

## 1. General Information

1a. Submitted by the College of: ENGINEERING

Date Submitted: 10/8/2015

1b. Department/Division: Electrical and Computer Engineering

1c. Contact Person

Name: James Lumpp

Email: jel@uky.edu

Phone: 7-3895

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: EE 223

2c. Full Title: AC Circuits

2d. Transcript Title:

2e. Cross-listing:

2f. Meeting Patterns

LECTURE: 3

LABORATORY: 3

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

2h. Number of credit hours: 4

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?

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2j. **Course Description for Bulletin:** Analysis and design methods for analog linear circuits whose elements consist of passive and active components used in modern engineering practice, including transfer functions, network parameters, and a design project and laboratory experiments involving modern design practices.

2k. **Prerequisites, if any:** Prereq: EE 211 Concurrent: MA 214.

2l. **Supplementary Teaching Component:**

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

If YES, enter the off campus address:

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

**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?:** 50

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?:** No

If Yes, explain:

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?:** Yes

If YES, list affected programs: BS EE and BS COE degrees require the course

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|HOLLOWAY|Lawrence E Holloway|EE 223 NEW Dept Review|20151008

SIGNATURE|BJSTOK0|Barbara J Brandenburg|EE 223 NEW College Review|20151022

SIGNATURE|JMETT2|Joanie Ett-Mims|EE 223 NEW Undergrad Council Review|20151216

### New Course Form

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

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

Generate R

**Attachments:**

Upload File

	ID	Attachment
Delete	6003	ee223 sample syllabus rev A.pdf

(\*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/Year <sup>1</sup>
- 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?  Yes <sup>4</sup>  No
- b. \* Prefix and Number:
- c. \* Full Title:
- d. Transcript Title (if full title is more than 40 characters):
- e. To be Cross-Listed <sup>2</sup> with (Prefix and Number):
- f. \* Courses must be described by at least one of the meeting patterns below. Include number of actual contact hours <sup>3</sup> for each meeting pattern type.
 

<input type="text" value="3"/> Lecture	<input type="text" value="3"/> Laboratory <sup>4</sup>	<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: <input type="text"/>		
- 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:

Analysis and design methods for analog linear circuits whose elements consist of passive and active components used in modern engineering practice, including transfer functions, network parameters, and a design project and laboratory experiments involving modern design practices.

## k. Prerequisites, if any:

Prereq: EE 211 Concurrent: MA 214.

l. Supplementary teaching component, if any:  Community-Based Experience  Service Learning  Both3. \* 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? 50

## 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:

## 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 requirement<sup>2</sup> for ANY program?  Yes  No

If YES<sup>2</sup>, list affected programs::

BS EE and BS COE degrees require the course

## 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 apply 10.a above) are attached.

<sup>1</sup> Courses are typically made effective for the semester following approval. No course will be made effective until all approvals are received.  
<sup>2</sup> The chair of the cross-listing department must sign off on the Signature Routing Log.

<sup>13</sup> 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)

<sup>14</sup> You must also submit the Distance Learning Form in order for the proposed course to be considered for DL delivery.

<sup>15</sup> In order to change a program, a program change form must also be submitted.

Rev 8/09

Per *Senate Rule 5.2.4.2*, students missing any graded work due to an excused absence are responsible: for informing the Instructor of Record about their excused absence within one week following the period of the excused absence (except where prior notification is required); and for making up the missed work. The professor must give the student an opportunity to make up the work and/or the exams missed due to an excused absence, and shall do so, if feasible, during the semester in which the absence occurred.

### **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 when feasible and in no case more than one week after 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.

*Senate Rules 6.3.1* (see <http://www.uky.edu/Faculty/Senate/> for the current set of *Senate Rules*) 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 a question of plagiarism involving their 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 content from another source without appropriate acknowledgment of the fact, the students are guilty of plagiarism.

Plagiarism includes reproducing someone else's work (including, but not limited to a published article, a book, a website, computer code, or a paper from a friend) without clear attribution. 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 or information, the student must carefully acknowledge exactly what, where and how he/she has 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.

