurtrez-Boussès, S. & Renaud, F. Population genetics and molecular epidemiology or how to "débusquer la bête". *Inf. Genetics Evol.* 7:308-332. 2007.
- Milgroom, M. G. & Peever, T. L. Population biology of plant pathogens. The synthesis of plant disease epidemiology and population genetics. *Plant Dis* 87:608-617. 2003.
- Orr, H. A. Fitness and its role in evolutionary genetics. *Nat. Rev. Genet.* 10:531-539. 2009.
- Stukenbrock, E. H. & McDonald, B. A. Population genetics of fungal and oomycete effectors involved in gene-for-gene interactions. *Mol. Plant Microbe Interact.* 22:371-380. 2009.
- Wakeley, J. Coalescent Theory: An Introduction. Roberts & Company Publishers, Village. 2008.
- Waples, R. S. & Gaggiotti, O. What is a population? An empirical evaluation of some genetic methods for identifying the number of gene pools and their degree of connectivity. *Mol. Ecol* 15:1419-1439. 2006.
- Yang, Z. Computational molecular evolution. Oxford University Press, Oxford. 2006.

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UNIVERSIDADE  
FEDERAL DE  
VIÇOSA

COURSE PROGRAM

Nº

SHEET:

INITIALS:

IDENTIFICATION

COURSE: <b>HOST-PATHOGEN INTERACTIONS (Interação Patógeno-Hospedeiro)</b>		CODE: <b>FIP 701</b>	
DEPARTMENT: <b>PLANT PATHOLOGY (Fitopatologia)</b>		ADMINISTRATIVE UNIT CODE: <b>CCA</b>	
DURATION IN WEEKS <b>15</b>	NUMBER OF HOURS PER WEEK		TOTAL NUMBER OF HOURS <b>60</b>
LECTURES: <b>04</b>	LABORATORIES: <b>00</b>	TOTAL: <b>04</b>	
CREDIT NUMBER: <b>04</b>	SEMESTER: <b>1</b>		
PRE-REQUISITES		PRE OR CO-REQUISITES	

CONTENT

Importance of studying host-pathogen interactions in plant pathology. The plant cell. Pathogenesis events. Enzymes. Toxins. Physiological changes in the plant during the infection. Resistance mechanisms. Induction of resistance.

OFFERED TO THE FOLLOWING PROGRAMS (ONLY FOR UNDERGRADUATE LEVEL COURSES)

1.	( )	7.	( )
2.	( )	8.	( )
3.	( )	9.	( )
4.	( )	10.	( )
5.	( )	11.	( )
6.	( )	12.	( )

(OB)= OBLIGATORY

(OP)= OPTIONAL

Nº DA ATA DA REUNIÃO:

DATA DE APROVAÇÃO:

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CHEFE DO DEPARTAMENTO

ALTERAÇÃO

APROVADA  
PELO



CTP



CTG

Nº DA ATA DA REUNIÃO

DATA DE APROVAÇÃO:

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\_\_\_\_\_  
PRESIDENTE DO CONSELHO

APROVAÇÃO

DA COORDENAÇÃO DE ENSINO,  
PESQUISA E EXTENSÃO - CEPE

Nº DA ATA DA REUNIÃO

DATA DE APROVAÇÃO

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SECRETÁRIO DE ÓRGÃOS COLEGIADOS



UNIVERSIDADE  
FEDERAL DE  
VIÇOSA

COURSE PROGRAM (continued)

Nº

SHEET:

INITIALS:

COURSE:

**HOST-PATHOGEN INTERACTIONS**

CODE:

**FIP 701**

UNITS AND TOPICS	<input checked="" type="checkbox"/> LECTURES	<input type="checkbox"/> LABORATORY SESSIONS	NUMBER OF HOURS PER WEEK
01. Importance of studying host-pathogen interactions in plant pathology			1
02. The plant cell			1
03. Pathogenesis events: <ul style="list-style-type: none"> <li>3.1. Infection process: adhesion, germination, pre-penetration, penetration;</li> <li>3.2. Molecular events during the recognition process of the host by the pathogen and of the pathogen by the host;</li> <li>3.3. Signal cascades during host-pathogen interactions;</li> <li>3.4. Host colonization and nutrient transfer.</li> </ul>			14
04. Enzymes			6
05. Toxins			6
06. Physiological changes in the plant during the infection: <ul style="list-style-type: none"> <li>6.1. Transpiration and respiration;</li> <li>6.2. Photosynthesis;</li> <li>6.3. Translocation, permeability and metabolism of carbohydrates and other nutrients;</li> <li>6.4. Enzyme activity and concentration of proteins, nucleic acids and growth regulators.</li> </ul>			5
07. Resistance mechanisms: <ul style="list-style-type: none"> <li>7.1. Structural and/or pre-formed resistance mechanisms;</li> <li>7.2. Biochemical and/or post-formed resistance mechanisms.</li> </ul>			15
08. Induction of resistance <ul style="list-style-type: none"> <li>8.1. Induced systemic resistance</li> <li>8.2. Acquired systemic resistance</li> </ul>			12

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UNIVERSIDADE  
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VIÇOSA

COURSE PROGRAM (continued)

Nº

SHEET:

INITIALS:

COURSE:

**HOST-PATHOGEN INTERACTIONS**

CODE:

**FIP 701**

UNITS AND TOPICS



LECTURES



LABORATORY  
SESSIONS

NUMBER OF HOURS PER  
WEEK

No lab sessions

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UNIVERSIDADE  
FEDERAL DE  
VIÇOSA

## REFERENCES

Nº

SHEET:

INITIALS:

CODE:

**HOST-PATHOGEN INTERACTIONS**

CODE:

**FIP 701**

Daniel, M.; Purkayastha, R.P. (eds.). Handbook of Phytoalexin - Metabolism and Action. Marcel Dekker, Inc. New York, 615 p., 1995.

Heitefuss, R.; Williams, P.H. (eds.). Physiological Plant Pathology. Encyclopedia of Plant Physiology, vol. 4, Springer. Verlag, New York, 890 p., 1976.

Huang, J.S. Plant Pathogenesis and Resistance. Biochemistry and Physiology of Plant-Microbe Interactions. Kluwer Academic Publishers, Norwell, Madison, 691 p., 2001.

Kamal, B.; Normand, B.; Daayf, F. (eds.). Molecular Plant-Microbe Interactions. CABI, 352 p., 2009.

Loon, L.C.; Kader, J.C.; Delseny, M. (eds.). Plant Innate Immunity. Advances in Botanical Research, vol. 51, Academic Press, 1<sup>st</sup> Edition, 400 p., 2009.

Sadik, T.; Elizabeth, B. Multigenic and induced systemic resistance in plants. Springer, 1<sup>st</sup> Edition, 521 p. 2007.

Sutic, D.; Sinclair, J.B. Anatomy and Physiology of Diseased Plants. CRC Press, Boca Raton, Florida, 208 p., 1990.

Upadhyay, R.K.; Mukerji, K.G. (eds.). Toxins in Plant Disease Development and Evolving Biotechnology, Science Publishers Inc., Enfield, 246 p., 1997.

Vidhyasekaran, P. Fungal Pathogenesis in Plants and Crops - Molecular Biology and Host Defense Mechanisms. Marcel Dekker Inc., New York, 553 p., 1997.

Walters, D.; Newton, A.; Lyon, G. (eds.). Induced resistance for plant defence: a sustainable approach to crop protection. Blackwell Publishing, 258 p., 2007.

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### **APPENDIX 3**

Guidelines for the PhD degree at UFV (in English).

UNIVERSIDADE FEDERAL DE VIÇOSA – UFV  
OFFICE OF RESEARCH AND OF THE GRADUATE SCHOOL

Disclaimer: This is an edited version of the original document. Operational details were removed for the sake of brevity. Nevertheless, the original Portuguese and English versions can be obtained upon request ([pr.ppg@ufv.br](mailto:pr.ppg@ufv.br))

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ACADEMIC REQUIREMENTS  
GRADUATE PROGRAMS

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#### ACADEMIC YEAR

The academic year at the Universidade Federal de Viçosa comprises two regular terms of academic activity and a special summer term.

1. Each regular term lasts a minimum of 100 (one hundred) days of school work, excluding the time reserved for exams.
2. The special summer term lasts at least 45 (forty-five) days.

#### COURSES AND PROGRAMS OFFERED

The University offers the following courses and programs:

##### 1. Regular:

1.1. **UNDERGRADUATE PROGRAMS:** courses that provide university education and enable students to obtain academic degrees and professional practice. They are open to holders of certificate of completion of high school or equivalent, who have been approved in the UFV entrance examination, or bearers of a higher education diploma.

1.2. – “*Stricto sensu*” (Master’s and Doctorate degree) and “*Lato sensu*” (Specialization/MBA)

**GRADUATE PROGRAMS:** programs and courses designed to candidates with college degree that meet the conditions prescribed for each case.

##### 2. Special Courses:

2.1. **EXTENSION COURSES:** courses which are open to any applicant, although not at higher education level, aiming to spread knowledge and work techniques.

2.2. **SEQUENTIAL COURSES:** open to candidates who have graduated from high school or equivalent course and meet the requirements of the institution. These courses can be in-classroom, semi-in-classroom or distance based.

GENERAL RULES FOR *STRICTO SENSU* GRADUATE PROGRAMS

## OBJECTIVES

Art. 1 – The *Stricto Sensu* Graduate Programs offered by the Universidade Federal de Viçosa are intended to provide broad and deep scientific and cultural background to students, through the development of research and innovation ability, in different branches of knowledge.

*STRICTO SENSU* GRADUATE PROGRAMS

Art. 2 – The *Stricto Sensu* Graduate Programs comprise two levels of training, Master's and Doctoral degrees, which will confer the titles of *Magister Scientiae* (M.Sc.) and *Doctor Scientiae* (D.Sc), respectively.

## CHAPTER I

## GENERAL ORGANIZATION

Art. 3 - The minimum duration of the Master's and Doctoral Programs is one (1) and two (2) years and maximum of three (3) and 5 (five) years, respectively, counted from the date of admission.

Art. 4 - In addition to other requirements, students must take courses in the area of concentration (core group of courses defined by each Program) or in other knowledge fields that are related to the Program. The related fields are defined by each Program.

§ 1 – Courses of the area of concentration are those that characterize the field of study of the program, while disciplines of the related field are those that do not belong to this field, but are considered desirable or necessary to complete the training of students.

§ 2 - The disciplines in the area of concentration should total at least 50% (fifty percent) of the number of credits required.

...

## CHAPTER II

## TECHNICAL BOARD OF GRADUATE PROGRAMS

Art. 6 - The Council of Graduate Programs is in charge of the general teaching coordination of the Graduate Programs.

...

Art. 9 - The Council of Graduate Programs is in charge of the following activities:

a) preparation of the general schedule of the activities of the graduate programs, which will be submitted to approval by the Board of Teaching, Research and Extension;



- b) elaboration of the Statute of Graduate Programs for approval by the Board of Teaching, Research and Extension, and edition of supplementary instructions;
- c) establishment of the minimum requirements of the Graduate Programs, after the general standards established by law are met;
- d) approval of the areas of concentration of Graduate Programs and the requirements for each of them;
- e) accreditation of professionals who will work in the Graduate Programs;
- f) approval of the names of candidates for graduate titles;
- g) approval of the admission of students indicated by the respective coordinators of Graduate Programs;
- h) approval of the number of vacancies for Graduate Programs;
- i) promote the development of graduate activities;
- j) make adjustments, agreements or arrangements, either academic or financial, for the support, cooperation and development of Graduate Programs;
- k) evaluation of the operation and performance of Graduate Programs; and
- l) performance of actions attributed to an informative and consultative organ of the Board of Teaching, Research and Extension, for graduate studies.

### CHAPTER III

#### CREATION OF THE PROGRAMS

...

### CHAPTER IV

#### COORDINATION OF THE PROGRAMS

Art. 13 - The teaching and scientific coordination of each Graduate Program, under the administration of the respective departments, will be exercised by a Coordinating Committee consisting of:

- a) one (1) coordinator, as its chairman, appointed by the head of the department and appointed by the President of the University, whose name is included in a triple list organized by his/her peers;
- b) three (3) professors elected by their peers; and
- c) one (1) representative of the students in the Program, elected by his/her peers, and respective alternate.

...

Art. 19 - The Coordinating Committee is responsible for:

- a) defining the disciplines of the area of concentration and related field, and establishing if they will be mandatory or optional (electives), which will be approved by competent authorities;
- b) establishing specific requirements of the Program and submitting them to the Council of Graduate Programs;
- c) appointing professors to the position of advisors of the Program;

- d) organizing instructions, standards, plans or projects related to the Program and submitting them to the analysis of competent bodies;
- e) proposing to the competent departments the creation of the disciplines required for the Program;
- f) opining about the analytical program of the disciplines of the area of concentration or mandatory, suggesting modifications, when necessary, to achieve the objectives of the Program;
- g) selecting qualified candidates for admission into the program;
- h) establishing standards for the operation of Seminars;
- i) proposing or opining about the exclusion of students from the Program due to academic or disciplinary reasons;
- j) nominating candidates for scholarship granting;
- l) assessing or proposing agreements or cooperative arrangements, either academic or financial, for the support or development of the Program;
- m) receiving, assessing, resolving or referring, as appropriate, suggestions, complaints, representations or resources, from students or professors, related to any scientific-educational issue involving the Program; and
- n) taking the appropriate actions attributed to an information and consulting organ related to the Technical Board of Graduate Studies.

Art. 20 - Coordinators have the following specific duties:

...

## CHAPTER V

### ADMISSION TO THE PROGRAMS

Art. 21 - Candidates who have graduated from a higher education institution may be admitted at Graduate Programs, since their curricula contain disciplines relevant to the intended Program.

§ 1 - In the case of undergraduate curricula without sufficient basis for the program claimed, students should take disciplines offered at undergraduate level, at the discretion of the Coordinator of the Program.

§ 2 - Candidates that have been disconnected from any Graduate Program of the Universidade Federal de Viçosa, due to low academic performance, abandonment or lapse of time cannot be admitted to the same level of graduate program, for the periods of 2 (two) or 4 (four) years for master's and doctoral degrees, respectively.

§ 3 - Candidates who have been disconnected from any Graduate Program of the Universidade Federal de Viçosa due to disciplinary reasons cannot be admitted to the Graduate Program.

§ 4 - The Registrar's Office is in charge of ensuring compliance with the restrictions set out in paragraphs 2 and 3, by means of their records of students disconnected from graduate programs of the Universidade Federal de Viçosa.

22 - A Master's degree will be required for admission in the doctoral program.

§ - Sole paragraph - On a reasoned proposal by the Coordinating Committee, the Council of Graduate Studies may waive this requirement.

Art. 23 – Candidates must present the following documents for application:

- a) Enrollment form (two copies);
- b) a certified copy of the certificate or statement of completion of undergraduate degree (for doctoral program, the certificate of conclusion of the master's degree program is also required);
- c) a certified copy of the academic transcript of the undergraduate program explaining the evaluation system (the academic transcript of the master's degree program is also required for doctoral degree);
- d) Curriculum vitae, one copy (with proof);
- e) One 3 x 4 photograph;
- f) Copy of Certificate of Birth or Marriage;
- g) Copy of the ID card;
- h) Copy of the proof of military service; (Brazilian citizens)
- i) Copy of Voter Registration; (Brazilian citizens)
- j) Copy of the CPF;
- k) three letters of reference, at the discretion of the Program; and
- l) proof of payment of enrollment fee, which shall be stipulated by the Universidade Federal de Viçosa.

§ - Sole paragraph - If applicants have only the certificate of course completion, upon enrollment, they will be obliged to present certified copy of their diploma to the Registrar's Office.

Art. 24 - The date of submission of application for enrollment shall be divulged in the Academic Calendar of the Universidade Federal de Viçosa.

