



College of Agriculture  
Office of Academic Programs  
N6 Agricultural Science Building  
North Lexington, KY 40546-0091

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

November 1, 2008

MEMO

To: Graduate Council  
Undergraduate Council

From: Dr. Mike Mullen  
Associate Dean

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

Re: New Course – PLS 557 Seed Vigor

Attached please find a proposal for a new distance learning course, PLS 557. This course was taught as a Special Topic this past spring to students from KY and other states. It is taught online only in order to make it available for place-bound professionals across KY and students at other universities who may need this rather specialized course.



This has been approved by both the Undergraduate and Graduate Curriculum Committees in the College as well as by the faculty in the Department of Plant and Soil Sciences.

We look forward to this course being approved.

## APPLICATION FOR NEW COURSE

1. Submitted by the College of Agriculture Date: August 5, 2008

Department/Division proposing course: Plant and Soil Sciences

2. Proposed designation and Bulletin description of this course:

a. Prefix and Number PLS 557

b. Title\* Seed Vigor

\*If title is longer than 24 characters, offer a sensible title of 24 characters or less: \_\_\_\_\_

c. Courses must be described by at least one of the categories below. Include number of actual contact hours per week..

( ) CLINICAL ( ) COLLOQUIUM ( ) DISCUSSION ( ) LABORATORY ( ) LECTURE  
( ) INDEPEND. STUDY ( ) PRACTICUM ( ) RECITATION ( ) RESEARCH ( ) RESIDENCY  
( ) SEMINAR ( ) STUDIO (2) OTHER – Please explain: distance education

d. Please choose a grading system:  Letter (A, B, C, etc.)  Pass/Fail

e. Number of credit hours: 2

f. Is this course repeatable? YES  NO  If YES, maximum number of credit hours: \_\_\_\_\_

g. Course description:

Study of the concept of seed vigor, methods for seed vigor testing, and the relationship of seed vigor to seedling emergence and crop performance

h. Prerequisite(s), if any:

An introductory crop production or basic botany course

i. Will this course also be offered through Distance Learning? YES  NO

If YES, please check one of the methods below that reflects how the majority of the course content will be delivered:

Internet/Web-based  Interactive video  Extended campus

3. Supplementary teaching component:  N/A or  Community-Based Experience  Service Learning  Both

4. To be cross-listed as: \_\_\_\_\_ / \_\_\_\_\_  
Prefix and Number printed name Cross-listing Department Chair signature

5. Requested effective date (term/year): spring / 2009



## APPLICATION FOR NEW COURSE

17.  The major teaching objectives of the proposed course, syllabus and/or reference list to be used are attached.
18.  Check box if course is 400G or 500. If the course is 400G- or 500-level, *you must include a syllabus showing differentiation* for undergraduate and graduate students by (i) requiring additional assignments by the graduate students; and/or (ii) the establishment of different grading criteria in the course for graduate students. (See *SR 3.1.4*)
19. Within the department, who should be contacted for further information about the proposed new course?

Name: Dennis TeKrony Phone: 7-5020 x 80754 Email: dtekrony@uky.edu

20. Signatures to report approvals:

DATE of Approval by Department Faculty	<div style="display: flex; justify-content: space-between;"> <span>Michael Barrett</span> <span>/ On Original</span> </div> <div style="display: flex; justify-content: space-between; font-size: small;"> <span>printed name</span> <span>Reported by Department Chair</span> <span>signature</span> </div>
10/08/2008	<div style="display: flex; justify-content: space-between;"> <span>Michael D Mullen</span> </div> <div style="display: flex; justify-content: space-between; font-size: small;"> <span>printed name</span> <span>Reported by College Dean</span> <span>signature</span> </div>
3 / 24 / 2009	/
* DATE of Approval by Undergraduate Council	<div style="display: flex; justify-content: space-between; font-size: small;"> <span>printed name</span> <span>Reported by Undergraduate Council Chair</span> <span>signature</span> </div>
* DATE of Approval by Graduate Council	/
* DATE of Approval by Health Care Colleges Council (HCCC)	<div style="display: flex; justify-content: space-between; font-size: small;"> <span>printed name</span> <span>Reported by Health Care Colleges Council Chair</span> <span>signature</span> </div>
* DATE of Approval by Senate Council	Reported by Office of the Senate Council
* DATE of Approval by University Senate	Reported by Office of the Senate Council

\*If applicable, as provided by the *University Senate Rules*. (<http://www.uky.edu/USC/New/RulesandRegulationsMain.htm>)

# Syllabus – Seed Vigor , PLS557

## Instructor:

Dennis M. TeKrony  
Professor in Seed Biology,  
Department of Plant and Soil Sciences,  
University of Kentucky, Lexington, KY 40546-0312  
257-5200 EXT 80754  
[dtekrony@email.uky.edu](mailto:dtekrony@email.uky.edu)

## Course Description:

Study of the concept of seed vigor, methods for seed vigor testing and the relationship of seed vigor to seedling emergence and crop performance.