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 (DRC). The DRC coordinates campus disability services available to students with disabilities. It is located on the corner of Rose Street and Huguelet Drive in the Multidisciplinary Science Building, Suite 407. You can reach them via phone at (859) 257-2754 and via email at [drc@uky.edu](mailto:drc@uky.edu). Their web address is <http://www.uky.edu/StudentAffairs/DisabilityResourceCenter/>.

**EXAM SCHEDULE:** The test days are fixed.

TEST #1	October XX, 2016
TEST #2	November XX, 2016
FINAL EXAM	Thursday, December XX, 2016 @ XXXX

**TOPICS:** The lecture schedule is tentative.

TOPIC	CHAPTER	≈ # LECTURES
Review of AC circuits	10	2
Single-phase AC Power	11	4
Mutual inductance and transformers	11	3
Three-phase circuits and power	12	4
Transfer functions, resonant circuits, op amp circuits	13	6
Filters	16	2
Networks	17	3

**LABS:** The lab schedule is tentative.

TOPIC	LAB #	≈ SCHEDULE
Measurements of Time Constants and Phase Angles in Circuits with Passive Components (TM)	1	Week 2
Complex Power (FR)	2	Week 4
Maximum Power Transfer (TM)	3	Week 6
The Operational Amplifier as a Circuit Element and its Application to a Summing Circuit (TM)	4	Week 8
Measurement of the Frequency Response of an Operational Amplifier (TM)	5	Week 10
Series and Parallel Resonant Circuits (FR)	6	Week 12

### EXCUSED ABSENCES

Students need to notify the professor of absences prior to class when possible. *Senate Rules 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. Two weeks prior to the absence is reasonable, but should not be given any later. Information regarding major religious holidays may be obtained through the Ombud (859-257-3737, [http://www.uky.edu/Ombud/ForStudents\\_ExcusedAbsences.php](http://www.uky.edu/Ombud/ForStudents_ExcusedAbsences.php)).

Students are expected to withdraw from the class if more than 20% of the classes scheduled for the semester are missed (excused) per University policy.



**COURSE STRUCTURE:** The beginning of the course deals with evaluating the use of transfer functions in circuit analysis (filters, tuning circuits, ...). Around the middle of the course we evaluate AC circuit analysis for power applications, including single and three phase power systems and circuits containing mutual inductance and transformers. Labs on AC power and transfer functions will be assigned throughout the semester.

**GRADES:**

<b>WEIGHT:</b>	HW/Quizzes	10 %
	Labs	30 %
	Test #1	20 %
	Test #2	20 %
	Final Exam	20 %

<b>SCALE:</b>	90-100	A
	80-89	B
	70-79	C
	60-69	D
	Below 60	E

**GRADING:** The numerical score is computed using the above weighting system. The A's will be in the 90's, B's in the 80's, etc., unless, in my opinion, the difficulty of the material/tests justifies curving the grades. Numerical scores will not be adjusted for external circumstances. Any requests for reviewing homework/quiz/test/lab grades must be made by the second class period after the homework/quiz/test/lab is returned to you. Attach a note outlining the grading concern.

**MID-TERM GRADES:**

Mid-term grades will be posted in myUK by the deadline established in the Academic Calendar (<http://www.uky.edu/registrar/calendar>).

**TESTS:** The two tests and the final exam will be in-class.

**HOMEWORK AND QUIZZES:** Homework will be assigned throughout the semester. It will generally be due 1 to 2 class periods after it is assigned. No late homework will be accepted unless there is an excused absence (see below for policy). At the end of the semester, the two lowest homework scores will be dropped. Homework should be neat. Put your name and the date at the top of the first page. Work on one side of the paper only. Staple the sheets together and hand in flat, not folded. In general, the quizzes will be 1 to 2 pages in length. The quizzes will be given throughout the semester and will be announced at least one day in advance. The quiz problems will follow problems assigned for homework. A quiz problem will count the same as a typical homework assignment. No make-up quizzes will be offered unless there is an excused absence (see below for policy).

