Code #EN14 (2014) Rev

**New/Special Course Proposal-Bulletin Change Transmittal Form**

X **Undergraduate Curriculum Council** - Print 1 copy for signatures and save 1 electronic copy.

☐**Graduate Council** - Print 1 copy for signatures and send 1 electronic copy to mmcginnis@astate.edu

|  |
| --- |
| X **New Course or** ☐**Special Course (Check one box)***Please complete the following and attach a copy of the catalogue page(s) showing what changes are necessary.*  |

|  |  |
| --- | --- |
| \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Enter date…**Department Curriculum Committee Chair** | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Enter date…**COPE Chair (if applicable)** |
| \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Enter date…**Department Chair:** | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Enter date…**General Education Committee Chair (If applicable)**  |
| \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Enter date…**College Curriculum Committee Chair** | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Enter date…**Undergraduate Curriculum Council Chair** |
| \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Enter date…**College Dean** | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Enter date…**Graduate Curriculum Committee Chair** |
|  | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Enter date…**Vice Chancellor for Academic Affairs** |

1.Proposed Course Prefix and Number (For variable credit courses, indicate variable range.)

EE 2322

2.Course Title – if title is more than 30 characters (including spaces), provide short title to be used on transcripts. Title cannot have any symbols (e.g. slash, colon, semi-colon, apostrophe, dash, and parenthesis). Please indicate if this course will have variable titles (e.g. independent study, thesis, special topics).

Electrical Workshop

3.Will this course be lecture only, lab only, lecture and lab, activity, dissertation, experiential learning, independent study, internship, performance, practicum, recitation, seminar, special problems, special topics, studio problems, student exchange, occupational learning credit, or course for fee purpose only (e.g. an exam)? Please choose one.

Laboratory Only

4.What is the grade type (i.e. standard letter, credit/no credit, pass/fail, no grade, developmental)?

Standard letter

5.Is this course dual listed (undergraduate/graduate)?

No

6.Is this course cross listed? (If it is, all course entries must be identical including course descriptions. It is important to check the course description of an existing course when adding a new cross listed course.)

No

7.Brief course description (40 words or fewer) as it should appear in the bulletin.

Workshop processes involved in electrical engineering including workshop safety, electrical wiring and assembly, winding practice, domestic electrical appliances, soldering and de-soldering techniques, electronic project construction techniques, use of electronic bench equipment, and preparation of reports.

8. Indicate all prerequisites and if this course is restricted to a specific major, which major. (If a student does not have the prerequisites or does not have the appropriate major, the student will not be allowed to register).

a. Are there any prerequisites?

 PHYS 2034

b. Why?

This is a basic hands on learning course. Primary knowledge of electricity and various electrical components gained from PHYS 2034 will be required to develop understanding of electrical circuit building.

9.Course frequency(e.g. Fall, Spring, Summer). Not applicable to Graduate courses.

Fall

10.Contact Person (Name, Email Address, Phone Number)

Shubhalaxmi Kher, skher@astate.edu, 870-972-2088

11.Proposed Starting Term/Year

Fall 2015

12.Is this course in support of a new program?

No

If yes, what program?

Enter text...

13.Does this course replace a course being deleted?

No

If yes, what course?

Enter text...

Has this course number been used in the past?

No, this is a new course number.

*Submit Course Deletion Proposal-Bulletin Change Transmittal Form.*

14.Does this course affect another program?

No

If yes, provide contact information from the Dean, Department Head, and/or Program Director whose area this affects.

Enter text...

15.Justification should include:

a.Academic rationale and goals for the course (skills or level of knowledge students can be expected to attain)

All major advances in technology heavily leverage electrical engineering. Electrical Engineers work in every industry, from automobiles to aircraft to video games and manufacturing. Many electrical engineers follow their designs from conception to manufacture, routinely leaving their desks to work in labs or in the field. This course will provide hands on learning experience and develop understanding and skills related to processes involved in electrical engineering.

b.How does the course fit with the mission established by the department for the curriculum? If course is mandated by an accrediting or certifying agency, include the directive.

Electrical engineers use the controlled application of electricity to solve problems in areas ranging from tiny consumer electronic devices, medical equipment, computers to automobiles and massive power generating apparatus used by utility companies.

This course will develop the skills required for electrical engineering including; workshop safety, electrical wiring and assembly, winding practice, domestic electrical appliances, soldering and desoldering techniques, electronics project construction techniques.

c.Student population served.

EE undergraduate students.

d.Rationale for the level of the course (lower, upper, or graduate).

The material is appropriate for entry level undergraduate students in electrical engineering.

16.Outline (The course outline should be topical by weeks and should be sufficient in detail to allow for judgment of the content of the course.)

