

RECEIVED

JUN 10

OFFICE OF THE
SENATE COUNCIL**1. General Information**

1a. Submitted by the College of: ENGINEERING

Date Submitted: 6/8/2015

1b. Department/Division: Mechanical Engineering

1c. Contact Person

Name: Alexandre Martin

Email: alexandre.martin@uky.edu

Phone: 257-4462

Responsible Faculty ID (if different from Contact)

Name:

Email:

Phone:

1d. Requested Effective Date: Semester following approval

1e. Should this course be a UK Core Course? No

2. Designation and Description of Proposed Course

2a. Will this course also be offered through Distance Learning?: No

2b. Prefix and Number: EGR 601

2c. Full Title: INTRODUCTION TO RESEARCH IN ENGINEERING

2d. Transcript Title:

2e. Cross-listing:

2f. Meeting Patterns

LECTURE: 3

2g. Grading System: Letter (A, B, C, etc.)

2h. Number of credit hours: 3

2i. Is this course repeatable for additional credit? No

If Yes: Maximum number of credit hours:

If Yes: Will this course allow multiple registrations during the same semester?

2j. **Course Description for Bulletin:** Introduction to scientific research, applied to engineering. Characterization of scientific research, the definition of a research project, and methodology in research. Discussion includes management, organization and execution of a research project, scientific writing, information related to research ethics and data management, national policies, and intellectual properties. Case studies. Introduction to share research tools such as high performance computing or scanning electron microscopy.

2k. **Prerequisites, if any:** Graduate standing or consent of instructor.

2l. **Supplementary Teaching Component:**

3. **Will this course taught off campus?** No

If YES, enter the off campus address:

4. **Frequency of Course Offering:** Fall,

Will the course be offered every year?: Yes

If No, explain:

5. **Are facilities and personnel necessary for the proposed new course available?:** Yes

If No, explain:

6. **What enrollment (per section per semester) may reasonably be expected?:** 12-24

7. **Anticipated Student Demand**

Will this course serve students primarily within the degree program?: Yes

Will it be of interest to a significant number of students outside the degree pgm?: Yes

If Yes, explain: Will be of interest to graduate students college-wide.

8. **Check the category most applicable to this course:** Traditional – Offered in Corresponding Departments at Universities Elsewhere,

If No, explain:

9. **Course Relationship to Program(s).**

a. **Is this course part of a proposed new program?:** No

If YES, name the proposed new program:

b. **Will this course be a new requirement for ANY program?:** No

If YES, list affected programs: This might eventually becomes a requirement for all Engineering PhD programs.

10. **Information to be Placed on Syllabus.**

a. **Is the course 400G or 500?:** No

b. **The syllabus, including course description, student learning outcomes, and grading policies (and 400G-/500-level grading differentiation if applicable, from 10.a above) are attached:** Yes

Distance Learning Form

Instructor Name:

Instructor Email:

Internet/Web-based: No

Interactive Video: No

Hybrid: No

1. How does this course provide for timely and appropriate interaction between students and faculty and among students? Does the course syllabus conform to University Senate Syllabus Guidelines, specifically the Distance Learning Considerations?

2. How do you ensure that the experience for a DL student is comparable to that of a classroom-based student's experience? Aspects to explore: textbooks, course goals, assessment of student learning outcomes, etc.

3. How is the integrity of student work ensured? Please speak to aspects such as password-protected course portals, proctors for exams at interactive video sites; academic offense policy; etc.

4. Will offering this course via DL result in at least 25% or at least 50% (based on total credit hours required for completion) of a degree program being offered via any form of DL, as defined above?

If yes, which percentage, and which program(s)?

5. How are students taking the course via DL assured of equivalent access to student services, similar to that of a student taking the class in a traditional classroom setting?

6. How do course requirements ensure that students make appropriate use of learning resources?

7. Please explain specifically how access is provided to laboratories, facilities, and equipment appropriate to the course or program.

8. How are students informed of procedures for resolving technical complaints? Does the syllabus list the entities available to offer technical help with the delivery and/or receipt of the course, such as the Information Technology Customer Service Center (<http://www.uky.edu/UKIT/>)?