Art. 25 - Besides the analysis of the documents required in the application process, the Coordinating Committees may adopt other criteria they deem appropriate for the selection of candidates.

Art. 26 - The selection will be valid only for enrollment in the school year for which it was approved or the subsequent period, after consultation with the Program Coordination.

27 - The coordinators will inform the candidates of the result of the selection.

## CHAPTER VI

### ENROLLMENT

Art. 28 - Every semester, on the date fixed by the School Calendar, all students must apply for renewal of enrollment.

...

Art. 30 - Failure to renew enrollment in due season will mean abandonment of the Program and automatic disconnection, if, on the date specified in the academic calendar, students do not require from the School Board of Enrollment a special leave, which will be valid for the respective semester and granted one (1) time.

Art. 31 - When authorized to conduct activities outside the institution, students are dismissed from enrollment renewal while their period of leave lasts.

Art. 32 - Students may request cancellation of enrollment in one or more disciplines, if their advisors agree.

§ - Cancellation of enrollment will only be granted once for each discipline.

...

## CHAPTER VII

### TEACHING REGIME

Art. 34 - Regular teaching will be organized in the form of courses, with lectures, seminars, directed studies, practical classes and other teaching methods.

§ Sole paragraph - The disciplines will be classified into three levels, codes 600, 700 and 800, according to the content and focus of their respective analytical programs (syllabus).

Art. 35 - Seminars, Special Problems, Special Topics, Research and Internship in Teaching will be encoded as 700-level disciplines.

§ - Sole paragraph- Seminars should be specific to each program.

Art. 36 – Credit is the basic unit for assessing the intensity and duration of disciplines. 1 (one) credit is equivalent to fifteen (15) hours of lecture or thirty (30) hours of practical classes.

Art. 37 – Academic performance examination will be carried out through practical work, oral tests, written tests and final exam, at the discretion of professors. Specifically for the discipline Teaching Internship, performance will be evaluated by the coordinator of the discipline and the professors that tutored students in the execution of the planned activities.

Art. 38 - The system used for assessing disciplines will be concept-grade expressed by a letter, according to the following equivalence of relative performance:

CONCEPT-GRADE SYMBOLS	PERFORMANCE PERCENTAGE
-----------------------	------------------------

Excellente A	from 90% to 100%
--------------	------------------

Good B	From 75% to 89%
--------	-----------------

Fair C	From 60% to 74%
--------	-----------------

Failure R	Below 60%
-----------	-----------

Incomplete I	
--------------	--

Cancellation of enrollment in Discipline J	
--	--

Cancellation of Enrollment K	
------------------------------	--

Satisfactory S	
----------------	--

Non-Satisfactory N	
--------------------	--

Ongoing Q	
-----------	--

§ 1 - In the disciplines Special Problems and Internship in Teaching, students may use the maximum of three (3) credits at each level to complete their study plan.

§ 2 - The Analytical Programs of Special Problems and Special Topics and a list with the names of the students approved to attend these disciplines should be forwarded to the Board of School Registration, which will create a class for each specific analytical program, in the same school term.

§ 3 - The discipline Seminar will grant, in each level, 1 (one) or 2 (two) credits, which will not be counted in the performance coefficient, but may be considered to complete the minimum credits required by the program at the discretion of the Coordinating Committee.

§ 4 - The provisional concept I (incomplete) will be attributed to students that discontinue, force majeure, part of their their academic work, and have obtained a performance proportionally sufficient for approval in the evaluations applied. Proof of the hindrances should be given to the professors of the disciplines attended. The concept I (incomplete) will be transformed into R (failure) if the works are not completed and a new concept is not assigned and sent to the Registrar's Office, before the deadline set by the School Calendar.

§ 5 - The concept J (cancellation of enrollment in discipline) refers to the effective cancellation of enrollment.

§ 6 - The concept K (suspension of enrollment) refers to the effective suspension of enrollment.

Article 39 - The requirements that do not give credit or are not counted in the credits provided for in Art. 83 or Art. 84 of this regiment will be evaluated by the following concepts:

Q - Ongoing;

S - Satisfactory; and

N - Non-Satisfactory.

Art. 40 - At the end of each term, the performance coefficient is calculated, based on the sum of the number of credits in each discipline, which will be multiplied by 3, 2, 1 and 0, assigned to the concepts A, B, C and R, respectively, and divided by the total number of credits of the respective disciplines.

§ 1 - To calculate the accumulated performance coefficient, the value will be represented with a decimal point, which will be rounded to the next higher figure if the second decimal point is greater than or equal to 5 (five).

§ 2 - The performance coefficient is achieved by dividing the sum of the points obtained by the sum of credits of the disciplines taken in each term, which have received concepts A, B, C or R.

§ 3 - The accumulated performance coefficient is obtained for all terms students were enrolled.

Art. 41 - Students that obtain concept R in a discipline should attend it again. The last concept obtained should be the final result, with the exception of the disciplines Special Problems and Special Topics.

Art. 42 - The disciplines whose concepts are R, I, J or K shall not be used in the counting of the credits required in the program.

Art. 43 - The title will only be awarded to students who met the other requirements and were approved in all disciplines listed in their academic transcript, excepting the disciplines Special Problems and Special Topics.

Art. 44 - For all purposes under this Statute, students that do not achieve frequency of at least 75% in the teaching activities scheduled will fail.

Art. 45 - Students that fall into one or more of the conditions specified below will be disconnected from the program, except if they are enrolled in disciplines which are not included in the calculation of the performance coefficient:

- a) obtaining, in their first term, performance coefficient below 1.3 (one and three tenths);
- b) obtaining, in their second term, accumulated performance less than 1.7 (one and seven tenths);
- c) obtaining, in their second term, accumulated performance coefficient less than 2.0 (two), having completed the minimum number of credits required by the program;
- d) obtaining, in their third term and in the subsequent terms, an accumulated performance coefficient of less than 2.0 (two);
- e) obtaining grade R (failure) in any discipline for the second time, either in undergraduate or graduate program, except in the case of specific disciplines, to meet the requirements of foreign language;
- f) obtaining two concept-grades N (Non-Satisfactory), either consecutive or not, in Research; and
- g) failing to complete all requirements of the program within the prescribed period.

§ - Sole paragraph - The concept "R" will be counted in the calculation of the performance coefficient, while another concept is not attributed to the discipline taken twice.

## CHAPTER VIII

### ADVICE TO STUDENTS

Art. 46 - The didactic orientation to students will be exercised by advisors or, alternatively, by co-advisors.

§ - Sole paragraph - Advisors will be appointed by the Coordinating Committee, subject to the provisions of the Internal Statute of the program.

Art. 47 - Research for writing dissertation or thesis will be supervised individually by an advisor or, optionally, by an Advisory Committee formed by an advisor and co-advisor(s).

Art. 48 – Advisors are specifically in charge of:

- a) organizing students' study plan;
- b) proposing the names of co-advisors who will take part in the Advisory Committee;
- c) conducting research, object of the dissertation or thesis of students, and assigning the concept obtained in assessments;
- d) promoting regular meetings with the participation of students and the Advisory Committee;
- e) approving the application for renewal of enrollment as well as requests for replacement, cancellation and enrollment for disciplines and suspension of enrollment;
- f) assisting students in issues related to current academic standards and processes;
- g) chairing the Board of Defense of Dissertation or Thesis or the Board of the Qualification Examination.

Art. 49 - The average number of students under orientation of a professor cannot exceed (6), for each Graduate Program.

## CHAPTER IX

### STUDY PLAN

Art. 50 - The Study Plan will necessarily contain the courses of the area of concentration and related field, as well as seminars, foreign language and area of research for the dissertation or thesis.

§ 1 - The courses attended out of the Universidade Federal de Viçosa will be classified as belonging to the area of concentration, related field or out of the program, at the discretion of the Coordinating Committee of the Program.

§ 2 - Enrollment in the course "Internship in Teaching" can only be made by students enrolled in the Graduate Program of the Universidade Federal de Viçosa, subject to availability of vacancy, to be defined by the respective department, and consent from students' advisors and the coordinator of the discipline

Art. 51 - After being approved by advisors and students, the Study Plan will be analyzed by the Coordinator of the Program and the Chairman of the Council of Graduate Studies, by the end of the first term attended by students at the University.

§ 1 - Without an approved Study Plan, students cannot be enrolled in the second term.

§ 2 - The Study Plan may be changed by suggestion from advisors.

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## CHAPTER X

### FOREIGN LANGUAGE REQUIREMENT

Art. 53 - Students will have three alternatives to meet the foreign language requirement:

- a) approval in a foreign language proficiency examination applied by the Department of Languages or the Coordination of Graduate Program;
- b) approval in disciplines recognized by the Technical Board of Graduate Studies as sufficient; and
- c) approval in standardized foreign language examinations.

Art. 54 - The proficiency examinations, prepared by the Department of Languages, will be applied on dates mutually agreed with the School Calendar.

Art. 55 - The concept "N" obtained in a foreign language discipline will be automatically replaced by the concept "S" when students are successful in a foreign language proficiency examination.

## CHAPTER XI

### USE OF CREDITS

Art. 56 - credits of course taken at the Universidade Federal de Viçosa may be used, provided that they are consistent with the content of the program in which students are enrolled.

§ - Sole paragraph - Credits obtained in disciplines specific to the *Lato Sensu* program cannot be used.

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## CHAPTER XII

### TRANSFER OF CREDITS OBTAINED OUTSIDE THE UFV

Art. 62 - The Universidade Federal de Viçosa may accept the transfer of credits obtained at other education institutions, for disciplines consistent with the Program to which students are bound, up to 50% (fifty percent) of the number required in Art. 83 or 84 of this Statute.

§ 1 - Only disciplines with concept A and B can be transferred.

§ 2 - Credits obtained in disciplines specific to Lato Sensu Programs cannot be transferred.

§ 3 - Credits obtained in disciplines taken at double level condition, as undergraduate students, cannot be transferred.

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Art. 65 – Credit transfer must be recommended by the Coordinating Committee of the Program and approved by the Council of Graduate Studies.

## CHAPTER XIII

### QUALIFYING EXAM

Art. 67 - Every candidate for the title of *Doctor Scientiae* should undergo a qualifying examination.

§ - The qualifying examination aims to assess whether students have the scientific and cultural training expected for a contender for the title of *Doctor Scientiae*.

Art. 68 - Only students who have obtained all credits demanded in their study plan can take the qualifying examination.

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Art. 70 - The Examination Board shall be composed of five (5) members who hold Doctoral degree.

Sole Paragraph - The Board shall have five (5) full members and two (2) alternates.

Art. 72 - The qualifying examination will consist of two stages, one written and another oral, and will address areas of knowledge relevant to students' training.

Art. 73 – Students who obtain the unanimous positive indication from the members of the Examining Board shall be considered approved.

74 - The test results should be reported to the Dean of Research and Graduate Studies, in proper form, within ten (10) days after its completion.

Art. 75 – Students who failed the qualifying examination will be given another chance, after a maximum of six (6) months from the date of realization.

## CHAPTER XIV

### THE RESEARCH PROJECT

Art. 76 - Every graduate student should prepare a compulsory research project for the development of their dissertation or thesis.



Art. 77 - The research project shall be prepared under the supervision of the Advisory Committee, approved by the head of the department and the director of the Center for Sciences and registered in the office of the Dean of Research and Graduate Studies.

Art. 78 - The research projects of students applying for the title of *Magister Scientiae* or *Doctor Scientiae* will be delivered mandatorily for registration in the office of the Dean of Research and Graduate studies up to the last day of the disclosure of the concepts for the third and fifth terms, established in the School Calendar, respectively.

§ 1 - All students applying to the titles of *Magister Scientiae* or *Doctor Scientiae* will be required to enroll in the discipline Research, after the payment of due fees, in the second and fourth renewal of enrollment, respectively.

§ 2 - If students fail to meet the deadlines established in the caput of this article, they will be given concept 'N' in Research.

## CHAPTER XV

### DISSERTATION OR THESIS

Art. 79 - All graduate students who are candidates for the title of *Magister Scientiae* or *Doctor Scientiae* shall prepare and defend a dissertation or thesis, respectively, and be approved in it.

§ 1 - The dissertation or thesis may be written in English, Portuguese or Spanish, at the discretion of the Advisory Committee.

§ 2 - Candidates, the Advisory Committee and the Examining Board are in charge of the formatting, language and content of the dissertation or thesis.

§ 3 - The dissertation or thesis, under the supervision of the Advisory Committee, should be based on original research work that really contributes to scientific knowledge on the subject.

§ 4 - The results of the research carried out for obtaining the Master's degree or Doctoral degree are subject to current laws, rules or resolutions related to intellectual property of the Universidade Federal de Viçosa.

Art. 80 - The dissertation or thesis will be defended before a board formed by holders of doctoral degree, under the chairmanship of the respective advisors.

§ 1 - The dissertation board will include at least 3 (three) full members and 2 (two) alternates.

§ 2 - The Board of thesis will be appointed with at least five (5) members and two (2) alternates.

§ 3 - The members of the Board, proposed by the Advisory Committee and indicated by the Coordinator of the Program, will be appointed by the President of the Technical Board of Graduate Studies.

§ 4 - At least 1 (one) of the full members of the dissertation board should not belong to the Program or to students' Advisory Committee.

§ 5 - At least 1 (one) of the full members of the thesis board should not belong to the Program and 1 (one) member should not belong to the Universidade Federal de Viçosa, and none of these two should belong to the Advisory Committee of the respective student.

§ 6 – After the designation of the board of thesis or dissertation defense, a minimum period of 10 (ten) days shall be observed for the defense. Advisors should set the date, time and place of the defense and inform the members of the board and students.

§ 7 - The defense of the dissertation or thesis should also include assessment of the knowledge acquired by the applicant during the development of the program.

§ 8 - Candidates receiving the unanimous indication from the members of the board will be approved.

§ 9 – Candidates disapproved can be submitted to another defense, at the discretion of the Examining Board.

§ 10 - The result of the defense should be reported to the Dean of Research and Graduate Studies, in proper form, within 10 (ten) days after its completion.

§ 11 – If advisors are unable to attend, by force majeure, the Coordinating Committee of the Program will indicate one of the members of the Examining Board to preside, as alternate, with knowledge of advisors.

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## CHAPTER XVI

### ACADEMIC TITLE

Art. 83 - The title of *Magister Scientiae* will be granted to students that:

- a) complete at least 24 (twenty-four) credits in disciplines of the Graduate Program to which they are bound, in accordance with the provisions of this Statute, with an accumulated performance coefficient equal to or higher than 2 (two);
- b) meet the foreign language requirements;
- c) meet the requirements of the discipline Seminar; and
- d) submit the text of their duly approved dissertation and copies of its final version to the Dean of Research and Graduate Studies.

Art. 84 - The title of *Doctor Scientiae* will be granted to students that:

- a) complete at least 24 (twenty-four) credits, if they have a title of *Master's* or *Magister Scientiae*, or 48 (forty-eight) credits, if they have only a bachelor's degree in disciplines of the Graduate Program to which they are bound, according to the provisions of this Statute, with accumulated performance coefficients equal to or higher than 2 (two);
- b) meet the foreign language requirements;
- c) meet the requirements of the discipline Seminar; and
- d) submit the text of the duly approved thesis and copies of its final version to the Dean of Research and Graduate Studies.

Art. 85 - The Technical Board of Graduate Studies or the Coordinating Commission may establish other requirements for the Program, besides those already specified.

## CHAPTER XVII

### THE ISSUANCE OF A CERTIFICATE OF SPECIALIZATION FOR MASTER'S DEGREE STUDENTS

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## CHAPTER XVIII

## CO-TUTELAGE AND GRADUATE DUAL PROGRAMS IN PARTNERSHIP WITH FOREIGN INSTITUTIONS OF HIGHER EDUCATION

Art. 90 - Co-tutelage is understood as academic cooperation in *stricto sensu* graduate studies agreed between the UFV and foreign institutions, in which students in training receive shared guidance of faculty members of the institutions involved.