## Prerequisite:

An introductory crop production or basic botany course.

## Course Goal:

To provide students with a basic understanding of the concept of seed vigor, methods for seed vigor testing and the relationship of seed vigor to crop performance.

## Learning Outcomes:

After completing this course, the student will be able to:

1. Explain the concept of seed vigor and its relationship to seed germination.
2. Describe the factors influencing seed vigor and the requirements of a seed vigor test.
3. Describe the different types of seed vigor tests and the methods used for vigor testing.
4. Discuss the standardization of seed vigor tests.
5. Discuss the relationship of seed vigor to seedling emergence and crop performance.
6. Evaluate the usefulness and limitations of seed vigor testing and make decisions on the appropriate test to use in given situations

## Required reference for course:

1. Seed Vigor Testing Handbook No. 32. 2002. Association of Official Seed Analysts, Las Cruces, NM.  
**NB:** This handbook is **only** available from the Association of Official Seed Analysts. An order form is attached at the end of the syllabus for your convenience. The required book, shipping and handling, and credit card fee have been calculated for you (\$49.88), simply fill in your address and credit card

information and send it to the address listed at the top of the form.

**General references for course:**

1. Copeland, L. O. and M. B. McDonald, 2001, Principles of Seed Science and Technology 4th Edition, Kluwer Academic Publishers, Boston, MA.  
**NB:** This book available for ordering at all major online bookstores. It costs \$167 new, though many online bookstores give discounts and some even have used copies for sale.
2. Hampton, J. and D. M. TeKrony. 1995. Handbook of vigour test methods. International Seed Testing Assoc., Zurich, Switzerland.
3. TeKrony, D.M. and J. Spears. 2001. Seed Vigor Testing. p 11-1 to 11-20 In: McDonald, M. B., T. Gutormson and B. Turnipseed (ed) Seed Technologist Training Manual. Society of Commercial Seed Technologists. Ithaca, NY.
4. TeKrony, D. M. and D. B. Egli. 1991. Relationship of Seed vigor to crop yield: A review. Crop Science 31: 816-822.
5. TeKrony, D. M. 2003. Precision is an essential component in seed vigor testing. Seed Science and Technology 31: 435-477.
6. TeKrony, Dennis M. 2001. ISTA Seed Vigour Survey- 2000. International Seed Testing Association News Bulletin 122: 14-15.

**Exams, quizzes and other assignments:**

Assigned quiz for Units 1-2 (25pts)  
Assigned quiz for Units 3-4 (35pts)  
Assigned quiz for Units 5-7 (30pts)  
Term Paper - see details below (50 pts)  
Current Topics - see details below (30 pts)  
Mid-Term Exam (50 pts)  
Final Exam (80 pts)  
TOTAL POINTS POSSIBLE IN COURSE: 300 (Grad students), 250 (Undergraduate students)

**Grading**

The grading scale will be on a percentage basis:

Graduate Credit:

91-100% = A, 81-90% = B, 71-80% = C, 70% and below = E (failing grade)

Undergraduate Credit

91-100% = A, 81-90% = B, 71-80% = C, 61-70% = D, 60% and below = E (failing grade)

**Term Paper**

**A term paper is required for each student taking the course for graduate credit.**

The paper will have two objectives:

1. To investigate and describe the background, development and use of one vigor test that was presented in the course or is described in the Seed Vigor Testing Handbook and
2. To discuss the relationship of the results of the vigor test selected to crop performance (seedling emergence, plant growth, yield) for at least one crop species.

Your paper should be based on a survey of original literature including refereed journal articles (i.e. do not cite books or book chapters) relating to the two objectives. You can use a library or an electronic search of literature, including Google, for the term paper.

**The paper should include:**

Introduction  
Results and discussion of the vigor test selected  
Your conclusions regarding the value of this test for the seed industry and the consumer  
Literature cited (a minimum of three references)

It should be approximately 8 to 10 typed, double spaced pages in length. The paper is worth 50 points and is due after the completion of Units 1-7 of the course. You can turn it in by using the link in Unit 8.