9. Will the course be delivered via services available through the Distance Learning Program (DLP) and the Academic Technology Group (ATL)? NO

If no, explain how student enrolled in DL courses are able to use the technology employed, as well as how students will be provided with assistance in using said technology.

10. Does the syllabus contain all the required components? NO

11. I, the instructor of record, have read and understood all of the university-level statements regarding DL.

Instructor Name:

SIGNATURE|CHE202|Kimberly W Anderson|EGR 601 NEW Dept Review|20141111

SIGNATURE|BJSTOK0|Barbara J Brandenburg|EGR 601 NEW College Review|20150327

SIGNATURE|ZNNIKO0|Roshan Nikou|EGR 601 NEW Graduate Council Review|20150410

SIGNATURE|JEL224|Janie S Ellis|EGR 601 NEW Senate Council Review|20150424

SIGNATURE|BJSTOK0|Barbara J Brandenburg|EGR 601 NEW Approval Returned to Dept|20150610

New Course Form

<https://myuk.uky.edu/sap/bc/soap/rfc?services=>

[Open in full window to print or save](#)

Generate R

Attachments:

		<input type="button" value="Browse..."/>	Upload File
<input type="button" value="Delete"/>	ID	Attachment	
	5120	syllabus-601.pdf	
<input type="button" value="First"/>		1	<input type="button" value="Last"/>

(*denotes required fields)

1. General Information

- a. * Submitted by the College of: Submission Date:
- b. * Department/Division:
- c.
- * Contact Person Name: Email: Phone:
- * Responsible Faculty ID (If different from Contact) _____ Email: _____ Phone: _____
- d. * Requested Effective Date: Semester following approval OR Specific Term/Year¹ _____
- e.
- Should this course be a UK Core Course? Yes No
- If YES, check the areas that apply:
- Inquiry - Arts & Creativity Composition & Communications - II
- Inquiry - Humanities Quantitative Foundations
- Inquiry - Nat/Math/Phys Sci Statistical Inferential Reasoning
- Inquiry - Social Sciences U.S. Citizenship, Community, Diversity
- Composition & Communications - I Global Dynamics

2. Designation and Description of Proposed Course.

- a. * Will this course also be offered through Distance Learning? Yes¹ No
- b. * Prefix and Number:
- c. * Full Title:
- d. Transcript Title (if full title is more than 40 characters): _____
- e. To be Cross-Listed² with (Prefix and Number): _____
- f. * Courses must be described by at least one of the meeting patterns below. Include number of actual contact hours³ for each meeting pattern type.
- | | | | |
|--|--|---------------------------------|---------------------------------|
| <input type="text" value="3"/> Lecture | <input type="text"/> Laboratory ¹ | <input type="text"/> Recitation | <input type="text"/> Discussion |
| <input type="text"/> Indep. Study | <input type="text"/> Clinical | <input type="text"/> Colloquium | <input type="text"/> Practicum |
| <input type="text"/> Research | <input type="text"/> Residency | <input type="text"/> Seminar | <input type="text"/> Studio |
| <input type="text"/> Other | If Other, Please explain: _____ | | |
- g. * Identify a grading system:
- Letter (A, B, C, etc.)
- Pass/Fail
- Medicine Numeric Grade (Non-medical students will receive a letter grade)
- Graduate School Grade Scale
- h. * Number of credits:
- i. * Is this course repeatable for additional credit? Yes No
- If YES: Maximum number of credit hours: _____
- If YES: Will this course allow multiple registrations during the same semester? Yes No

j. * Course Description for Bulletin:

Introduction to scientific research, applied to engineering. Characterization of scientific research, the definition of a research project, and methodology in research. Discussion includes management, organization and execution of a research project, scientific writing, information related to research ethics and data management, national policies, and intellectual properties. Case studies. Introduction to share research tools such as high performance computing or scanning electron microscopy.

k. Prerequisites, if any:

Graduate standing or consent of instructor.

l. Supplementary teaching component, if any: Community-Based Experience Service Learning Both

3. * Will this course be taught off campus? Yes No

If YES, enter the off campus address:

4. Frequency of Course Offering.

a. * Course will be offered (check all that apply): Fall Spring Summer Winter

b. * Will the course be offered every year? Yes No

If No, explain:

5. * Are facilities and personnel necessary for the proposed new course available? Yes No

If No, explain:

6. * What enrollment (per section per semester) may reasonably be expected? 12-24

7. Anticipated Student Demand.

a. * Will this course serve students primarily within the degree program? Yes No

b. * Will it be of interest to a significant number of students outside the degree pgm? Yes No

If YES, explain:

Will be of interest to graduate students college-wide.