Week No. Topic

1 Workshop safety

2 Electrical wiring, circuit breakers, and assembly

3 Winding practice, inductance, and transformers

4-5 Domestic electrical appliances and their circuits

6-7 Soldering and desoldering techniques, PCB making

8-9 Electronic project construction techniques

10-12 Use of electronic bench equipment

13-14 Preparation of reports

17.Course requirements (e.g. research papers, projects, interviews, tests, etc.)

Laboratory experiments and projects.

18.Special features (e.g. labs, exhibits, site visitations, etc.)

Hands on learning and laboratory experiments

19.Department staffing and classroom/lab resources (Will this require additional faculty, supplies, etc.?)

No

20. What is the primary intended learning goal for students enrolled in this course?

Primary learning goal is to develop basic skills required for workshop safety, electrical wiring, assembly, PCB making, winding by providing hands on training.

21.Reading and writing requirements:

a.Name of book, author, edition, company and year

 No text book is required.

b.Number of pages of reading required per week:

N/A

c.Number of pages of writing required over the course of the semester:

N/A

22.High-Impact Activities (Check all that apply)

☐Collaborative assignments

☐Research with a faculty member

☐Diversity/Global learning experience

☐Service learning or community learning

☐Study abroad

☐Internship

☐ Capstone or senior culminating experience

XOther Explain: Basic hands on learning experience

23. Considering the indicated primary goal (in Box #20), provide up to three outcomes that you expect of students after completion of this course.

**Outcome #1:** (For example, what will students who meet this goal know or be able to do as a result of this course?)

Students will have an ability to understand and build basic electric circuits.

Learning Activity :(For example, what instructional processes do you plan to use to help students reach this outcome?)

Students will learn PCB making and circuit testing using laboratory experiments and projects.

Assessment Tool: (For example, what will students demonstrate, represent, or produce to provide evidence of their learning?)

Students will build various circuits, projects, and demonstrate how the circuit works. A rubric will be used to evaluate student performance.

*(Repeat if needed for additional outcomes 2 and 3)*

**Outcome #2:**

Learning Activity:

Assessment Tool:

**Outcome #3**:

Learning Activity:

Assessment Tool:

24. Please indicate the extent to which this course addresses university-level student learning outcomes:

* 1. Global Awareness

XMinimally
☐Indirectly
☐Directly

* 1. Thinking Critically

☐Minimally
☐Indirectly
X Directly

* 1. Using Technology

☐Minimally
☐Indirectly
X Directly

**From the most current electronic version of the bulletin, copy all bulletin pages that this proposal affects and paste it to the end of this proposal.**

**To copy from the bulletin:**

1. Minimize this form.
2. Go to <http://registrar.astate.edu/bulletin.htm> and choose either undergraduate or graduate.
3. This will take you to a list of the bulletins by year, please open the most current bulletin.
4. Find the page(s) you wish to copy, click on the “select” button and highlight the pages you want to copy.
5. Right-click on the highlighted area.
6. Click on “copy”.
7. Minimize the bulletin and maximize this page.
8. Right-click immediately below this area and choose “paste”.
9. For additions to the bulletin, please change font color and make the font size larger than the surrounding text. Make it noticeable.
10. For deletions, strike through the text, change the font color, and enlarge the font size. Make it noticeable.

Add EE 2322 Course on page 193, 199, and course description on page 443

**EE 2322 Electrical Workshop** Workshop processes involved in electrical engineering including workshop safety, electrical wiring and assembly, winding practice, domestic electrical appliances, soldering and de-soldering techniques, electronic project construction techniques, use of electronic bench equipment, and preparation of reports. Prerequisite, PHYS 2034. Fall.

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**Area of Concentration: Electrical Engineering**

|  |  |
| --- | --- |
| **Electrical Engineering:** Electives denoted with an asterisk (\*) may be selected from any courses within the desig­nated elective group; subject to a program advisor’s approval. They must make a rational contribution to the student’s personal and professional education goals.  | **Sem. Hrs.**  |
| CHEM 1023, General Chemistry II  | 3  |
| EE 2322 Electrical WorkshopCS 2114, Structured Programming  | 2 4 |
| EE 3401, Electronics I Laboratory  | 1  |
| EE 3403, Electronics I  | 3  |
| EE 3313, Electric Circuits II  | 3  |
| EE 3333, Digital Electronics I  | 3  |
| EE 3343, Engineering Fields and Waves I  | 3  |
| EE 3353, Continuous and Analog Systems  | 3  |
| EE 3373 Probability and Random SignalsEE 3383, Principles and Practices in Electrical Engineering  | 33 |
| EE 4323, Electrical Machinery **OR** EE 4353, Power Systems  | 3  |
| EE 4373, Electronics II **OR** EE 3363, Semiconductor Matl and Devices I  | 3  |
| EE 4773, Intermediate Electrical Engineering Laboratory **OR** EE 3303, Semiconductor and Optoelectronic Materials and Devices I Laboratory  | 3  |
| EE 4383, Digital Electronics II **OR** EE 4313, Control Systems  | 3  |
| ENGR 4413, Engineering Problem Solving  | 3  |
| \*Engineering Electives  | 2  |
| \*Approved Electives  | 3  |
| **Total Required Hours:**  | **46**  |