§ 1 Definitions: a) dual/joint title - two or more degrees conferred by two or more institutions for the same study program developed separately and implemented in each of the participating institutions; b) joint degree - degree jointly awarded by institutions or degree conferred by each institution participating of a program developed and recognized by the institutions concerned.

§ 2 For each thesis and/or dissertation developed in co-tutelage, a specific agreement should be signed between UFV and the foreign institution. This agreement must be approved by the Technical Board of Graduate Studies.

§ 3 - The agreement for co-tutelage will be signed between the higher courts of the institutions, with agreement of the coordinators of the graduate programs involved.

§ 4 - International graduate dual programs, in association with foreign institutions recognized by CAPES, are considered as co-tutelage.

Art. 91 - Students developing thesis and/or dissertation under co-tutelage agreement will graduate from the partner institutions.

§ 1 - The board of examiners of the defense of thesis/dissertation must have at least one representative from each institution.

§ 2 - The session for defense of thesis/dissertation will not require the presence of the assessors and students in the same location. Technological resources can be used to communicate in real time.

§ 3 - Theses/dissertations can be written and defended in the languages mentioned in Art. 79, § 10, as defined in the agreement of co-tutelage.

Art. 92 - The protection of the theme of the thesis/dissertation, as well as publication, exploitation and protection of research results which are common to both institutions should be ensured in accordance with the provisions of the cooperation agreement signed between the parties and specific legislation of each country involved in the co-tutelage agreement.

Art. 93 - Applicants must comply with all requirements of the agreement between the institutions to obtain the title in co-tutelage.

## CHAPTER XIX

## OFFSHORE GRADUATE STUDIES

Article 94 - The UFV will offer graduate programs abroad to other institutions through agreements. The degree conferred to these programs, either master's or doctoral degree, will be in offshore degree mode.

§ 1 - The offshore degree mode will be held in co-tutelage. In this case, the provisions of Chapter XVIII are applied.

## TITLE III

## NON-BOUND STUDENTS

Art. 95 - The Universidade Federal de Viçosa may accept non-bound students who are interested in improving their knowledge without pursuing, however, a graduate title.

Art. 96 - Applicants must submit the following documents upon enrollment:

- a) due enrollment form (two copies);
- b) a certified copy of the diploma or statement of completion of undergraduate degree;
- c) a certified copy of the academic transcript of the undergraduate program, declaring the evaluation system adopted;
- d) a 3 x 4 photo;
- e) Copy of Birth or Marriage Certificate;
- f) copy of Identification Card;
- g) copy of proof of Military Service;
- h) copy of Voter Registration Card; and
- i) copy of CPF.

§ - Candidates must specify the disciplines they want to attend, in the application form.

Art. 97 - The application period will close thirty (30) days prior to the offer of the discipline (s) and must be approved by the coordinator of each discipline and the head of each department that offers these disciplines.

§ 1 - The application shall be made in each department that offer disciplines and shall meet the criteria established above.

§ 2 - Non-bound students may enroll in up to 3 (three) disciplines per regular term, in the maximum of two (2) terms.

Art. 98 - Admission of non-bound students will be valid for one semester.

§ 1 - The enrollment fee will correspond to the value of the enrollment of students who are starting the Graduate Program, according to the rates set by the Universidade Federal de Viçosa.

§ 2 - The granting of new enrollment as non-bound student will be conditional on the approval in discipline (s) previously attended

Art. 99 - Non-bound students may request cancellation of enrollment in disciplines, respecting the dates specified in the academic calendar.

## TITLE IV

## STUDENTS ENROLLED IN OTHER INSTITUTIONS (BOUND STUDENTS)

Art. 100 - The Universidade Federal de Viçosa may accept graduate students regularly enrolled in stricto sensu Graduate Programs from other Higher Education Institutions who wish to take disciplines of the UFV stricto sensu Graduate Programs.

Art. 101 - Upon enrollment, applicants must submit to the Dean of Research and Graduate Studies the following documents:

- a) certified copy of the academic transcript of the Graduate Program in which they are enrolled;
- b) request for enrolling in the discipline (s) they wish to attend;
- c) request from the institution they are bound to.

Art. 102 - The period for application will terminate thirty (30) days before the start of the classes of the discipline(s) required. The application for enrollment must be analyzed and approved by the Coordination of the respective Graduate Program of the Universidade Federal de Viçosa and by the coordinator of each discipline and the head of each department that offers these disciplines.

§ - Sole paragraph - Bound students may attend a maximum of twelve (12) credits.

Art. 103 - Admission of bound students will be valid for one semester.

§ 1 - The enrollment fee will be equivalent to the rate for renewal of enrollment in Graduate Programs, as established by the Universidade Federal de Viçosa.

§ 2 - The granting of new enrollment as bound student will be conditioned to approval (s) in the discipline (s) previously taken.

Art. 104 - Bound students may request cancellation of enrollment in one or more disciplines, within the dates specified in the academic calendar.

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## TITLE VI

### ACCREDITATION OF PROFESSORS AND RESEARCHERS

Art. 107 – UFV higher education professors holding a doctorate degree will be accredited for the exercise of graduate activities.

§ Sole paragraph – graduate activities are understood as teaching, research, co-advising and advising.

Art. 108 – The exercise of orientation activities in a graduate program will require the accreditation of faculty members specifically for the program.

§ 1 - The criteria for accreditation of professors as advisors will be established by the respective Coordinating Committee and approved at a regular meeting of the Technical Board of Graduate Studies.

§ 2 - The Coordinating Committee, considering the criteria in § 1, indicates the accreditation of the professors that request it to the Dean of Research and Graduate Studies.

§ 3 - At intervals of no more than 5 (five) years, professors will forward to the Coordinating Commission their request for re-accreditation as advisors in the program. Based on the criteria established in § 1, the Coordinating Committee shall decide whether the professors who require re-accreditation will be re-accredited or not by the Dean of Research and Graduate Studies.

§ 4 - If a professor is not re-accredited as advisor, he/she must complete his/her advisory work still in progress.

Art. 109 – High school teachers and technicians from the Universidade Federal de Viçosa who hold a doctoral degree may be accredited as co-advisors and advisors.

Art. 110 - The accreditation of researchers or faculty members from other institutions that hold doctoral degree should be carried to allow them to become co-advisors and advisors specifically of master's and doctorate students.

§ - The accreditation of professors/researchers outside the Universidade Federal de Viçosa will not imply employment of any nature by the University, nor entail any liability on its part.

Article 111 - The request for accreditation must be submitted in the form of process, to the Dean of Research and Graduate Studies, by the department to which the respective professor/technician belongs, after analysis by the Coordinating Commission of the Program, where the professor/technician will perform most activities. Requests from researchers or professors from other institutions will be submitted only by the Coordinating Committee of the Program.

§ - Sole Paragraph - The process should include reasoned justification, curriculum of the candidates, proof of the title achieved and authorization from their immediate boss, for researchers or professors from other institutions.

Article 112 - The chairman of the Technical Board of Graduate Studies is responsible for probating the process and authorizing the enrollment of advisor professors; and the Technical Board of Graduate Studies is responsible for approving the accreditation of professors who do not teach in higher education programs and technicians of the Universidade Federal de Viçosa, as well as professors and technicians from other institutions.

## TITLE VII

### FINAL PROVISIONS

Art. 113 - The Graduate Programs at the Universidade Federal de Viçosa shall be governed by the provisions of this regiment, without prejudice to specific provisions of the Statute, General Rules of the University and other standards, Acts and Resolutions established by the competent Governing Bodies.

Art. 114 - The provisions of this regiment for Postgraduate studies may be modified by the competent authorities, where necessary, even during the school year.

Art. 115 - Contrary provisions are therefore revoked, in particular, Resolution No. 1/2006-CEPE.

Art. 116 - These Rules shall enter into force on the date of their publication.

### SPECIAL SUMMER PERIOD

The Special Summer Period, which lasts for a minimum of 45 (forty-five) days, takes place in the months of January and February and offers disciplines at undergraduate and graduate levels. Enrollment is open to students admitted to regular graduate programs, non-bound students, or students enrolled in other higher education institution.

### COEFFICIENT OF PERFORMANCE

1. COEFFICIENT OF PERFORMANCE (CR) is achieved by dividing the sum of the points obtained during a term by the sum of credits of the disciplines in which students are enrolled. For example:

Calculation of the Coefficient of Performance    Disciplines    Credits    Concepts    Values  
Points

CTP 710 4 C 1 4

CTP 600 3 B 2 6

CTP 602 3 R 0 0

CTP 634 4 C 1 4

CTP 671 3 A 3 9

Sum 17 - - 23

Coefficient of Performance (CR)  $23:17 = 1,4$

2. ACCUMULATED COEFFICIENT OF PERFORMANCE is achieved by dividing the sum of all points already obtained, from the first regular period, by the sum of all credits in disciplines in which a student is effectively enrolled.

\* Rules altered by Resolutions 05/2007, 03/2008, 05/2008, 03/2009, 10/2010, 09/2011 and 08/2012 of the CEPE.

## **APPENDIX 4**

Letter from the Director (Coordinator) of Graduate Studies at UFV.





**UNIVERSIDADE FEDERAL DE VIÇOSA  
CENTRO DE CIÊNCIAS AGRÁRIAS  
DEPARTAMENTO DE FITOPATOLOGIA**

**Viçosa, August 01 2014**

Dear Prof. Lisa J. Vaillancourt:

I would like to inform you that the U.S. graduate students will take their tests and write their papers in English when taking the laboratory courses of Mycology, Bacteriology, Nematology and Virology regarding the Dual Degree Program to be celebrated between our Plant Pathology Program at Viçosa Federal University, Brazil, with the Plant Pathology Department at University of Kentucky.

Best Regards,

Prof. Fabrício de Ávila Rodrigues  
Graduate Coordinator of the Plant Pathology  
Program at Viçosa Federal University

**ADDITIONAL TERM OF AGREEMENT**

**STUDENT EXCHANGE BETWEEN  
FEDERAL UNIVERSITY OF VIÇOSA  
AND  
UNIVERSITY OF KENTUCKY**

**SELECTION OF PARTICIPANTS:**

The selection procedure by which reciprocal exchange candidates are nominated is the responsibility of the sending university. The candidates may be either undergraduate or graduate students. The number of students sent by each university, each year, will be up to ten, and reciprocity will be based on student credit hours.

Each institution reserves the right to require candidates to present the necessary documentation for selection and to provide the results of any required admission examinations.

Each institution reserves the right to accept or reject a candidate on the basis of regular academic selection criteria and to assign each student appropriate status at the time of admission. It is also understood that certain candidates may be rejected on account of shortage of faculty, lack of student places or other resources.

Selection of students shall be without regard to race, sex, color, religion, sexual orientation, marital status, national origin, age, or beliefs.

The acceptance of exchanges is conditional on the obtaining the necessary immigration and travel clearance. The receiving university will endeavor to assist students in obtaining the proper documents.

At least three months prior to the planned arrival of students, each university will send to the other full information on the students nominated to fill the allocated places.

**TERMO ADITIVO AO CONVÊNIO**

**INTERCÂMBIO DE ESTUDANTES ENTRE  
A UNIVERSIDADE FEDERAL DE VIÇOSA  
E A  
UNIVERSIDADE DE KENTUCKY**

**SELEÇÃO DOS PARTICIPANTES:**

O processo de seleção pelo qual os candidatos ao intercâmbio deverão passar, será de responsabilidade da instituição que está enviando. Os candidatos poderão estar cursando graduação ou pós-graduação. O número de alunos a ser enviado por cada universidade anualmente será de até dez, e a reciprocidade será com base no número de horas/créditos.

A cada instituição é reservado o direito de exigir aos candidatos documentação pertinente para a seleção, bem como os resultados obtidos nos testes de seleção,

Cada instituição tem o direito de aceitar ou rejeitar o candidato com base nos critérios normais de rendimento acadêmico, competindo-lhe atribuir ao estudante o status adequado no momento da admissão. Fica, ainda, esclarecido que alguns candidatos poderão não ser aceitos devido ao número reduzido de vagas, à falta de espaço ou de outros recursos.

A seleção de candidatos será sem distinção de raça, sexo, cor, religião, orientação sexual, estado civil, nacionalidade, idade ou crenças.

A aceitação dos candidatos estará condicionada pelas exigências relativas a vistos e autorizações de viagem de acordo com as leis de imigração. A universidade receptora deverá auxiliar os estudantes no processo de obtenção da documentação necessária.

Pelo menos três meses antes da chegada prevista dos estudantes, cada universidade enviará à outra informações completas sobre os estudantes selecionados para completar



## ACADEMIC PROGRAM

The University of Kentucky will enroll accepted Federal University of Viçosa exchanges as full-time special non-degree classification students for up to two regular semesters of the academic year, this is for a period of twelve months. Federal University of Viçosa students may enroll in regular University of Kentucky courses for which they have the appropriate prior study and which are adequate to the needs of the Federal University of Viçosa curriculum.

At the end of the academic semester, the University of Kentucky will send to the Federal University of Viçosa a report on the academic achievement of the exchange students. This report will take the form of an official transcript.

The Federal University of Viçosa will enroll accepted University of Kentucky exchanges as full-time special non-degree classification students for up to two regular semesters of the academic year, this is for twelve months. The University of Kentucky students may enroll in regular Viçosa courses for which they have the appropriate prior study and which are adequate to the needs of the University of Kentucky curriculum.

At the end of the academic semester, the Federal University of Viçosa will send to the University of Kentucky a report on the academic achievement of the exchange students. This report will take the form of an official transcript.

## STUDENT FINANCES

All students will pay tuition and fees to their home university.

as vagas oferecidas.

## PROGRAMA ACADEMICO

A Universidade de Kentucky irá matricular os estudantes do intercâmbio provenientes da Universidade Federal de Viçosa como estudantes em tempo integral, em caráter especial, não graduados, por até dois semestres letivos, ou seja, por um período de doze meses. Os estudantes da Universidade Federal de Viçosa poderão matricular-se em cursos da Universidade de Kentucky, em matérias para as quais tenham os necessários pré-requisitos e que sejam adequadas ao currículo da Universidade Federal de Viçosa.

No final do semestre acadêmico a Universidade de Kentucky enviará à Universidade Federal de Viçosa um relatório relativo ao aproveitamento acadêmico dos estudantes. Este relatório, terá o formato de um histórico escolar oficial.

A Universidade Federal de Viçosa irá matricular os estudantes do intercâmbio provenientes da Universidade de Kentucky na condição de estudantes em tempo integral, em caráter especial, não graduados, por um período de até dois semestres letivos, ou seja de doze meses. Os estudantes da Universidade de Kentucky poderão se matricular em cursos da Universidade Federal de Viçosa, em matérias para as quais tenham os necessários pré-requisitos e que sejam adequadas ao currículo da Universidade de Kentucky.

No final do semestre acadêmico a Universidade Federal de Viçosa enviará à Universidade de Kentucky um relatório relativo ao aproveitamento acadêmico dos estudantes. Este relatório, terá o formato de um histórico escolar oficial.

## TAXAS ESCOLARES

Todos os estudantes deverão pagar as taxas estudantis devidas às suas universidades de origem.



Room and meal costs, travel, health and accident insurance, books and supplies, and incidental expenses are the responsibility of the individual exchange students, except if the receiving university determines otherwise.

The receiving institution will reserve appropriate university housing for each exchange. Arrangements for other than university housing must be negotiated on an individual basis.

The receiving institution will provide to the students, in advance, a list of estimated living expenses. The exchanges will be entitled to the use of all host university facilities on the same basis as home students.

#### EXCEPTIONS AND AMENDMENTS

For conditions of the exchange not covered by this memorandum of agreement or for problems which may arise during the course of the exchange agreement, both parties agree to refrain from unilateral action and to consult and negotiate mutually agreeable decisions.