8. * Check the category most applicable to this course:

Traditional – Offered in Corresponding Departments at Universities Elsewhere

Relatively New – Now Being Widely Established

Not Yet Found in Many (or Any) Other Universities

9. Course Relationship to Program(s).

a. * Is this course part of a proposed new program? Yes No

If YES, name the proposed new program:

b. * Will this course be a new requirement¹ for ANY program? Yes No

If YES¹, list affected programs::

This might eventually become a requirement for all Engineering PhD programs.

10. Information to be Placed on Syllabus.

a. * Is the course 400G or 500? Yes No

If YES, the *differentiation for undergraduate and graduate students must be included* in the information required in 10.b. You must include: (i) identify additional assignments by the graduate students; and/or (ii) establishment of different grading criteria in the course for graduate students. (See SR

b. * The syllabus, including course description, student learning outcomes, and grading policies (and 400G-/500-level grading differentiation if applicable 10.a above) are attached.

¹ Courses are typically made effective for the semester following approval. No course will be made effective until all approvals are received.

² The chair of the cross-listing department must sign off on the Signature Routing Log

Ⓜ In general, undergraduate courses are developed on the principle that one semester hour of credit represents one hour of classroom meeting per week for a semester, exclusive of any laboratory meeting. Laboratory meeting, generally, is two hours per week for a semester for one credit hour. (from SR 5.2.1)
Ⓜ You must also submit the Distance Learning Form in order for the proposed course to be considered for DL delivery.
Ⓜ In order to change a program, a program change form must also be submitted.

Rev 8/09

EGR 601
Introduction to research in engineering

202 RGAN: MWF, 12:00 noon–12:50 p.m.

Fall Semester 2014

Coordinator

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Instructors

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Name: Dean Eric Grulke
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Name: Prof. John Balk
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Invited Lecturers

Name: Ms. Susan K. Smith
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Phone: (859) 257-7176

Name: Ms. Mary Molinaro
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Email: molinaro@uky@uky.edu
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Name: Ms. Natasha Jones
Office: 144 ASTeCC
Email: tasha.jones@uky.edu
Phone: (859) 218-6554

Course description

Introduction to scientific research, applied to engineering. Characterization of scientific research, the definition of a research project, and methodology in research. Discussion includes securing or writing proposal, identifying topics, management, organization and execution of a research project, scientific writing, publishing a journal paper. Information and case studies related to research ethics and data management, national policies, and intellectual properties. Introduction to share research tools such as high performance computing or scanning electron microscopy.

Course credits

This course is **3 credits** course.

Prerequisites

Graduate standing or consent of instructor.

Student learning outcomes

After taking this class, the student will be able to

- understand scientific research, as well as the various steps of a research activity
- use various concepts and methodological approaches in scientific research
- organize a research project in the context of a MS thesis or a PhD dissertation
- utilize specific research tools available at the University of Kentucky, such as High Performance Computation (HPC) or Electron Microscopy (EM).

Course goals or objectives

The main objective of this course is to familiarize students with the principles and general guidelines of scientific research. More specifically, this course presents the student with a broader sense of the various steps of conducting a research project as well as highlights the essential characteristics of a successful project. It also shows the student how to put their own project in perspective, and gives them tools to analyze and compare various scientific approaches.

Required materials

Steneck, N. H., *ORI Introduction to the Responsible Conduct of Research*, Department of Health and Human Services, Washington, D.C., revised ed., August 2007, 164 pages.

Available as a free download: <http://ori.dhhs.gov/sites/default/files/rcrintro.pdf>

Description of course content

The course is organized according to the following outline.