**LABORATORY REPORTS:** A written report will be prepared for every laboratory experiment. The report must be typed and based on the data and observations recorded in your laboratory notebook. Laboratory reports are due at the beginning of the following laboratory period. Except for severe extenuating circumstances, no late laboratory reports will be accepted. Your laboratory reports must be prepared using a word processor. Hand-written equations will be accepted. Equations using an equations editor are preferred. In addition, the graphs appearing in your report must be prepared using a computer-plotting package. Hand drawn graphs will not be accepted. However, you are allowed to sketch circuit diagrams. Keep your reports brief but complete.

There are two types of laboratory reports you will prepare during this course. The first is a technical memorandum and the second is a full report. The format of each of these reports is described on pages 6 and 7 in the lab manual.

**HONOR SYSTEM:** All submitted assignments and work done on tests must be your own. You may discuss homework problem solutions and labs with classmates or with me but the work you submit must be your own. Cheating and/or plagiarism on graded material will not be tolerated. See *ACADEMIC INTEGRITY* below.

**INSTRUCTOR:** Dr. W. T. Smith, 467D FP Anderson Tower, 257-1009, william.smith@uky.edu

**WHEN, WHERE:** Lecture: 2:00-3:15 TR, FPAT 263; Lab: see schedule for section times, FPAT 465

<b>OFFICE HOURS:</b>	M	T	W	Th
<b>FROM -</b>	9:30	9:00	1:30	10:30
<b>TO -</b>	10:30	10:00	2:30	11:30

(Additional hours by appointment)

**PREREQUISITE:** EE 211; **CONCURRENT:** MA 214

**COURSE DESCRIPTION:** Analysis and design methods for analog linear circuits whose elements consist of passive and active components used in modern engineering practice, including power, transfer functions, network parameters, and a design project and laboratory experiments involving modern design practices.

**TEXTBOOKS:** Basic Engineering Circuit Analysis, 11th Edition, J. David Irwin and R. Mark Nelms, Wiley, 9781119181934 with WileyPLUS for Canvas. ; EE 222 Electrical Engineering Laboratory I: Laboratory Manual, K. W. Whites, E. L. Steele, Revised August 2000. (Available only at Kennedy's Bookstore)

**PARTS KIT:** You will need to purchase parts for this course. Additionally, you should purchase a breadboard (small or medium sized) and the screwdriver for adjusting a trim pot. All parts are available from the IEEE Parts Store located in 560 Anderson Hall. Visit <http://www.engr.uky.edu/~ieec/> for details.

**LAB NOTEBOOK:** Any firm, covered laboratory notebook that has numbered pages and can make copies of pages is acceptable for this course. Examples include:

National Roaring Spring  
Carbon Paper #43-649 #77469  
No carbon Paper #43-644 #77644

**COURSE MOTIVATION:** A successful career as an electrical engineer begins with the basic ability to solve and evaluate circuit problems. In addition, the techniques and math for solving elementary circuit problems are used throughout the ECE curriculum.

**EXPECTED OUTCOMES OF STUDENT LEARNING:** The following outcomes will be developed and measured through performance on homework, tests and project(s):

1. The ability to perform AC steady-state power analysis.
2. The ability to analyze circuits containing mutual inductance and ideal transformers.
3. The ability to derive transfer functions (variable-frequency response) from circuits containing independent sources, dependent sources, resistors, capacitors, inductors, operational amplifiers, transformers and mutual inductance elements.
4. The ability to derive two-port parameters from circuits containing resistive and impedance circuits.
5. The ability to use software to compute and graphically display circuit voltages, currents and transfer functions.
6. The ability to operate basic electrical engineering equipment such as the digital voltmeter, DC power supply, signal generator and oscilloscope.
7. The ability to collect data and maintain a laboratory notebook in an organized and ethical manner.
8. The ability to analyze and measure DC and AC voltages and currents in linear circuits.
9. The ability to analyze and construct basic operational amplifier circuits (such as summers and filters) and measure input and output voltages.
10. The ability to conduct an experiment, collect data, quantify measurement error, and convey this information in a technical report.