Amendments to the agreement may be made at any time by agreement of the parties through the exchange of documents. Such amendments shall be added in the form of appendices.

This agreement is initially for a five-year period, renewable at the end of this period by mutual agreement.

The balance of exchanges will be reviewed annually. As a result of this review, student numbers exchanged in subsequent years will be adjusted based on an expected balance in terms of student credit hours.

If the number of exchanges is not equal for both sides at the end of five years, the agreement will continue until a balance in the

Hospedagem, alimentação, seguro de saúde e de acidentes, livros e material escolar, bem como despesas não programadas são da responsabilidade do estudante, exceto, se a instituição receptora determinar o contrário.

A instituição receptora fará reserva de hospedagem adequada para os alunos do intercâmbio, em residências universitárias. Outro tipo de alojamento deverá ser negociado pelo próprio estudante.

A instituição receptora fornecerá de antemão aos estudantes, uma estimativa de custos. Os estudantes do intercâmbio poderão utilizar todas as instalações da universidade receptora da mesma forma que os estudantes locais.

#### EXCEÇÕES E OUTRAS CONSIDERAÇÕES

Para situações do intercâmbio não previstas neste acordo, ou problemas que possam surgir quando o programa estiver em curso, ambas as partes se comprometem a evitar ações unilaterais, e a consultar e negociar decisões de comum acordo.

Acréscimos ao acordo poderão ser feitos a qualquer momento desde que sejam de comum acordo entre as partes e expostos em documentos escritos. Estes acréscimos deverão ser acrescidos na forma de termo aditivo.

Este acordo terá inicialmente a duração de cinco anos, podendo vir a ser renovado, de comum acordo, no final deste período.

O balanço do intercâmbio será revisto anualmente. Em resultado desta revisão, o número de estudantes será ajustado nos anos subsequentes de forma a garantir um equilíbrio esperado em termos de número de horas/créditos.

Se o número de estudantes que participaram do intercâmbio não for o mesmo para ambas as partes no final de cinco anos, o acordo



number of students exchanged is reached.

continuará até que um equilíbrio em nú seja alcançado.

**University of Kentucky**

**Universidade Federal de Viçosa**

*Susan Carvalho*

*Nilda de Fatima*

**Susan Carvalho**  
**Associate Provost for International Programs**

**Prof. Nilda de Fatima Ferreira Soares**  
**Reitor**

Date 01/03/13

Date 03/01/13

*M. Scott Smith*

**M. Scott Smith**  
**Dean, College of Agriculture**

Date 01/03/13

*John Walz*

**John Walz**  
**Dean, College of Engineering**

Date 01/03/13



Processo nº. 008353/2001

Convênio nº. 002/2013

**ACADEMIC INTERCHANGE AGREEMENT  
BETWEEN  
UNIVERSITY OF KENTUCKY  
AND  
UNIVERSIDADE FEDERAL DE VIÇOSA**

The University of Kentucky and the Federal University of Viçosa, wishing to develop cooperative relations on the basis of established contacts and mutual understandings, especially to develop academic and cultural interchange through mutual assistance in the areas of teaching and research, agree as follows:

**FIRST CLAUSE**

**Area of Cooperation**

The area of cooperation includes, subject to mutual consent and appropriate conditions, any program offered at either University and proposed by either as desirable, feasible, and contributory to the fostering and development of the cooperative relationship between the two universities.

**SECOND CLAUSE**

**Methods**

All understandings and assistance shall be subject to availability of funds and the specific approval of the President of the University of Kentucky and the President of the Federal University of Viçosa, through such activities or programs as:

1. Exchange of faculty members and

**CONVENIO DE INTERCAMBIO J  
ACADEMICO ENTRE  
UNIVERSIDADE DE KENTUCKY  
E  
UNIVERSIDADE FEDERAL DE VIÇOSA**

A Universidade de Kentucky e a Universidade Federal de Viçosa, no intuito de desenvolver relações de cooperação com base no estabelecimento de contatos e entendimentos mútuos, enfatizando desenvolver intercâmbio acadêmico e cultural através de cooperação mútua nas áreas de ensino e pesquisa, acordam o seguinte:

**CLÁUSULA PRIMEIRA**

**Área de Cooperação**

A área de cooperação inclui, sob consentimento mútuo e existência de condições apropriadas, qualquer programa oferecido e proposto por qualquer das Universidades como desejável, executável, e contributivo ao fomento e desenvolvimento de relações de cooperação entre as duas Universidades.

**CLÁUSULA SEGUNDA**

**Métodos**

Todos os entendimentos e assistências estarão condicionados à disponibilidade de fundos e à aprovação específica dos Reitores da Universidade de Kentucky e da Universidade Federal de Viçosa, através de atividades e programas tais como:

1. Intercâmbio de membros do corpo



technical staff

2. Exchange of students
3. Conduct joint research activities
4. Participation in seminars and academic meetings
5. Special short-term academic programs
6. Cultural exchange activities
7. Joint participation in international training courses
8. Provide for undergraduate training with coursework at the University of Kentucky and the Federal University of Viçosa
9. Provide opportunities for staff development for both universities and other personnel development programs
10. Engage in consultancies
11. Other activities as deemed mutually appropriate.

The terms of such mutual assistance and necessary budget for each program and activity shall be mutually discussed and agreed upon in writing by both parties prior to the initiation of the particular activity or program. Each University will designate a Liaison Officer to develop specific activities or programs for the approval of the respective presidents.

### THIRD CLAUSE

decente e do quadro de técnicos de nível superior

2. Intercâmbio de estudantes
3. Elaboração de atividades conjuntas de pesquisa
4. Participação em seminários e encontros acadêmicos
5. Programas acadêmicos especiais de curta duração
6. Atividades de intercâmbio cultural
7. Participação conjunta em cursos internacionais de treinamento
8. Proporcionar treinamento em nível de graduação com cursos realizados na Universidade de Kentucky e na Universidade Federal de Viçosa
9. Proporcionar oportunidades para desenvolvimento do quadro funcional de ambas Universidades e de outros programas de aprimoramento de pessoal
10. Exercer consultorias
11. Outras atividades julgadas mutuamente apropriadas.

Os termos de tal assistência mútua e o orçamento necessário para cada programa e atividade devem ser mutuamente discutidos e postos em acordo escrito por ambas as partes antes do início de atividades ou programas particulares. Cada Universidade designará um coordenador responsável para desenvolver atividades específicas ou programas para aprovação dos respectivos reitores.

### CLÁUSULA TERCEIRA



**Effective Date & Length of Agreement**

This agreement will remain in force for a period of five years subject to the availability of funds, and any amendment and/or modification of this agreement requires a written approval of the President of the University of Kentucky and that of the President of the Federal University of Viçosa appended hereto. After the initial five-year period, this agreement may be renewed by mutual consent.

Either party reserves the right to terminate this agreement upon six (6) months written notice to the other. Any individual activities to be continued will be specifically identified and provided for at the time of termination.

Nothing contained herein or in the activities conducted hereunder shall constitute either party the agent, servant or employee of the other party. Each party shall be fully and solely responsible for its own actions and obligations.

This agreement shall take effect on the date indicated below and IN WITNESS HEREOF, the parties hereto have offered their signatures:



**Eli Capilouto**  
President

Date 01/03/2013

Examined for Form & Legality  
Office of Legal Counsel  
University of Kentucky

By:   
Attorney at Law

**Data de Início e Duração do Convênio**

Este convênio será válido por cinco anos, mediante a disponibilidade de recursos, e qualquer emenda e, ou, modificação do acordo requer aprovação escrita do Reitor da Universidade Kentucky e do Reitor da Universidade de Viçosa e deve ser anexada a este documento. Terminado o período inicial de cinco anos, O convênio pode ser renovado sob consentimento mútuo.

As partes reservam-se o direito de denunciar o convênio sob comunicação escrita com seis (6) meses de antecedência. Quando do término do convênio, a prorrogação de qualquer atividade individual será identificada e providenciada.

O conteúdo deste documento ou as atividades conduzidas sob o mesmo não devem constituir qualquer das partes em agente, servidor ou empregado da outra parte. Cada parte deve ser total e unicamente responsável por suas próprias ações e obrigações.

Este convênio entrará em vigor na data abaixo discriminada, e EM TESTEMUNHO DA VERDADE, as partes o consignam:



**Prof. Nilda de Fatima Ferreira Soares**  
Reitor

Data 03/01/2013





Senate Council  
January 12, 2015

Proposed Changes to 5.4.5.C.b.i (“Diplomas”, “In Memoriam Posthumous Degrees”)

### **5.4.5 DIPLOMAS**

Diplomas may be issued at a December or May Commencement Convocation. They may be issued by the University Registrar at other times when the degrees have been recommended by the University Senate and approved by the Board of Trustees.

#### **A. Diplomas Issued to Graduated Students [US: 2/13/2006]**

Pursuant to delegation from the Board of Trustees, the University Senate establishes final policy on the informational content to be included on diplomas (GR IV.C. 3). Diplomas attesting the award of degrees and honors may be issued at a December or May Commencement Convocation. They may be issued by the University Registrar at other times when the degrees have been recommended by the University Faculty through the elected faculty senators in University Senate and approved by the Board of Trustees (KRS 164.240; GR IV.A). [US: 2/14/11]

Diplomas shall display the name of the University, the name of the degree being conferred, the authority under which the indicated degree is being conferred, and signatures representing that authority (i.e., the University Senate being represented by the signature of the President who is Chair of the University Senate, and the Board of Trustees being represented by the signature of the Chair of the Board).

Each college dean shall attest to the Registrar the names of graduates in their college who have met the conditions for the “degree honors” prescribed above in SR 5.4.2.2.A-F. The Registrar shall ascertain the names of graduates who have met the conditions for Honors Program recognition (SR 5.4.2.2.G). The honors specified in SR 5.4.2.2.A-G shall be displayed on the diploma, along with the signatures of the attesting college dean and Registrar.

Upon the recommendation of the elected faculty Senators in the University Senate, the Board of Trustees may award, and prescribe conditions for, new categories of academic honors that are conferred only upon final Board action (pursuant to KRS 164.240 and GR IV.A).

- \* The elected University Faculty Senators control the qualifications that enable students prospectively graduating in a given semester to be included on the list received from the University Registrar, for the vote of the elected Faculty Senators, on whether to approve recommending those graduates to the Board of Trustees for conferral of a degree. The current requirements for eligibility of prospectively graduating students for inclusion on the list for conferral of a Ph.D. are that, by a stated deadline during that semester, the respective Director of Graduate Studies attests in writing to the Graduate School that: the graduate student (a) was not in a conditional status, (b) had no "I" and "S" grades in credit-bearing courses, (c) had passed the qualifying examination, (d) has a reasonable prospect for successful defense and submission of a dissertation for that semester's graduation, and (e) had met all other requirements of the individual's graduate program for the degree. [SREC: 8/2009]

#### **B. Diplomas Issued to Recipients of Honorary Degrees [US: 2/13/2006]**

Diplomas attesting to the award of an Honorary Degree shall include the name of the University, the date of the award of the degree and its title, that the authority under which the Honorary Degree is being conferred is that of the “Board of Trustees” and the “University Faculty”, and signatures representing that authority (i.e., the University Faculty being represented by the signature of the President who is Chair of

the University Senate, and the Board of Trustees being represented by the signature of the Chair of the Board).

**C. In Memoriam Posthumous Degrees [US: 2/10/2014]**

**1. Purpose.** Pursuant to Senate Rule 5.4.5.A, the University of Kentucky Senate seeks to provide to the families of deceased students who had not completed requirements for a degree with a meaningful acknowledgment of the achievements and legacy of the student and, at the same time, uphold academic and institutional integrity. To meet these goals, the University Senate recommends that the UK Board of Trustees establish a new category and title of Honorary Degree, *In Memoriam* Posthumous Degree (hereafter *In Memoriam* degree), to be conferred upon final action by the Board of Trustees.

**2. Conditions for Conferral of *In Memoriam* Posthumous Degrees**

a. **Eligibility.** An *In Memoriam* ~~Posthumous-D~~degree allows for recognition of a student's connection to the University of Kentucky regardless of their progress toward completion of degree requirements. Undergraduate, graduate, and professional students who were registered in a degree program at the time of their death, but did not complete degree requirements, are eligible for an *In Memoriam* ~~Posthumous-D~~degree.

b. **Procedures.** A proposal for conferral of an *In Memoriam* ~~Posthumous-D~~degree shall be initiated and processed as follows:

i. Upon being made aware of the deceased student by either the family or chair of the student's home department, the Dean's Office of the student's college shall consult with the student's degree program, ~~and~~ the Dean of Students Office, the Senate Council office, and the Office of the Registrar to review the student's academic and disciplinary record, to confirm that at the time of death:

1. The student was in a UK degree-seeking status, and

2. The student was in good academic standing.

ii. The Dean's office shall forward the request for an *In Memoriam* ~~Posthumous-D~~degree to the Office of the University Registrar, ~~and to the University Senate.~~ The University Registrar shall process the request and place the deceased student's name on an *In Memoriam* degree list for Senate action.

iii. ~~If approved~~In the likely event that, the elected Faculty Senators approve the recommendation of each *In Memoriam* degree along with other degrees, the Senate Council office shall forward the recommendation~~the request by the degree list process~~ to the University President for transmittal to the Board of Trustees for final action. ~~The elected Faculty Senators may vote to disapprove forwarding the recommendation.~~In the such rare eventcases that the elected Faculty Senators do not approve recommendation of the *In Memoriam* degree candidate, the elected Faculty Senators will provide, through the Senate Council, a written justification of the disapproval to the President (Chair of the Senate).

iv. Upon final approval by the Board of Trustees, the ~~Office of~~ University Registrar shall prepare an *In Memoriam* ~~Posthumous-D~~degree diploma for the student's family. The diploma document for this honorary degree title will be structured the same as for other honorary degrees (SR 5.4.5.B).

# University of Kentucky

# University of Louisville

*The Board of Trustees of the University of Kentucky and  
the Board of Trustees of the University of Louisville,  
upon the recommendation of the respective Faculty, and by virtue  
of the authority vested in them, have conferred on  
[Name]*

*who has completed the studies and who has fulfilled all requirements thereof, the degree of*

*Master of Business Administration  
Business Administration*

*and is entitled to all the rights and privileges pertaining to that degree.*

\_\_\_\_\_  
President

\_\_\_\_\_  
Dean

\_\_\_\_\_  
President

\_\_\_\_\_  
Dean

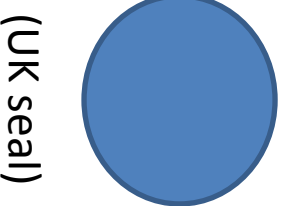
\_\_\_\_\_  
Chair

\_\_\_\_\_  
Registrar

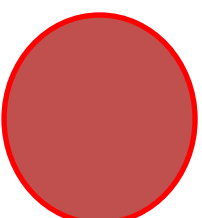
\_\_\_\_\_  
Chair

\_\_\_\_\_  
Registrar

Board of Trustees



(UK seal)



(UofL seal)

Board of Trustees



UNIVERSITY OF  
**KENTUCKY**<sup>®</sup>  
 Regulations

**Governing Regulation, Part X**

Responsible Office: Board of Trustees

Date Effective: ~~DRAFT6/11/2013~~

Supersedes Version: 6/11/2013  
~~6/14/2011~~

## Governing Regulation, Part X Regulations Affecting Employment

### Major Topics

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#### A. General

1. Merit as the Basis for Appointment
2. Employment of Relatives (Nepotism)
3. Intellectual Property
4. Representation and Attendance at Meetings
5. Retirement
6. Social Security
7. Group Insurance
8. Workers' Compensation
9. Employee Disability Program

#### B. Employment of Faculty

1. Appointment of Faculty
2. Conditions of Employment
3. Miscellaneous

#### C. Employment of Staff Employees

#### D. Opportunity for Hearing

#### E. Matters Affecting Faculty and Staff

### A. General

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#### 1. Merit as the Basis for Appointment

The University of Kentucky complies with the federal and state constitutions, and all applicable federal and state laws, regarding nondiscrimination. The University provides equal opportunities for qualified persons in all aspects of University employment. All appointments shall be made strictly

on the basis of merit. An applicant for a position shall not be discriminated against ~~because of on the basis of race, color, national origin, ethnic origin, religion, creed, age, physical or mental disability, veteran status, uniformed service, political belief, sex, sexual orientation, gender identity, gender expression, pregnancy, marital status, genetic information, social or economic status, or whether the person is a smoker or nonsmoker, as long as the person complies with University policy concerning smoking. (see also *Governing Regulation XIV.B.1, Nondiscrimination Policy*)~~sex, race, ethnic origin, national origin, sexual orientation, color, creed, religion, age, or political belief. Additionally, the University shall not discriminate against any applicant for employment because of Vietnam-era veteran status, disabled veteran status, or physical or mental disability in regard to any position for which the applicant for employment is qualified.