- **Module 1 [20 lectures] (A. Martin)**
 1. Introduction (A. Martin) [2 lectures]
 2. A short introduction to L^AT_EX (J. McDonough) [4 lectures]
 3. Characterization of scientific research (A. Martin) [1 lecture]
 - Definition of research as a learning process
 - Scientific research
 - Training of a researcher
 4. Definition and illustration of different types of research (A. Martin) [1 lecture]
 - Fundamental research, applied research and clinical research
 - Funded research, sponsored research or open research
 5. Definition of a research project (A. Martin) [1 lecture]
 - Definition of goal and hypothesis

- Literature review and criticism of past research
- Definition of social and economical needs
- Definition of the technological scope
- Usefulness and relevance
- 6. Managing, organizing and executing a research project (A. Martin) [1 lecture]
 - Scheduling and work planning
 - Budget
 - Analysis, verification, validation and dissemination of results
- 7. Anatomy of a scientific paper (A. Martin) [6 lectures]
 - Outline
 - Abstract & Introduction
 - Results, Discussion and Conclusion
- 8. Publishing a scientific paper (A. Martin) [2 lectures]
 - Peer-review process
 - Conference vs. Journal paper
 - Types of journal (Impact Factor, type of access, reviewing process, etc.)
 - Authorship
- 9. Overview of the research tools available at the Engineering Library (S. Smith) [2 lectures]
- **Module 2 [9 lectures] (E. Grulke)**
 1. Part 1 – Intellectual Property (N. Jones) [1 lectures]
 2. Part 2 – Data management (M. Molinaro) [4 lectures]
 - (a) Overview of research data management
 - (b) Contextual details needed to make data meaningful to others
 - (c) Storage, backup, and security of Data
 - (d) Plan for archiving and preservation and sharing of data
 3. Part 3 – Overview: responsible conduct of research (E. Grulke) [4 lectures]
 - (a) Research integrity
 - (b) Human subjects, laboratory animals
 - (c) Conflicts of interest
 - (d) Mentor/trainee responsibilities
 - (e) Collaborative research
- **Module 3, option a) (M. Beck) [15 lectures]**
 1. Introduction to Linux/UNIX shell commands [1 lecture]
 2. Introduction to Scientific programming (using FORTRAN) [6 lectures]
 3. Compiling a code (using Makefile) [1 lecture]
 4. Using math libraries (using LAPACK) [2 lectures]
 5. Introduction to version control (using SVN) [2 lectures]
 6. Introduction to parallel programming (using OpenMP and MPI) [4 lectures]
 7. Introduction to the HPC cluster at the University of Kentucky [3 lectures]
- **Module 3, option b) (J. Balk) [15 lectures]**
 1. Introduction to scanning electron microscopy (instrumental components, image formation theory)
 2. Theoretical background for energy dispersive x-ray spectroscopy (EDS, chemical analysis)
 3. Theoretical background for electron backscatter diffraction (EBSD, grain orientation and texture measurement)
 4. Demonstrations of SEM use
 5. Hands-on training (students complete SEM training with their own research samples)
 6. Independent work on student projects

Course assignments

The grade is based on term projects, homework assignments and class participation. **All course assignments need to be written using the document preparation system L^AT_EX.**

Term project	50%
Homework assignments	30%
College seminars	10%
Participation	10%
<hr/>	
	100%

1. Homework #1: Formulate a research topic, and write an introduction to this research topic. Select and read 10 journal articles among the most recent or most important that relates to this topic. For each article, write an abstract, write a critic and rate the article (10% of the grade, due at the end of Module 1)
2. Project #1: Write a research proposal, with literature review, methodology, feasibility, as well as an outline of the results and expected conclusion (50% due a the end of the semester)
3. Homework #2: Ethics in research: At the end of each lecture session, the students will respond to questions about case studies (10%, due at the end of Module 2)
4. Homework #3: Research tool project (HPC or TEM) (10%, due at the end of Module 3)

College seminars

Students are expected to attend a certain number of the seminars presented by the College or University. The actual number of seminar will be based on their relevance to the course material, and will be decided by the instructor. Students will have to submit electronically (only PDF documents will be accepted) half-page abstracts of the seminars no later than one week after they took place. Scheduling conflicts will result in an alternative method of evaluation: the students will have to read and write a one page abstract of a scientific paper published by the speaker.