**Current Topic Articles - for Discussion Board**

Each semester all students enrolled in the course will present one article from the mass media or a scientific journal that relates to some aspect of seed quality (germination and vigor) and/or the crop performance topics covered in the course. The title, reference source and a brief summary for these articles will initially be sent to the instructor. If he approves of the article, the student must return a one page summary of his/her assessment of the article to the instructor to include:

1. Background and objective of the article
2. Statement as to why this article is an important issue for the class
3. Provide information as to how the article relates to seed quality (germination and vigor), the seed industry and the consumer
4. Provide the reference source for the article as well as any other references on this topic.
5. State your position on the article

The instructor will place the summary of the topic selected on the discussion board for the class. Other students in the class will read the article, evaluate the summary and respond (yes, no -- why) if they support your position and summary of the article. These articles will provide an opportunity for all students taking the course to spend a few minutes thinking about issues that have been raised in class (as well as those that have not been presented), but you feel are important or relevant. Your evaluation should address why this article is important to this class or the seed industry.

After the enrollment in the course is determined each semester, the instructor will contact all students by email and establish the date during the semester that each student should present their article. (If you have a preferred date early or late in the semester, please request it to the instructor). Current topics will be graded on a 30 point scale. Twenty points will be based on the quality of your written analysis and summary of

the article. Ten points per student will be based the response to other students articles. Each student will make at least one current topic presentation during the semester. Each unexcused, but missed current topic assignment will receive a zero grade.

### **Seed Vigor Syllabus:**

1. Define the concept of seed vigor
  - a. Relationship of seed vigor to germination and seedling performance
  - b. Definition of seed vigor
  - c. History and background of seed vigor development
2. Factors influencing seed vigor
  - a. Seed development and maturation
  - b. Seed deterioration
3. Seed vigor testing
  - a. Types of seed vigor tests
  - b. Stress tests
    - i. Cold test and saturated cold test
    - ii. Accelerated aging and saturated salt AA test
    - iii. Cool test
    - iv. Controlled deterioration
  - c. Biochemical tests
    - i. Conductivity test (bulk and single seed)
    - ii. Tetrazolium chloride
  - d. Seedling growth and evaluation tests
4. Standardization and quality control of vigor tests
  - a. Referee testing
  - b. Precision is essential component
  - c. Use of control seed samples
5. Relationship of seed vigor to crop performance
  - a. Seedling emergence
  - b. Field emergence experiment
  - c. Crop yield
6. Interpretation and use of seed vigor tests
  - a. Seed testing laboratories
  - b. Seed industry
  - c. Consumer
7. Status of vigor testing
  - a. Limitations
  - b. Usefulness



**About the Instructor:**

Dr. TeKrony is a native of South Dakota where he worked as a student in the Seed Testing Laboratory at South Dakota State University prior to completing his BS degree in 1960. He completed his MS and PhD in Seed Science and Technology at Oregon State University in 1967 and 1969, respectively. He accepted a position as Seed Extension Specialist in the Department of Agronomy at the University of Kentucky in 1969 where he was also responsible for Foundation and Certified seed production. He moved to a research and teaching appointment in Seed Biology in 1977 where he has remained until the present. He has advised the graduate studies of 13 MS and 9 PhD students and has published more than 100 refereed journal and other scientific publications. He chaired the Seed Vigor committees of the Association of Official Seed Analysts in North America and the International Seed Testing Association and has conducted many seed vigor training workshops in the USA and in Brazil, Hungary, Austria, France, China and Denmark. He has developed a 20 minute video entitled "What is Seed Vigor" which has been used to educate professionals in seed laboratory and the seed industry. He recently developed a two credit Distance Learning Seed Vigor course, which will be offered to students on line in the spring of 2008. His seed vigor research emphasis has been in four primary areas: 1.) laboratory evaluation of seed germination and vigor and its relationship to crop performance, 2.) determine the effect of the environment during seed development and maturation on seed germination and vigor, 3.) relate physiological changes occurring during seed development and maturation to seed viability and vigor and 4.) determine the influence of seedborne diseases on the expression of soybean and wheat seed germination and vigor.

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**UNIVERSITY SENATE ROUTING LOG**

**Proposal Title:** PLS 557 Seed Vigor – New Distance Learning Course

**Contact Person (name, email & phone #):** Dr. Dennis Tekrony, [dtekrony@email.uky.edu](mailto:dtekrony@email.uky.edu),  
257-5020, ext 80754

**Instruction:** To facilitate the processing of this proposal please identify the groups or individuals reviewing the proposal, identify a contact person for each entry, provide the consequences of the review (specifically, approval, rejection, no decision and vote outcome, if any) and please attach a copy of any report or memorandum developed with comments on this proposal.