## 2. Employment of Relatives (Nepotism)

- a. Nepotism is generally inconsistent with the University's longstanding policy of making employment decisions based solely on unit needs and individual qualifications, skills, ability, and performance. Nepotism is generally prohibited within the University community. Nepotism means actions by a member of the University community that directly influence, benefit, or detriment the University employment (e.g., hiring, promotion, supervision, evaluation, and determination of salary) of any other University member who is a relative. Relative means a person's father, mother, brother, sister, husband, wife, son, daughter, aunt, uncle, son-in-law, daughter-in-law, and step-relatives in the same relationships. Employment includes regular and temporary full- and part-time employment, student employment and work-study, and graduate and other assistant programs.
- b. No member of the Board of Trustees, except those elected to the Board of Trustees as faculty or staff representatives, shall be employed by the University. (KRS 164.131(7)) No relative of a member of the Board of Trustees shall be employed by the University. (KRS 164.225)
- c. No relative of the President or any person reporting directly to the President shall be employed in a position in that person's administrative area, unless approval is granted by the Board of Trustees. Approval by the Board shall only be granted upon a determination that:
  - (1) The employment is in the best interest of the University;
  - (2) The Board has been informed of the selection process and all University regulations and policies regarding hiring and employment qualifications have been followed; and
  - (3) The Board has reviewed and approved a written management plan, including an agreement concerning supervisory and other management arrangements. The management plan shall ensure that employment decisions are made impartially and that neither employee is disadvantaged. The management plan shall ensure that the possibility of nepotism and the appearance of impropriety are eliminated and shall be consistent with *Human Resources Policy and Procedures 19.0, Nepotism*.
- d. In general, no relative of any employee of the University shall be employed in any position in the University over which the related employee exercises supervisory or line authority. In some cases, however, when it is in the best interest of the University, potential conflicts can be managed through prompt disclosure of the relationship and approval by the appropriate senior administrator. Senior administrator means the person reporting directly to the President and having supervisory authority for the area where the conflict or potential conflict exists. Approval by the Senior Administrator shall only be granted upon a determination that:
  - (1) The employment is in the best interest of the University;
  - (2) The Senior Administrator has been informed of the selection process and all University

regulations and policies regarding hiring and employment qualifications have been followed; and

- (3) The Senior Administrator has reviewed and approved a written management plan, including an agreement concerning supervisory and other management arrangements. The management plan shall ensure that employment decisions are made impartially and that neither employee is disadvantaged. The management plan shall ensure that the possibility of nepotism and the appearance of impropriety are eliminated and shall be consistent with *Human Resources Policy and Procedures 19.0, Nepotism*.

- e. The employment of relatives of University employees, as described in this paragraph, whose relationship was not a violation of this section of these *Governing Regulations* prior to its amendment on April 10, 1984, does not constitute a violation of the amended policy provided the relatives are regular employees of the University and remain in the University employment positions which they held on April 10, 1984. However, the transfer of any such employees described in this paragraph (whose employment relationship was not a violation of policy prior to its amendment on April 10, 1984) to any other regular University position shall require approval of the President.

### 3. Intellectual Property

As a general policy, all intellectual property conceived, first reduced to practice, written, or otherwise produced by faculty members, staff employees, or students of the University using University funds, facilities, or other resources shall be owned and controlled by the University. Any faculty member, staff employee, or student who produces such intellectual property using University funds, facilities, or other resources shall assign personal rights to the property to the University, or its designate, but shall have an interest in and a right to share in any financial returns from the commercialization of the property. Notwithstanding, it is a specific policy of the University that the traditional products of scholarly activity, such as journal articles, textbooks, reviews, monographs, works of art, sculpture, music, and course materials, shall be the unrestricted property of the author. The University shall exert no ownership claim of such works. A Standing Committee on Intellectual Property appointed by the President shall administer the policy and oversee implementation of the procedures, both as detailed in the *Administrative Regulations* on intellectual property (See AR 7:6 and AR 7:7).

### 4. Representation and Attendance at Meetings

In order that the University may be properly represented at the various gatherings or functions to which it is invited from time to time to participate, the President selects faculty members or staff employees to represent the institution.

In addition, employees are urged to become members and to participate in meetings of international, national, regional, and state and local organizations and associations related to their University employment.

Funds may be available to defray the expenses in whole or in part of those who are authorized to attend meetings by the President or other appropriate administrative officers.

### 5. Retirement

The University of Kentucky Retirement Plan represents a consolidation of the original Retirement Resolution (April 7, 1964) and its numerous subsequent amendments into a unified statement of University policy and guidelines on retirement of employees. The University of Kentucky Retirement Plan, which has been adopted by the Board of Trustees and may be amended only by that body, is presented in its entirety in the *Administrative Regulations* (See AR 3:1).

## 6. Social Security

All employees except those in Civil Service are covered by the Old-Age and Survivors Insurance of the National Social Security Program and are thus eligible for benefits in accordance with the governing legislation. Each eligible employee of the University must, if the employee has not previously done so, secure a Social Security card and supply to the Office of the Treasurer a completed Treasury Form W-4 with the employee's social security number and other information necessary for withholding appropriate contributions.

## 7. Group Insurance

Regular full-time faculty members and staff employees who are employed by the University are insured under the Basic Life Insurance Program. This insurance may be increased optionally in accordance with and up to the maximum amount contained in the University's contract with the insurer. The premium for the basic insurance is paid by the University, whereas that for the optional increase in insurance is paid by the employee.

In addition, all regular full-time faculty members and staff employees are encouraged to participate in the University's basic health and other insurance programs that also may include coverage for dependents.

## 8. Workers' Compensation

A University employee sustaining an on-the-job injury to developing a job-related illness is covered by provisions of the Kentucky Workers' Compensation Act.

## 9. Employee Disability Program

Regular full-time faculty members and staff employees, other than those covered by Civil Service or the Federal Employee Retirement System, are covered by the Long Term Disability Program. Coverage commences after the completion of one (1) year of employment unless the eligible employee, at the time of hire, satisfies the exception condition as outlined in the plan document in which case there is immediate coverage. This program provides income protection through a Long Term Disability Plan. Supplemental Long Term Disability coverage may be offered at the employee's expense.

# B. Employment of Faculty

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## 1. Appointment of Faculty

### a. Types of Faculty Appointments

Faculty appointments are with educational units and shall be of three basic types: (1) non-tenured appointments; (2) tenured appointments; and (3) post-retirement appointments.

(1) There are two types of non-tenured appointments.

(a) One type of non-tenured appointment is that in which a faculty member is ineligible for tenure as a consequence of having been appointed (1) in the lecturer, research, clinical, adjunct, visiting, or voluntary title series or (2) on a part-time or temporary basis in a title series. An appointment on a temporary basis involves an individual who has assigned duties and responsibilities that shall be completed within one (1) year or less.

(b) A second type of non-tenured appointment is that in which a faculty member is appointed

on a full-time, year-to-year basis in the regular, special, extension, or librarian title series. In such an appointment, the faculty member does not have tenure but may be considered for tenure if recommended for such by the appropriate University administrators.

- (2) A tenured appointment is one in which a faculty member is on full-time continuous appointment.

The term "joint appointment" shall apply in any case in which an individual holds two (2) or more intra-University faculty appointments. In such an instance, one of the appointments shall be designated as the primary appointment by the dean of the college if the individual's appointments are associated with educational units in the same college or by the Provost if the appointments are with educational units in different colleges. The constituent appointments relating to a joint appointment may be processed simultaneously or at different times; however, each appointment, reappointment or promotion, shall be processed independently and considered on its own merits. An individual's academic rank, though usually the same, may differ in the constituent appointments. The possibility of tenure applies only to the primary appointment. In case of termination of the non-primary appointment(s) leaving only the primary appointment for a full-time faculty member, the individual's assignment associated with the primary appointment shall become full-time. When an individual under consideration for appointment to an administrative position is also to be considered for a faculty appointment, recommendations of committees on the two respective appoints shall be developed independently on their respective merits, in accordance with the respective established appointment procedures.

- (3) Post-retirement appointments are of two (2) types.

- (a) One type is that in which retired faculty members may be appointed to perform duties for which fee schedules have been established and approved by the Provost.
- (b) A second type of post-retirement appointment may be used in a very limited number of cases, when it is essential to a University program or office or when it is otherwise impossible practicably to fill a position with a fully qualified person. Such a part-time or full-time appointment is restricted to former employees who have elected to retire, requires specific prior approval by the Board of Trustees, and is made for a period not to exceed one (1) year.

More detailed information on the various types of appointments is provided in the *Administrative Regulations* (See AR 2:1 and AR 3:1).

b. Probationary Periods

Probationary periods are applicable to non-tenured appointments of faculty members on a full-time year-to-year basis in the regular, special title, extension, or librarian title series. Such non-tenured appointments may be for one (1) year or for other stated periods, subject to renewal. The total non-tenure period, however, shall not exceed seven (7) years unless one of the following provisions applies: Human Resources Policy and Procedure 88.0 (Family Medical Leave); GR X.B.3(b) (Leave for Duration of an Election or Term of Office); GR X.B.2(d)(v) (Educational Leave); GR X.B.1(c) (Automatic Delay of Probationary Periods); or for other leaves of absence where the University, in granting the leave, and the individual, in accepting it, agree that time spent on the leave of absence shall not count as probationary period service. An individual initially appointed to the rank of full professor may be given non-tenure status for a period not to exceed one (1) year. An individual shall not remain at the rank of instructor in the University for more than three (3) years. If after that period, promotion to a higher rank cannot be justified, the individual's appointment with the University shall not be renewed.



Following appropriate probationary periods not exceeding in duration those described above, all persons of associate professor (or librarian II) or higher rank shall be given tenure or their appointments shall not be renewed; all persons of assistant professor rank (or librarian III) shall be promoted to associate professor (or librarian II) with tenure or their appointments shall not be renewed. Established appointment, promotion, and review procedures shall be followed in making these decisions.

Probationary periods (or maximum non-tenure periods) are not applicable in cases where faculty members are appointed (1) in the lecturer, research, clinical, adjunct, visiting, or voluntary series of academic ranks and titles, or (2) on a part-time or temporary basis. In all such appointments, faculty members are ineligible for tenure.

c. Delay of Probationary Periods

A probationary regular, special, extension, or librarian title series faculty member who becomes the parent of a child or children by birth, adoption, or guardianship, shall automatically be granted a one-year delay of the probationary period by the dean of the respective college. A faculty member who qualifies for this automatic delay of the probationary period shall submit to his or her department chair a signed and completed Faculty Tenure Delay Form (TDF) and supporting documentation, if required. A faculty member may waive the automatic delay only by completing the waiver section of the TDF. Upon receipt of the TDF, the chair shall prepare and submit to the dean and the Provost a revised Notice of Academic Appointment reflecting the change in probationary dates, along with the completed TDF and supporting documentation.

In addition, a probationary faculty member who assumes significant responsibilities for the care of a relative (see GR X.A.1) or domestic partner may request consideration of a one-year delay of probationary period based on extenuating circumstances. These extenuating circumstances for a delay related to significant care responsibilities must be clearly beyond those experienced by most probationary faculty. Documentation explaining the extenuating circumstance of the care-giving situation shall accompany the request. This request shall be routed through the normal administrative channels and will be considered for approval by the Provost.

This provision is available to all probationary non-tenured faculty upon their official start date and up until the anniversary of their official start date in the year in which their tenure review is scheduled to occur.

Notifications of all delays shall be made by the faculty member to his or her department chair as soon as possible after the qualifying event or circumstances (i.e., birth, adoption, guardianship, or assumption of significant care responsibilities), but in no case later than six (6) months from the time of the qualifying event or circumstances or no later than the last day of the fifth year of the probationary period; whichever comes first.

The delay shall not be granted more than two (2) times within the probationary period of a faculty member. The faculty member shall be reviewed for tenure under the same academic standards as a candidate who has not extended the probationary period and shall not be penalized or adversely affected by the delay of the probationary period. Further, extension years shall not be counted towards sabbatical. A delay of the probationary period in no way limits the right of the University to terminate a probationary appointment prior to the time of the mandatory review for promotion and tenure, should circumstances warrant such action.

d. Appointment Record

The precise terms and conditions, excepting salary, covering each appointment shall be stated in writing on an official appointment record. Notice of reappointment shall be in the possession of the

appropriate administrative officers and the appointee at least three (3) months before the renewed appointment begins, when possible, or at the earliest date feasible in view of budget considerations. It shall be the responsibility of the Provost to ensure compliance with this regulation.

e. Notification of Non-Renewal of Appointment: Non-Tenured Appointments

Part-time, visiting, or temporary faculty appointments have explicit one (1) year or less terminal dates that terminate at the expiration of the term without notice.

For those employed year-to-year on a fiscal or academic year basis, notification of non-renewal of appointment at the end of the first year of service shall be given not later than March 1 if the appointment expires at the end of that year or three (3) months in advance if the one-year appointment terminates during the academic year. Notification of non-renewal of appointment at the end of the second year of service shall be given no later than December 15 if the appointment expires at the end of the year or six (6) months in advance if the appointment expires during the year. Notification of non-renewal of appointment after more than two (2) years of service shall be given at least twelve (12) months before expiration of appointment. Non-renewal decisions concerning regular, full-time faculty members shall be reported to the Board of Trustees.

Any related appeal(s) to the Provost concerning procedural matters or privilege and/or to the University Senate Advisory Committee on Privilege and Tenure concerning procedural matters, privilege, or allegations of violation of academic freedom must be initiated in writing by the concerned faculty member within sixty (60) days after being notified in writing by the dean about non-renewal of appointment.

f. Termination of Appointment

(1) Reasons for Termination

Except in cases of financial emergency, the termination of a tenured appointment or the dismissal of a person prior to the expiration of a non-tenured appointment shall be, in accordance with KRS 164.230, only for reasons of incompetence, neglect of or refusal to perform duties, or for immoral conduct.

In a case of termination because of a financial emergency, the faculty member may have the issues reviewed by the University Senate Advisory Committee on Privilege and Tenure with the right of appeal to the President and the Board of Trustees for the University faculty member. The faculty member shall be given notice as soon as possible and never less than twelve (12) months notice. The released faculty member's position shall not be filled by a replacement within a period of two (2) years unless the released faculty member has been offered reappointment and given a reasonable time within which to accept or decline it.

(2) Procedure

Dismissal of a faculty member with tenure or of a non-tenured faculty member before the end of a specified term of appointment shall be preceded by discussions between the faculty member and the appropriate administrative officer or officers looking toward a mutual settlement. In the event of failure to agree upon settlement, the Provost shall be responsible for the preparation of a reasonably detailed statement of charges which shall be furnished to the faculty member and the University Senate Advisory Committee on Privilege and Tenure. The committee shall make an informal investigation for the purpose of attempting to affect a resolution and, in the case of failure, shall recommend to the President whether, in its opinion, dismissal proceedings should be undertaken. Its opinion shall not be binding upon the President.