Grading

A letter grade (A (90%), B (80%), C (70%) or E) will be assigned to the students based on the evaluation the course assignment.

Mid-term Grade

No mid-term examination will be given.

Course Policies

Submission of Assignments

Reports and assignments must be submitted electronically via Blackboard, in .pdf format (with the .tex source). **All course assignment will be written using the document preparation system L^AT_EX.**

Attendance Policy

Attendance to all lectures is mandatory. More than one unexcused absence will automatically result in a "Failing" grade.

Excused Absences

Students need to notify the professor of absences prior to class when possible. S.R. 5.2.4.2 defines the following as acceptable reasons for excused absences: (a) serious illness, (b) illness or death of family member, (c) University-related trips, (d) major religious holidays, and (e) other circumstances found to fit "reasonable cause for nonattendance" by the professor.

Students anticipating an absence for a major religious holiday are responsible for notifying the instructor in writing of anticipated absences due to their observance of such holidays no later than the last day in the

semester to add a class. Information regarding dates of major religious holidays may be obtained through the religious liaison, Mr. Jake Karnes (859-257-2754).

Students will be asked to withdraw from the class if more than 20% of the classes scheduled for the semester are missed (excused or unexcused) per university policy.

Verification of Absences

Students may be asked to verify their absences in order for them to be considered excused. Senate Rule 5.2.4.2 states that faculty have the right to request "appropriate verification" when students claim an excused absence because of illness or death in the family. Appropriate notification of absences due to university-related trips is required prior to the absence.

Academic Integrity

Per university policy, students shall not plagiarize, cheat, or falsify or misuse academic records. Students are expected to adhere to University policy on cheating and plagiarism in all courses. The minimum penalty for a first offense is a zero on the assignment on which the offense occurred. If the offense is considered severe, or the student has other academic offenses on their record, more serious penalties, up to suspension from the university may be imposed.

Plagiarism and cheating are serious breaches of academic conduct. Each student is advised to become familiar with the various forms of academic dishonesty as explained in the Code of Student Rights and Responsibilities. Complete information can be found at the following website: <http://www.uky.edu/Ombud>. A plea of ignorance is not acceptable as a defense against the charge of academic dishonesty. It is important that you review this information as all ideas borrowed from others need to be properly credited.

Part II of Student Rights and Responsibilities (<http://www.uky.edu/StudentAffairs/Code/part2.html>) states that all academic work, written or otherwise, submitted by students to their instructors or other academic supervisors, is expected to be the result of their own thought, research, or self-expression. In cases where students feel unsure about the question of plagiarism involving their own work, they are obliged to consult their instructors on the matter before submission.

When students submit work purporting to be their own, but which in any way borrows ideas, organization, wording or anything else from another source without appropriate acknowledgement of the fact, the students are guilty of plagiarism. Plagiarism includes reproducing someone else's work, whether it be a published article, chapter of a book, a paper from a friend or some file, or something similar to this. Plagiarism also includes the practice of employing or allowing another person to alter or revise the work which a student submits as his/her own, whoever that other person may be.

Students may discuss assignments among themselves, or with an instructor or tutor, but when the actual work is done, it must be done by the student, and the student alone. When a student's assignment involves research in outside sources of information, the student must carefully acknowledge exactly what, where and how he/she employed them. If the words of someone else are used, the student must put quotation marks around the passage in question and add an appropriate indication of its origin. Making simple changes while leaving the organization, content and phraseology intact is plagiaristic. However, nothing in these Rules shall apply to those ideas which are so generally and freely circulated as to be a part of the public domain (Section 6.3.1).

Please note: Any assignment you turn in may be submitted to an electronic database to check for plagiarism.

Accommodations due to disability

If you have a documented disability that requires academic accommodations, please see me as soon as possible during scheduled office hours. In order to receive accommodations in this course, you must provide me with a Letter of Accommodation from the Disability Resource Center (Room 2, Alumni Gym, 257-2754, email address: jkarnes@email.uky.edu) for coordination of campus disability services available to students with disabilities.