<b>Reviewed by: (Chairs, Directors, Faculty Groups, Faculty Councils, Committees, etc.)</b>	<b>Contact person Name (phone/email)</b>	<b>Consequences of Review:</b>	<b>Date of Proposal Review</b>	<b>Review Summary Attached? (yes or no)</b>
Departmental Faculty	Dr. Mike Barrett	Approved	October 29, 2008	Yes, letter
College UG Curriculum Committee	Dr. Mike Mullen	Approved	September 29, 2008	Yes, minutes
College Graduate Curriculum Committee	Dr. Mike Mullen	Approved	October 8, 2008	Yes, summary of email communication

College of Agriculture  
Undergraduate Curriculum Committee  
Minutes – Sept 29, 2008

Members Present: , Bob Coleman, Lee Edgerton, Clair Hicks, Bob Houtz, Cheryl Mimbs, Jim Ringe, Donna Smith, Tammy Stephenson, David Williams, Deborah Witham, Mike Mullen.

Guests: Steve Bullard (Chair) and Laura Lhotka, both from the Forestry department.

Absent: Desmond Brown

Mullen opened the meeting and asked Ringe, Bullard and Lhotka to update the committee on departmental discussions concerning the Forestry degree program revision. Bullard reported that the department had voted, by a vote of 11-5, to use PLS 366 rather than FOR 205 as their soil science course. He also reported that the Forestry faculty then voted on the entire Forestry package to reaffirm support for it moving forward. The vote in the department to reaffirm the entire package passed by a margin of 15-1. The resulting curriculum as amended kept the FOR 200 course, Conservation Biology, at the 200 level, and moved the FOR 270, Wildlife Biology and Management, to FOR 370. This will assist NRCM and Pre-Vet students who sometimes use this course as 300+ level directed elective credit in their programs. Houtz moved that the program be approved, Smith seconded. Witham asked about resources in general to make the program work. Are faculty resources in place to handle these changes. Bullard indicated that the faculty had worked together on this and that the resources are in place to handle the changes. He also indicated that changing the program to include PLS 366 helped in this regard. Mullen indicated that PLS was on board for adding 10-20 more students into PLS 366 as the program added students. Edgerton brought up the issue of students getting coursework outside of the department and not having a College identity. Bullard and Ringe acknowledged this as a problem, but explained that courses formerly taught in biology were not available, and that at many universities, there are separate departments of forestry, wildlife biology, and wood products, while all of these are incorporated into the Forestry department here. Mullen pointed out that the proposed program actually has more cross-college course work than the existing program with the inclusion of GEN 100 and PLS 366. Bullard also talked about the fact that this program revision was being looked at across the region as a model for curricular revision. Bullard then congratulated Laura Lhotka for all the work she has done in making this revision move forward. The Committee agreed and congratulated her as well. Mullen called for the question. Motion passed unanimously.

The Committee then considered PLS 557 – Seed Vigor, a new course proposal from Plant and Soil Sciences. Mimbs moved to accept the proposal, Ringe seconded. Edgerton asked about it being a web only course. Mullen explained that Dennis Tekrony in PLS was offering it DL only so that students, extension agents, seed dealers, and others from anywhere could access the course. Williams explained that there are few courses like this available nationally, yet there is a demand. He also pointed out that Tekrony is among the top experts in the nation in Seed Vigor and that it makes sense to have him offer this course. Mullen called for the question. Motion passed unanimously.

The meeting was adjourned.

College of Agriculture  
Graduate Curriculum Committee  
Summary of Action on PLS 557

Oct 10, 2008

Dr. Mike Mullen sent the proposal for PLS 557 to all 11 members of the Graduate Committee on October 7, 2008 via email, asking for input and/or approval. Eight of the 11 members responded.

The following members all responded and voted in the affirmative on passing the proposal, which had already been approved by the UG Curriculum Committee:

Dr. Nancy Cox – Yes  
Dr. Charles Dougherty - Yes  
Dr. David Harmon – Yes  
Dr. Mike Mullen - Yes  
Dr. Kim Spillman – Yes  
Dr. Lisa Vaillancourt – Yes  
Dr. David Wagner - Yes  
Dr. Ken Yeargan - Yes



UNIVERSITY OF KENTUCKY

**College of Agriculture**

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**MEMORANDUM**

Date: October 29, 2008

To: Mike Mullen

From: Michael Barrett

A handwritten signature in black ink, appearing to read 'Michael Barrett'.

Subject: Department Support for New Course

Mike, I polled the faculty for their support of the new course on seed vigor proposed by Dennis Tekrony and I had 27 responses, all in favor of the course being established. Please proceed for the process to formally approve the course. Thanks for your help with this.