If the President initiates dismissal proceedings, the concerned individual shall have the right to be heard initially by the University Senate Hearing Panel (Privilege and Tenure).

The faculty member shall be informed in writing by the President regarding specific charges at least twenty (20) days prior to the hearing. At least seven (7) days prior to the hearing, the faculty member shall answer the charges in writing. The faculty member may waive the hearing. If the faculty member waives the hearing but denies the charges or asserts that the charges do not support a finding of adequate cause, the Hearing Panel shall evaluate all available evidence and base its recommendation upon the evidence in the record.

The Hearing Panel, in consultation with the President and the faculty member, shall exercise its judgment as to whether the hearing shall be public or private. During the proceedings the faculty member shall be permitted to have an academic advisor and a counsel of personal choice. At the request of either party or the Hearing Panel, a representative of a responsible educational association shall be permitted to attend the proceedings as an observer. A full stenographic record of the hearing or hearings shall be taken and made available to the parties concerned. The burden of proof that adequate cause for dismissal shall rest with the institution and shall be satisfied only by clear and convincing evidence in the record considered as a whole. If the faculty member's competence is in question, the testimony should include that of qualified faculty members from this and/or other institutions of higher education.

Upon the conclusion of the hearing, the Hearing Panel shall report to the President that adequate cause for dismissal has or has not been established by the evidence in the record. It may, in addition, recommend that, although adequate cause for dismissal has been established, an academic penalty less than dismissal would be more appropriate, giving supporting reasons for the recommendation. If the President rejects the report, the President shall provide reasons in writing to the Hearing Panel and the faculty member. If the President accepts a report with a decision adverse to the faculty member, the President shall provide an opportunity for response by the faculty member before transmitting the case to the Board of Trustees.

A decision adverse to the faculty member may be made only after an opportunity has been given for an additional hearing before the Board of Trustees as required by KRS 164.230. The Board of Trustees shall either sustain the recommendations of the Hearing Panel and the President or return the proceedings to the President and the committee with specific objections. The Hearing Panel then shall reconsider, taking into account the stated objections and receiving new evidence if necessary. The Board of Trustees shall make the final decision after a study of the Hearing Panel's reconsideration.

### (3) Suspension

Until the final decision on termination of an appointment has been reached, the faculty member shall be suspended, or assigned to other duties in lieu of suspension, only if immediate harm to the faculty member or others is threatened by the faculty member's continuance. Before suspending a faculty member, pending an ultimate determination of the individual's status through the hearing procedure, the President shall consult with the University Senate Advisory Committee on Privilege and Tenure. Salary shall be continued during the period of suspension.

### g. Academic Freedom of Non-Tenured Faculty

If faculty members on non-tenured appointments or faculty members on post-retirement appointments allege that decisions not to reappoint them were caused by considerations violating academic freedom, or that they were given less advance notice than required in these *Governing Regulations*, they must present their allegations in writing to the University Senate Advisory

Committee on Privilege and Tenure within sixty (60) days after being notified in writing by their respective deans of the decisions not to reappoint. Allegations so presented shall be given preliminary consideration by the University Senate Advisory Committee on Privilege and Tenure, which shall attempt to settle the matter by informal methods. The allegations shall be accompanied by statements that aggrieved faculty members agree to the presentation, for the consideration of the committee, of such reasons and evidence as the University may allege in support of its decisions. If the difficulty is unresolved at this stage and if the committee so recommends, the procedures set forth in *GR X.B(f)* shall be applied, except that the faculty members making the complaints are responsible for stating the grounds upon which they base their allegations and the burden of proof shall rest upon them. If *prima facie* cases are established via these procedures in favor of the faculty members, it becomes incumbent upon the persons who made the decisions not to reappoint, or who provided insufficient notice, to present evidence in support of those decisions.

#### h. Resignation

Notice of resignation should be given early enough to reduce serious inconvenience to the University. If faculty members desire to terminate existing appointments or to decline renewals in the absence of notices of non-renewal, they shall give written notice of no less than three (3) months if their rank is instructor or assistant professor, and no less than four (4) months if their rank is higher, before the end of their duties during the academic year (exclusive of a summer session) or thirty (30) days after receiving notification of the terms of their appointments for the coming year, whichever date occurs later. However, they may request in writing a waiver of this requirement in cases of hardship or in situations where they would otherwise be denied substantial professional advancement. Resignations of regular, full-time faculty members shall be reported to the Board of Trustees.

##### (1) Administrative Personnel

Administrative personnel who hold academic rank are subject to the foregoing regulations in their capacity as faculty members. Those administrative personnel (holding academic rank) who allege that considerations violative of academic freedom significantly contributed to decisions to terminate their appointments to administrative posts or not to reappoint them shall be entitled to the same procedures as those for non-tenured faculty who have alleged violation of academic freedom.

##### (2) Change of Assignment

When it is in the best interests of the institution, and if the professional status of a faculty member is not seriously jeopardized thereby, a change in the duties assigned to an individual may be made without such a change of assignment being regarded as a violation of the individual's tenure rights.

## 2. Conditions of Employment

### a. Terms of Assignment

Academic assignments are made on academic year (nine-month), ten-month, eleven-month, and twelve-month bases.

### b. Vacation Leave

All full-time faculty members on a ten-month, eleven-month, or twelve-month assignment basis shall be entitled to twenty-two (22) working days of vacation leave with pay per assignment period. With prior administrative approval, faculty members may take vacation leave at appropriate times

during the period in which they are eligible to take such leave; however, each faculty member shall be in actual attendance at least until after Commencement and until all reports have been made, and at least three (3) days prior to the first day of registration for the fall semester, unless for special reason leave is approved. Vacation leave shall be taken in the assignment period in which it is earned, or the vacation leave shall be forfeited. Exceptions may be granted in accordance with *Administrative Regulations* (See AR 3:6, Section VI.B).

Additional detailed information on faculty vacation leave is provided in the *Administrative Regulations* (See AR 3:6).

c. Professional Practices

(1) General Policies

During their annual assignment period (whether academic year, ten months, eleven months, or twelve months) faculty members are expected to serve the University full-time. It is expected that they will be interested primarily in the work of their particular educational unit, giving their chief effort to the promotion of its needs.

A faculty member shall, under certain conditions, be permitted to engage, as an expert, in professional employment (consulting or professional practice) outside the University for pay. In general, any outside employment demanding more than purely spare-time effort must be substantially justified in terms of the contribution its performance can bring to the faculty member's pursuit of instruction, research, and service. Conditions under which such employment may be undertaken are as follows:

- (a) Such employment shall not interfere with the fundamental responsibility of the faculty member to meet regularly assigned duties and inherent obligations to instruction, research, and service, including being regularly available to students and colleagues, which are normally expected of a full-time faculty member and for which the faculty member receives compensation from the University.
- (b) Such employment requires prior approval in writing by the appropriate University official.
- (c) All proposals to undertake outside employment shall be made in writing to the chairs whose recommendations shall be forwarded to the respective deans and thence, unless specified otherwise in the *Administrative Regulations* (See AR 3:9), to the Provost for final action. Such proposals shall indicate the nature of the work to be performed, the estimated amount of time involved, the duration of the employment, and the scale of compensation. These proposals shall become a matter of record by the Provost who shall transmit quarterly to the President full information about those that have received approval and those that have been denied. The President, in turn, shall report periodically to the Board of Trustees.

Whenever a proposal by a faculty member is disapproved by an official of the University, it is the obligation of that official to provide the faculty member, upon request, with an oral statement of the reasons for the decision.

Requests shall be specific. Approvals shall not be granted for blanket authorizations to consult or to engage in professional practice.

- (d) Such employment shall be governed by time limitations stated in the *Administrative Regulations* (See AR 3:9) and the provisions of Ethical Principles and Code of Conduct (See GR I-D).
- (e) Such employment must avoid creating a conflict of interest. Each faculty member shall be

expected to exercise sound judgment in requesting approval of outside employment, keeping in mind with utmost care the matter of conflict of interest.

While it is not possible to anticipate every factual situation which might give rise to a conflict of interest, such a conflict of interest does arise within the meaning of this regulation when a faculty member represents the legal interests of another party against the University or when a faculty member engages in litigation on behalf of another party against the University. Interpretations as to conflicts of interest in particular factual situations are to be made by the President with the proviso that an adverse decision can be appealed to the Executive Committee of the Board of Trustees.

(f) Service Plans (AR 3:14)

Documents detailing the administration Services Plans approved by the Board of Trustees appear as a part of the *Administrative Regulations* 3:14.

d. Leaves of Absence

(1) Sabbatical Leave

The purpose of sabbatical leave is to provide opportunities for study, research, creative effort, improvement of instructional or public service capabilities and methods, and related travel in order that the quality of each recipient's service to the University may be enhanced.

Faculty members who have full-time tenured appointments in the regular, special title, extension, or librarian series with the rank of assistant professor (or librarian III) or higher, are eligible for sabbatical leaves after six (6) years of continuous service in the rank of instructor (or librarian III) or higher at the University, or for sabbatical leaves under a different option after three (3) years of continuous service. All such sabbatical leaves shall be approved by the President or the President's designee.

After six (6) years of continuous eligible service, a faculty member may apply for one (1) year's sabbatical leave (academic year for appointees on academic year, ten-month, or eleven-month assignments) at one-half salary or six (6) months' sabbatical leave (academic semester for appointees on academic year, ten-month, or eleven-month assignments) at full salary. After three (3) years of continuous eligible service, an appointee may apply for six (6) months' sabbatical leave (academic semester for appointees on academic year, ten-month, or eleven-month assignments) at one-half salary. Normally "continuous service" is interrupted by a sabbatical leave; that is, no service prior to a sabbatical leave may be credited toward eligibility for future sabbatical leave. However, in the event that it becomes necessary for an individual to postpone a sabbatical leave at the request of and/or for the benefit of the University or one of its educational units, the period of postponement shall be counted as part of the six (6) years of service necessary for the individual to again become eligible for sabbatical leave. The request for and/or agreement that the sabbatical leave be postponed shall be made in writing by the dean, and be approved by the Provost. The request or agreement shall specify the period of postponement and the reason for it. In no case shall cumulative sabbatical leave be granted for a single period longer than one (1) full year at full salary.

Sabbatical leave shall not be used as a means of augmenting personal income. A recipient may not accept gainful employment during a sabbatical leave (for an individual on an academic year assignment basis, this does not include the period of May 16 through August 15; for an individual on a ten-month or eleven-month assignment basis, this does not include the period of vacation and the one (1) or two (2) months outside the assignment period each fiscal year; for an individual on a twelve-month assignment basis, this does not include the one-month vacation period) except as follows:

A fellowship, grant-in-aid, or government-sponsored exchange lectureship may be accepted for the period of the leave if acceptance shall promote the purpose of the leave and is approved by the President or the President's designee.

For those on one-year sabbatical leave, additional salary not to exceed one-half of the regular academic salary may be accepted for (1) work performed during the sabbatical leave on research projects administered by the University with funds from government or private grants or contracts when the terms of the grant or contract authorize the usage of such funds, and when the work to be performed is significantly related to the studies planned for the leave; (2) work on a research grant at another university; (3) research work in a government laboratory; or (4) work as a research professor or associate in another university. Any such arrangements pursuant to this paragraph must be approved by the President or the President's designee.

In neither of the above instances shall a recipient's total income attributable to a sabbatical leave project exceed the individual's regular academic salary. Sabbatical leave shall be granted with the understanding that the recipient, following the sabbatical leave, will continue service at the University for at least one (1) academic year.

(2) Temporary Disability Leave

Temporary Disability Leave (TDL) may be granted to faculty members by the Provost. Eligible faculty members who are totally disabled are entitled to six (6) months' TDL with pay. TDL with pay for more than six (6) months requires approval by the Board of Trustees.

(3) Leaves With Pay

Upon the recommendation of the appropriate administrative officers and approval of the Provost, a faculty member may be granted leave of absence with pay for a period not to exceed thirty (30) days for the purpose of permitting an appointee to attend a professional meeting, serve temporarily with an outside agency, serve in the military forces of the United States, or for other good cause. Such leaves of absence with pay for more than thirty (30) days require approval of the Board of Trustees.

(4) Leaves Without Pay

Upon the recommendation of the appropriate administrative officers and approval of the Provost, a member of the faculty may be given a leave of absence without pay. Ordinarily such leave shall not be granted for a period in excess of one year (12 months). However, such leave may be extended on application and approval by the appropriate administrative officers. The best interests of the University shall be a major consideration in granting an extension of any such leave. Leaves of absence without pay are not normally credited toward eligibility for sabbatical leave. However, exception may be made when the leave enhances the value of the individual to the University, e.g., a leave to accept a fellowship or a grant, service for professional organizations, etc. In no case shall the leave of absence without pay be considered as an interruption of continuous service.

(5) Educational Leave

To pursue an advanced degree at the University of Kentucky in accordance with these *Governing Regulations*, Part X.C.6, faculty members may request half-time or more leave, with proportional reduction in salary. If such educational leave for faculty development is recommended by the dean and approved by the Provost, the faculty members shall be entitled to normal faculty benefits and privileges during the period of temporary change in status. Although a period of educational leave shall not be credited toward eligibility for sabbatical leave, it shall not be considered as an interruption of continuous service. Also, for non-tenured

faculty members, such a period of educational leave shall not be counted as probationary period service.

(6) Scholarly Fellowship Leave

To accept a scholarly fellowship which allows a faculty member to pursue a program of research, and which the funding agency will not process through the University, faculty members may request leave with partial pay. If such leave is recommended by the dean and approved by the Provost, the faculty member shall be entitled to normal faculty benefits and privileges during the period of temporary change in status. Time spent on scholarly fellowship leave shall apply toward eligibility for sabbatical leave and count as probationary period service unless the University in granting the leave and the individual accepting it agree to the contrary.

(7) Entrepreneurial Leave

The University encourages faculty employees to engage in entrepreneurial activities and strives to support the efforts of faculty who wish to commercialize their discoveries. Therefore, the pursuit of entrepreneurial endeavors is a valid reason for application for a faculty leave of absence.

The request for entrepreneurial leave, submitted by the faculty person to his or her unit administrator, shall be accompanied by a completed and signed "Entrepreneurial Leave" form and all attachments. The period of the leave shall not normally exceed one academic year. However, the leave may be extended for a second and final year by the Provost upon the recommendation of the dean. The Entrepreneurial Leave form enumerates additional terms and conditions of such leaves. The unit administrator shall review the proposal and forward the materials to the dean of the college along with their recommendation. The dean shall forward his or her recommendation to the Provost for approval. Entrepreneurial Leaves shall be reported to the Board of Trustees.

Time spent on entrepreneurial leave shall not apply toward eligibility for sabbatical leave or count as probationary period service unless the University in granting the leave and the individual accepting it agree to the contrary. Time spent on entrepreneurial leave shall not otherwise be considered as an interruption of continuous service.

3. Miscellaneous

a. Faculty Members as Candidates for Degrees

Faculty members having a rank higher than that of instructor may not be considered as candidates for degrees in the discipline in which they are employed and hold academic rank. Faculty members pursuing degrees above the master's degree at the University of Kentucky may not hold more than a half-time work assignment either during the two (2) full-time, consecutive resident semesters preceding the qualifying examination or during the two semesters of full-time dissertation study immediately following the qualifying examination.

b. Faculty Members as Scholars and Citizens

It is the policy of the University to maintain and encourage, within the law, full freedom of inquiry, discourse, instruction, research, service, and publication and to protect members of the faculty against influences, from inside or outside the University, which would restrict them in the exercise of these freedoms in their areas of scholarly interest. Faculty members shall be permitted and encouraged to investigate any theory, challenge any premise, engage in political and social debate, and to express their dissent, without jeopardy to their academic careers, provided their behavior is not in violation of the law and does not interfere with the normal operation of the



educational programs of the University.

Like other citizens, faculty members are free to engage in political activities so far as they are able to do so within the law consistent with their obligations as teachers and scholars. When necessary, leaves of absence without pay may be given for the duration of an election campaign or a term of office, provided that there has been timely application for leave and that the requested leave is limited to a reasonable period of time. The terms of a leave of absence for this purpose shall be set forth in writing. The leave shall not affect unfavorably the tenure status of a faculty member, except that the time spent on such leave from academic duties shall not count as probationary service unless agreed to otherwise.

Elective and appointive part-time services on boards and commissions to which faculty members are prepared to provide exceptional amounts of time shall be governed by policies on professional practice (See GR X.C.3).

## C. Employment of Staff Employees

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The *Human Resources Policy and Procedures Administrative Regulations* are applicable to staff employees. The *Human Resources Policy and Procedures Administrative Regulations* are promulgated by the President pursuant to delegation of the Board of Trustees.

### 1. Post-Retirement Employment

- a. A post-retirement appointment may be used in a very limited number of cases, when it is essential to a University program or office or when it is otherwise impossible practicably to fill a position with a fully qualified person. Such a part-time or full-time appointment is restricted to former staff employees who have elected to retire, requires specific prior approval by the Board of Trustees, and is made for a period not to exceed one (1) year.
- b. A retiree may be employed as a temporary employee to perform duties for which fee schedules have been established and approved by the Provost or the Executive Vice President for Finance and Administration.

### 2. Emeritus Ranks

Emeritus ranks for retired staff employees and the rights of holders of emeritus titles are established by the President after consultation with the Staff Senate Executive Committee.

## D. Opportunity for Hearing

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In no case shall an appointment of a postdoctoral scholar, postdoctoral fellow, resident, clinical fellow, teaching assistant, or research assistant be terminated before the end of the period of appointment without the individual being provided an opportunity to be heard before the University Senate Advisory Committee on Privilege and Tenure. Such employees who have established a *prima facie* case to the satisfaction of the committee that a consideration violating academic freedom significantly contributed to the individual's termination, shall be given a written statement of reasons by those responsible for the termination and an opportunity to be heard by the University Senate Hearing Panel of the Privilege and Tenure Committee.

## E. Matters Affecting Faculty and Staff

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The *Human Resources Policy and Procedures Administrative Regulations* on Benefits are applicable to faculty members and staff employees. All other *Human Resources Policy and Procedures Administrative Regulations* are applicable to faculty members to the extent that there are no other applicable policies for faculty members on the subject matter.

## References and Related Materials

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Kentucky Workers' Compensation Act

KRS 164.230, Removal of professors, officers and employees

GR Part I, The University of Kentucky (Definition)

AR 2:1, Procedures for Faculty Appointment, Reappointment, Promotion, and the Granting of Tenure

AR 3:1, University of Kentucky Retirement Plan

AR 3:6, Faculty Assignment and Vacation Leave Policy

AR 3:9, Consulting and other Overload Employment

AR 3:14, Practice Plans for Health Science Colleges and University Health Services (and College Addenda)

AR 7:6, Intellectual Properties Policy and Procedures

AR 7:7, Intellectual Properties Committee

## Revision History

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8/18/1998, 12/11/2001, 4/20/2005, 9/12/2006, 9/11/2007, 10/14/2008, 6/14/2011, 6/11/2013

For questions, contact: [Office of Legal Counsel](#)



UNIVERSITY OF  
**KENTUCKY**<sup>®</sup>  
Regulations

**Governing Regulation, Part XIV**

Responsible Office: Board of Trustees

Effective: DRAFT **6/11/2013**

Supersedes Version: **6/11/2013** ~~New-GR~~

## Governing Regulation, Part XIV Ethical Principles and Code of Conduct

### Major Topics

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- A. [Ethical Principles](#)
- B. [Code of Conduct](#)
  - 1. [Nondiscrimination Policy](#)
  - 2. [Confidentiality of Information](#)
  - 3. [Use of the University's Name](#)
  - 4. [Civic Responsibility of the Individual](#)
  - 5. [Discrimination and Harassment](#)
  - 6. [Personal Relationships](#)
  - 7. [Employment of Relatives \(Nepotism\)](#)
  - 8. [Intellectual Property](#)
  - 9. [Conflict of Commitment](#)
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  - 11. [Auditing Services](#)
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  - 15. [Compliance Responsibilities](#)
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  - 18. [Acceptance of Gifts or Benefits](#)
  - 19. [Clarifications and Reporting Violations](#)

## Introduction

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The University of Kentucky Ethical Principles and Code of Conduct document the University's expectations of responsibility and integrity by its members.

### A. Ethical Principles

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Exemplary ethical conduct is critically important in our relationships with colleagues, trustees, students, volunteers, contractors, and the public. This statement reflects the values of the University approved by the Board of Trustees on January 27, 2004 and modified on March 27, 2012.

1. The following core values guide our decisions and behavior:

- Integrity;
- Excellence;
- Mutual respect and human dignity;
- Diversity and inclusion;
- Academic freedom;
- Personal and institutional responsibility and accountability;
- Shared governance;
- A sense of community;
- Work-life sensitivity;
- Civic engagement; and
- Social responsibility.

2. Each member of the University must endeavor to:

- Promote the best interests of the University of Kentucky;
- Foster the Vision, Mission, and Values of the University;
- Preserve the public's respect and confidence in the University of Kentucky;
- Exhibit personal integrity, honesty, and responsibility in all actions;
- Provide an environment of mutual respect, impartiality, and collaboration;
- Maintain confidentiality in all matters deemed confidential;
- Assure independence of judgment free from conflicting interests;
- Ensure that relationships that constitute or could be perceived as conflicts of interest are fully and properly disclosed and University guidelines are followed;
- Comply with the policies and procedures of the University of Kentucky and applicable state and federal laws and regulations; and
- Demonstrate stewardship of University property and resources.

### B. Code of Conduct

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Those acting on behalf of the University of Kentucky have a duty to conduct themselves in a manner that will maintain the public's trust in the integrity of the University and to act compatibly with their obligation to the University. The Code of Conduct establishes guidelines for professional conduct for University members, including trustees, executive officers, faculty, staff, and other individuals employed by the University, those using University resources or facilities, and volunteers and representatives acting as agents of the University (collectively "University members"). The conduct of students is addressed in the Student Rights and Responsibilities.

The Code of Conduct is intended to determine what conduct is expected and to help individuals to determine behaviors that should be avoided. Employees are strongly urged to consult with their supervisor to review and evaluate specific situations. Violations of this code will be subject to appropriate sanctions. In addition to the Code, University members are subject to all University regulations, policies, and state and federal law. As applicable, University members shall comply with:

- Federal laws, regulations, and policies;
- Kentucky Revised Statutes (KRS) and Kentucky Administrative Regulations (KAR);
- University and unit-level policies and procedures including, but not limited to, the *Governing Regulations (GR)*, *Administrative Regulations (AR)*, *Human Resources Policy and Procedure Manual (HRP&P)*, the *Business Procedures Manual (BPM)*, and *University Senate Rules*;
- Contract, grant, and donor stipulations;
- Accreditation requirements; and
- Generally accepted accounting principles.

While this Code of Conduct provides expectations and interpretation, additional guidance is found in other official University policy documents, such as the *Governing Regulations*, *Administrative Regulations*, *Human Resources Policies and Procedures*, *University Senate Rules*, and *Business Procedures Manual*.

### 1. Nondiscrimination Policy

The University of Kentucky complies with the federal and state constitutions, and all applicable federal and state laws, regarding nondiscrimination. The University provides equal opportunities for qualified persons in all aspects of University operations, and does not discriminate on the basis of race, color, national origin, ethnic origin, religion, creed, age, physical or mental disability, veteran status, uniformed service, political belief, sex, sexual orientation, gender identity, gender expression, pregnancy, marital status, genetic information, social or economic status, or whether the person is a smoker or nonsmoker, as long as the person complies with University policy concerning smoking.

~~Equal opportunities shall be provided for all persons throughout the University in recruitment, appointment, promotion, payment, training, and other employment and education practices without regard for economic or social status, race, color, ethnic origin, national origin, creed, religion, political belief, sex, sexual orientation, gender identity, gender expression, marital status, or age. The University does not discriminate on the basis of uniform service, veteran status, or physical or mental disability when an individual otherwise meets the minimum qualifications for application or participation.~~

All University members are expected to comply with the institution's nondiscrimination policy. The President is responsible for the development of an affirmative action plan by which full implementation of this policy shall be effected in the University. (See AR 6:1 and HRP&P 2.0.)

### 2. Confidentiality of Information

University members are entrusted with personal and institutional information that should be treated with confidentiality and used only for conducting University business. Respect for individual and institutional privacy requires the exercise of care and judgment. Unless required or permitted by law or University regulations, personal and official information provided by and about faculty, staff and students must not be given to third parties without the consent of the individuals concerned. When doubt exists regarding the confidentiality of information, University members should presume information is confidential until determined otherwise.

### 3. Use of the University's Name

University members have a public association with the University, but are also private citizens, thus care must be taken to appropriately differentiate between the two roles. University members may not

use or allow the use of the name of the University or identify themselves as employees of the University of Kentucky in the public promotion or advertising of commercial products without prior written approval. Individuals writing or speaking publicly in a professional or expert capacity may identify themselves by their relationship with the University, but if so identified then in all instances where the individual might give even the appearance of speaking on behalf of the University, care must be taken to emphasize that any views expressed are their own and are not representative of the University of Kentucky. University members are encouraged to contribute to public debate as citizens. In instances where University members comment publicly as part of their official University duties, they should do so using University stationery and e-mail accounts; when commenting as citizens, University members must use personal stationery and personal e-mail accounts.

#### 4. Civic Responsibility of the Individual

In their roles as citizens, staff employees and faculty members have the same freedoms as other citizens, without institutional censorship or discipline, although they should be mindful that accuracy, forthrightness, and dignity befit their association with the University. When staff employees or faculty members speak or write as citizens, they should indicate that they are not speaking for the University.

#### 5. Discrimination and Harassment

To foster an environment of respect for the dignity and worth of all members of the University community, the University is committed to maintain a work-learning environment free of prohibited discrimination and harassment, which includes sexual and other forms of harassment. The policy of the University of Kentucky, approved by the Board of Trustees, prohibits discrimination and harassment of or by students, faculty, and staff and assures that complaints of discrimination and harassment shall be treated and investigated with full regard for the University's due process requirements. In addition, allegations of discrimination and harassment by customers, visitors, contractors and employees of contractors will be investigated, and appropriate action shall be taken. The University policy and procedures on discrimination and harassment can be found in AR 6:1.

#### 6. Personal Relationships

The quality of decisions may be affected when those making decisions have personal relationships with those who are the subjects and possible beneficiaries of these decisions. The critical concern is that personal relationships, whether positive or negative, should not inappropriately or unfairly affect decisions. Conflicts of interest may arise when people are involved in making decisions affecting any members of their families, relatives, or those with whom they have or have had intimate relationships. Decisions affecting present or former business partners should also be avoided. Individuals with personal relationships should excuse themselves from such decision-making. In many cases, potential conflicts can be managed by candid but discreet disclosure of those relationships.

The University strongly urges those individuals in positions of authority not to engage in conduct of an amorous or sexual nature with a person they are, or are likely in the future to be, in a position of evaluating. The existence of a power differential may restrict the less powerful individual's freedom to participate willingly in the relationship. If one of the parties in an apparently welcomed amorous or sexual relationship has the responsibility for evaluating the performance of the other person, the relationship must be reported to the dean, department chair or supervisor so that suitable arrangements can be made for an objective evaluation of the student or employee. (See AR 6:1)

#### 7. Employment of Relatives (Nepotism)

This nepotism policy reflects the realities of today's multi-professional, dual-career families in a manner that addresses nepotism concerns but does not inhibit the ability of the University to hire the best qualified individuals. Nepotism is generally inconsistent with the University's

longstanding policy of making employment decisions based solely on unit needs and individual qualifications, skills, ability, and performance.

Nepotism is generally prohibited within the University community. Nepotism means actions by a member of the University community that shall directly influence, benefit, or cause detriment to the University employment (e.g., hiring, promotion, supervision, evaluation, and determination of salary) of any other member who is a relative. Relative means a person's father, mother, brother, sister, husband, wife, son, daughter, aunt, uncle, son-in-law, daughter-in-law, and step-relatives in the same relationships.

The employment of relatives within the University is not precluded, as long as the employment is in compliance with all University policies regarding employment qualifications, performance, promotion, and management of situations where nepotism, or the appearance of nepotism, is possible. See *Governing Regulation X, Regulations Affecting Employment, and Human Resources Policy and Procedure 19.0, Nepotism*, for additional University policies and procedures related to nepotism and the appropriate management of situations involving the employment of relatives within the University.

#### 8. Intellectual Property

University members should be responsible stewards of University resources. All intellectual property conceived, first reduced to practice, written, or otherwise produced by faculty, staff, or students of the University of Kentucky using University funds, facilities, or other resources shall be owned and controlled by the University. Any member of the faculty or staff of the University who produces such intellectual property using University funds, facilities, or other resources shall assign personal rights to the property to the University, or its designate. The traditional products of scholarly activity which have customarily been considered the unrestricted property of the originator, such as journal articles, textbooks, reviews and monographs, and which have been created without involving a material use of University resources, shall be the unrestricted property of the author. (See AR 7:6)

#### 9. Conflict of Commitment

Decisions and the judgment upon which the decisions are based must be independent from conflicting interests and must hold the best interest of the University of Kentucky foremost. Conflicts of commitment relate to an individual's distribution of effort between University appointment and outside activities. The University of Kentucky permits external employment or self-employment in an employee's profession or specialty (with the exception of employees participating in a practice plan) where there is not a conflict of interest or commitment. Faculty and professional administrative employees are expected to devote their primary professional loyalty, time, and energy to University of Kentucky teaching, research and service endeavors; activities outside the University must be conducted without detracting from these primary commitments. A conflict of commitment generally occurs when the pursuit of outside activities interferes with obligations to students, to colleagues and to the missions of the University. These conflicts may become apparent in regular performance reviews, in connection with annual salary decisions and scheduled reviews incident to promotion, reappointment or tenure decisions and shall be addressed by the appropriate department head. The University policy and procedures on outside consulting can be found in AR 3:9.

A staff employee may be employed outside the University when the employment does not constitute a conflict with University interests and when the hours of outside employment do not coincide or conflict with hours of scheduled work or affect the employee's ability to perform satisfactorily. A staff employee may also perform outside employment while on vacation, holiday, or special leave as long as the outside employment does not constitute a conflict of interest. Adherence with this policy is the responsibility of the staff employee who seeks outside employment; however, it is recommended the

employee advise his or her department head of the outside employment.

#### 10. Conflict of Interest

The public's respect and confidence in the University of Kentucky must be preserved. Confidence in the University of Kentucky is put at risk when the conduct of University members does, or may reasonably appear to, involve a conflict between private interests and obligations to the University. All University members shall avoid conduct that might in any way lead members of the general public to conclude that he or she is using an official position to further professional or private interests or the interests of any members of his or her family. In conducting or participating in any transaction, full disclosure of any real or perceived conflict with personal interests and removal from further participation in such matters is required.

AR 7:2, Research Conflict of Interest and Financial Disclosure Policy, sets forth specific relationships and activities that pose a potential conflict of interest for faculty, staff, and students involved in research and related activities. The University recognizes that actual or potential conflicts of interest may occur in the normal conduct of research and other activities. A conflict of interest can also arise if an employee's professional judgment is or may appear to be influenced by personal interests. It is essential that potential conflicts be disclosed and reviewed by the University. After disclosure, the University can make an informed judgment about a particular activity and require appropriate oversight, limitations, or prohibitions in accord with this policy. It is important to remember that each relationship is different, and many factors often will need to be considered to determine whether a conflict of interest exists.

#### 11. Auditing Services

To effectively discharge their fiduciary and administrative responsibilities, the University's administration and the Board of Trustees are assisted by internal and external (independent) auditing services. These services provide independent, objective assurances and consulting services with respect to evaluating risk management, control, and governance processes. It is a violation of University policy to mislead or give false information to or intentionally omit material facts from internal or external (independent) auditor(s).

#### 12. University Property and Resources

University members shall be responsible stewards of University property and resources. University members are entrusted with protecting the property, equipment, and other assets of the University and exercising responsible, ethical behavior when using the University's resources. University assets are intended for University activities. Limited personal use of fixed University resources, such as computers and telephones, which does not result in a charge to the University is permitted as long as the use does not interfere with assigned job duties.

University property and resources shall not be used for personal business or commercial activities. However, in some instances, when the goals of the individual and the University coincide, a University member may use University equipment outside of the realm of his or her professional duties. Any such use must have the prior, written approval from the dean or appropriate administrator where the resources are located, and must provide that the University will be reimbursed for the full cost of the use of the property and resources. Such use must not interfere with the University of Kentucky's uses, and must occur outside of the University member's regular employment assignment. The Office of Legal Counsel may assist with an appropriate agreement.

#### 13. Fiscal Responsibility



The University is committed to responsible stewardship. The Board of Trustees, President, executive officers, administrators, deans, department chairs, directors, principal investigators, and all others functioning as area or unit heads are responsible for setting a tone of accountability and high ethical standards in financial matters. All employees are expected to comply with the requirements outlined in:

- GR Part I, The University of Kentucky (Definition);
- UK Ethical Principles and Code of Conduct;
- A01-005, UK HealthCare Code of Ethics;
- AR 3:9, External Consulting, Other Outside Employment and Internal Overload Activity;
- AR 7:2, Research Conflict of Interest and Financial Disclosure Policy; and
- AR 7:9, Institutional Conflicts of Interest Involving Research

All organizational units (e.g., administrative area, college, department, division, center, or office) are expected to maintain a strong internal control environment for the University as defined in the *Business Procedures Manual*. (See BPM E-1-3, Fiscal Roles and Responsibilities, and E-1-4, Internal Control.)

Each organizational unit head is accountable for the sound financial management of the unit and retains this fiscal responsibility if authority for transactional processing, record keeping, approving and monitoring is delegated to others.

#### 14. Financial Advantage

Members of the University community shall exhibit personal integrity, honesty and responsibility in all actions. Official position or office shall not be used to obtain financial gain or benefits for oneself or members of one's family or business associates. Any action that creates the appearance of impropriety should be avoided. Except as specifically approved by the Board, purchases and contracts shall not be made with an employee of the University for any item of supply, equipment, or service, nor may an employee have any interest, directly or indirectly, in any purchase made by the University. (See BPM B.2.C, KRS 164.131, and KRS 164.367.) An indirect interest may be defined as a real or perceived use of a university position or office with respect to a purchase or contract, leading to financial or other benefits to the individual or a member of his or her family. An indirect interest includes situations where a business owned or controlled by a family member does business with the University area where the employee is assigned.

An employee seeking approval under this section shall first make an application to the University Ethics Committee by submitting in writing a full disclosure of all aspects of his or her relationship with the contracting company or business. The Ethics Committee shall make a recommendation to the President, who shall forward to the Board the Committee's recommendation together with his or her recommendation. In recommending approval of a contractual relationship, the Committee shall determine that:

- a. the contractual relationship is in the best interest of the University;
- b. the employee has taken whatever actions are necessary to avoid any conflict of interest or any appearance of a conflict of interest;
- c. if the conflict is subject to the provision of KRS Chapter 45A, the employee's contract shall be the lowest price bid or otherwise provides the best value to the University;
- d. the employee's interest in the contract does not present a conflict with the employee performing his or her job; and,
- e. the nature of the contract and the nature of the employee's interest in the contract or business shall

be fully disclosed to the University community by as broad communications as feasibly possible.

Action taken by the Board shall be in open session, by affirmative vote. The action item shall fully disclose the nature of the conflict, and the reasons for the action.

## 15. Compliance Responsibilities

### a. University

The University is committed to sustaining a culture of ethical behavior, trust, and compliance. This culture is one in which individuals are comfortable raising concerns when a good faith belief exists that the actions of a University member or unit are not consistent with laws, regulations, policies, or standards. The University shall ensure that appropriate actions are taken to resolve non-compliance and persons making good-faith reports of non-compliance shall not be subjected to retaliation.

### b. University Members

University members shall take appropriate measures to prevent, detect, and report compliance violations or suspected violations. University members shall, acting in good faith, report suspected compliance violations through the standard chain of command, through one's supervisor, or, if not appropriate because of that individual's potential involvement, to a higher level of management, to Human Resources, to a compliance officer or to the University Ethics Committee. (See AR 1:7) It is the responsibility of all University members to know and abide by rules, laws, regulations, contracts and University policies and procedures that are applicable to the work or activity undertaken, including, but not limited to the following:

- Federal laws, regulations, and policies;
- Kentucky Revised Statutes (KRS) and Kentucky Administrative Regulations (KAR);
- University and unit-level policies and procedures including, but not limited to the *Governing Regulations (GR)*, *Administrative Regulations (AR)*, *Human Resources Policy and Procedures (HRP&P)*, *Business Procedures Manual (BPM)*, and *Rules of the University Senate*;
- Contract, grant, and donor stipulations; and
- Accreditation requirements.

## 16. Compliance (Whistle Blower) Protection

It is a violation of University policy to retaliate against an individual because she or he has made, in good faith, a disclosure of noncompliance or has participated in an investigation, proceeding or hearing involving noncompliance of any of the above.

## 17. Truth, Honesty, and Integrity

### a. University members, with no exceptions, shall:

- Act with high ethical and professional standards of conduct;
- Be honest in performing their duties;
- Propose, conduct, and report research and transmit research findings with integrity and honesty;
- Protect people and humanely treat animals involved in research and teaching;
- Protect the intellectual property rights of individuals, the University, and third parties; and
- Respect the intellectual property rights of others.

### b. University members, with no exceptions, shall not:

- Fabricate information;
- Change or knowingly omit information to misrepresent events, circumstances, results or outcomes in official University records or documents; or
- Take credit for another's work or work product without appropriate permission.

#### 18. Acceptance of Gifts or Benefits

University members' decisions and actions shall be based on the best interest of the University. No member shall accept any type of reward, monetary or non-monetary, if there is an explicit or implicit assumption that influence has been exchanged for the favor.

When no favor is asked for or gained, gifts of nominal value or moderate acts of hospitality, such as meals, in relation to one's position or activities with the University may be accepted. The following limits shall be observed:

- a. Gifts or acts of hospitality valued up to \$50 annually from any one source need not be reported.
- b. Gifts or acts of hospitality valued between \$50 to \$200 should be reported to the supervisor prior to acceptance.
- c. Acts of hospitality above \$200 must be specifically justified and reported through the chain of command. Written approval for acceptance must be provided by the Provost or executive vice president, in advance.
- d. Individuals may not accept gifts valued above \$200. However, these gifts or benefits shall be directed to the Executive Vice President for Finance and Administration, where they can be acknowledged and accepted on behalf of the University.

UK HealthCare employees shall also abide by more stringent rules outlined in the Code of Conduct Addendum. (See HealthCare Policy A01-005, UK HealthCare Code of Ethics.)

#### 19. Clarifications and Reporting Violations

Like all policies, this policy could not possibly cover all possible situations. When any doubt about the propriety of an action exists, the University's policy requires a full and frank disclosure to an appropriate individual with sufficient authority to address the matter. For interpretation, counsel or advice regarding this policy, contact the Office of Legal Counsel.

University members are expected to report violations of this policy to an appropriate individual. The University will not tolerate any retaliation against a University member who makes a good faith report of a violation.

## References and Related Materials

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KRS 45A, Kentucky Model Procurement Code

KRS 118.015(1), Definitions

KRS 164.160, Trustees - power to receive and administer revenue and property

KRS 164.200, Regulations for university - Physical training and discipline of students

KRS 164.367, Governing board may permit its employees to have an interest in a contract between the institution and a business -- Regulations to be forwarded to the Legislative Research Commission

GR Part X, Regulations Affecting Employment

AR 3:9, Faculty Consulting and Other Overload Employment

AR 6:1, Policy on Discrimination and Harrassment

AR 7:2, Research Conflict of Interest and Financial Disclosure Policy

AR 7:6, Intellectual Property Disposition

AR 7:9, Institutional Conflicts of Interest Involving Research

A01-005, UK HealthCare Code of Ethics

HRP&P 2.0, Equal Opportunity, Discrimination, and Harassment

BPM B.2.C, General Purchasing and Contracting Authority

BPM E-1-3, Fiscal Roles and Responsibilities

BPM E-1-4, Internal Control

## Revision History

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The Content of this GR was formerly part of GR, Part I: 6/14/2005, 10/10/2006, 1/23/2007, 9/11/2007, 4/22/2008, 3/27/2012

GR XIV: 6/11/2013

For questions, contact: [Office of Legal Counsel](#)

Report of the UK Senate Teaching Evaluation Ad-Hoc Committee

November 2014

Members approving report:

Dr. Kelly Bradley (Department of Educational Policy Studies & Evaluation, College of Education)

Dr. Ben Braun (Department of Mathematics, College of Arts & Sciences)

Dr. Alan Brown (Department of Hispanic Studies, College of Arts & Sciences)

Ms. Beth Ettensohn (School of Art & Visual Studies, College of Fine Arts)

Dr. David Fardo (Department of Biostatistics, College of Public Health)

Dr. Jonathan Golding (Department of Psychology, College of Arts & Sciences), Chair

Dr. Peter Mirabito (Department of Biology, College of Arts & Sciences)

Ms. Tara Rose (Office of Institutional Effectiveness, Director of Assessment)

Dr. Roger P. Sugarman (Office of Analytics and Technologies, Director of Institutional Research)

## Report of the UK Senate Teaching Evaluation Ad-Hoc Committee

November 2014

UK adopted the current University of Kentucky (UK) Teaching Course Evaluation (TCE) form for the 1992-1993 academic year. Many colleges and departments/programs adopted the TCE form, but over the years a significant number of units have decided not to use the TCE form in favor of their own evaluation measure, including the Honors Program, Department of Statistics and the Colleges of Medicine, Dentistry, Law, Fine Arts, Architecture. Some of the reasons for why units opted out of using the TCE form included (a) questions not pertinent to a unit, (b) absence of questions pertinent to a unit, (c) rating-scale dissatisfaction (e.g., a 4-point scale was used instead of a 5-point scale), and (d) language that leads to ambiguous responses from students (i.e., “double-barreled” items).

Given the continued lack of university-wide support for the TCE form and following a report by the College of Arts & Sciences on the current teaching evaluation system, the UK Senate Council formed the Teacher Course Evaluation Ad-Hoc Committee in Spring 2014 with the charge of reviewing and proposing a revised evaluation form that should include items evaluating course content (to be approved by Senate) and teacher performance (to be approved by Provost). In addition, the Senate Council charged the Ad-Hoc Committee with assessing college-specific practices, and to include a plan to make a form that is universally accepted and/or offers the opportunity for units to customize an evaluation form.

The Ad-Hoc Committee initially included 18 members and began meeting during the Spring 2014 semester. Initial discussions focused on the large research literature investigating teaching evaluations, the teaching evaluation forms used at various institutions (both large and small) around the country, and how best to conceptualize a new TCE form that can be used across the UK campus. To this end the Ad-Hoc Committee decided that the new TCE form should include three levels of questions:

- (1) limited number of common rating and open-ended questions that can be answered by students in all units (see Appendix)
- (2) additional specific questions developed and asked by each unit
- (3) additional specific questions developed and asked by individual faculty members

The Ad-Hoc Committee viewed this model, and in particular the splitting of common vs. specific questions, as a critical means to gain acceptance of a new TCE form. The model allows UK to have a common instrument that addresses issues related to students’ perceptions of the quality of the course and corresponding instruction. In addition, it ensures that all units and faculty members can assess the quality of the pedagogy within their discipline. We recognize the importance of evaluating pedagogy and discussed it at length, but realized that this committee was not equipped to take on that task for all units, all types of courses, and all class meeting patterns throughout the university curriculum.

With this model agreed upon, the Ad-Hoc Committee continued meeting during the Fall 2014 semester; 13 members agreed to continue to serve on the committee. However, due to scheduling conflicts only 8 members maximum attended meetings. However, all committee members received detailed notes from all meetings and feedback was encouraged. The goal of the Fall 2014 meetings was to determine the common questions that would be asked as well as discuss other TCE form issues. With regard to the former, the proposed 18 rating and open-ended questions are presented in Appendix A.

In addition to developing the TCE form model and the common questions to include in the TCE form, the Ad-Hoc Committee also discussed at length and ultimately made decisions on two other issues. First, a contentious issue over the years with regard to the TCE form has been the nature of the rating scale used to answer questions. The previous version of the TCE form (i.e., prior to 1992) included 5 alternatives, but this was changed to a 4-point scale with the introduction of the current form. The committee could have avoided the issue of the number of points on the answer scale, but we decided to have in-depth discussions on this issue and consulted with researchers on campus about the advantages and disadvantages of each type of scale. In the end, the committee voted to recommend using a 5-point scale to allow for greater score variability and as a way for students to give an “average” rating. We understand that certain units on campus will not agree with our decision. Still, we hope that these units might consider using the new TCE form.

Second, we discussed how the score for each TCE form rating question should be reported. This discussion centered on the problem cited by faculty over the years that current TCE form scores, reported as means, include low-end outliers. These outliers lead to greater variability and lower overall means. The current output for faculty for rating questions does include the standard deviation of the score for each question, but faculty have stated that they do not feel this information is used (let alone understood) by those evaluating TCE form scores. In the end, the committee recommended that the new TCE form should include the total enrolled in a course being evaluated. In addition, the new form should include the response count, median score, mean score, and bar graphs showing the distribution of ratings across the 5-point scale, in that order.

There are still issues related to a new TCE form that must be resolved. However, the Ad-Hoc Committee felt that these issues were too far afield from the specific charges to the committee. These issues include a version of the new TCE form for online courses. We will add with regard to this version that it is likely that most of the current proposed questions can be used or slightly modified to accommodate an online course. Other issues include the name of the new TCE form, appropriate use of the TCE form scores in tenure and promotion cases, incentives to get students to respond online, minimum response rates required for TCE form scores to be reported/used, and greater access to TCE form scores, especially by students.

## Appendix A

**Student Items**

1-S) My classification is \_\_\_\_\_ (year in school as undergrad, year in school as grad)

2-S) My main reason(s) for taking this course is that it \_\_\_\_\_.

(is required course, is elective, covers a topic I am interested in)

Note: students will be able to select more than one answer

3-S) My expected grade in the course is a(n) \_\_\_\_\_.

4-S) Hours I spent per week on the course (excluding class time)

**Common Items*****Course Organization and Planning***

1-C) The course was well organized.

2-C) The instructor was prepared.

***Clarity, Communication Skills***

3-C) The instructor communicated clearly.

4-C) The instructor responded to questions effectively.

5-C) The pace of the course was appropriate.

***Student-Instructor Interaction, Rapport***

6-C) The instructor treated students with respect.

7-C) Class meetings contributed to my learning in the course.

8-C) The instructor's verbal interactions (questions and comments) with students helped me learn in the course.

***Grading and Examinations, Evaluation***

9-C) Grading in the course was fair.

10-C) Assessments (e.g., tests, quizzes, papers, homework, projects, clinical observations) reflected learning activities in the course.

**Summary Items**

11-C) NAME OF COURSE was a quality course.

12-C) INSTRUCTOR NAME provided quality teaching.

**Open-Ended Comments**

1-OEC) Which aspects of the course/instructor were most helpful and why?

2-OEC) Which aspects of the course/instructor would you change and why/how?

3-OEC) Other comments?