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Major in Electrical Engineering

Bachelor of Science in Electrical Engineering

A complete 8-semester degree plan is available at http://registrar.astate.edu/.

University Requirements:

See University General Requirements for Baccalaureate degrees (p. 41)

First Year Making Connections Course:

Sem. Hrs.

ENGR 1402, Concepts of Engineering (See College of Engineering Core Courses)

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General Education Requirements:

Sem. Hrs.

See General Education Curriculum for College of Engineering

38

Additional Support Courses:

Sem. Hrs.

Refer to Additional Support Courses for College of Engineering

7

College of Engineering Core Courses:

Sem. Hrs.

Refer to College of Engineering Core Courses

34

Major Requirements:

Electives denoted with an asterisk (\*) may be selected from any courses within the desig

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nated elective group; subject to a program advisor’s approval. They must make a rational

contribution to the student’s personal and professional education goals.

In addition to the University requirements for all Baccalaureate Degrees, a Bachelor of

Science in Electrical Engineering requires that one of the two following conditions be met:

1. “C” or better in each course in the 49-hour major courses;

OR

2. 2.5 (or greater) grade point average in the 49-hour major courses listed below

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Sem. Hrs.

CHEM 1023, General Chemistry II 3

EE 2322 Electrical Workshop 2

CS 2114, Structured Programming 4

EE 3401, Electronics I Laboratory 1

EE 3403, Electronics I 3

EE 3313, Electric Circuits II 3

EE 3333, Digital Electronics I 3

EE 3343, Engineering Fields and Waves I 3

EE 3353, Continuous and Analog Systems 3

EE 3373 Probability and Random Signals 3

EE 3383, Principles and Practices in Electrical Engineering 3

EE 4323, Electrical Machinery

OR

EE 4353, Power Systems 3

EE 4333, Communications Theory 3

EE 4373, Electronics II OR

EE 3363, Semiconductor Materials and Devices I 3

EE 4773, Intermediate EE Lab OR

EE 3303, Semiconductor and Optoelectronics Matl and Devices I Lab 3

EE 4383, Digital Electronics II OR

EE 4313, Control Systems 3

ENGR 4413, Engineering Problem Solving 3

\*Engineering Electives 2

\*Approved Electives 3

Sub-total

49

Total Required Hours:

128

Page 443, 2014-15 Undergrduate bulletin, Add course description to before EE 3313 Electric Circuits II.

ELECTRICAL ENGINEERING PROGRAM

Electrical Engineering (EE)

**EE 2322. Electrical Workshop** Develop understanding and skills related to various workshop processes involved in electrical engineering. Workshop safety, electrical wiring and assembly, winding practice, domestic electrical appliances, soldering and de-soldering techniques, electronic project construction techniques, use of electronic bench equipment, preparation of reports. Prerequisite, PHYS 2034. Fall.

**EE 3303. Semiconductor and Optoelectronic Materials and Devices I Laboratory** Experimentation and demonstrations in semiconductor growth and deposition, material analysis and characterization, doping, and processing. Fabrication of simple devices. Metallization, etching, and other manufacturing processes. Lecture one to two hours, laboratory four to five hours per week. Prerequisite, C or better in CHEM 1011, PHYS 2034, and EE 3401. Corequisite, EE 3363. Spring, even.

**EE 3313. Electric Circuits II** Transient analysis, average power, RMS values, mutual inductance, resonance, network theorems and principles, polyphase networks, complex power. Prerequisite, C or better in MATH 2214 and ENGR 2423. Spring.

**EE 3331.Digital Electronics I Laboratory** Experimentation and design with digital electronic and computer components and circuits including logic gates, flip flops, counters, and registers. Practical applications in timing and control. Logic families such as TTL, ECL, and CMOS. Prerequisite, C or better in ENGR 2421. Corequisite, EE 3333. Demand.

**EE 3333. Digital Electronics I** Introduction to the analysis and design of digital and computer circuits, Boolean algebra, binary arithmetic, combinational logic, sequential logic, registers, counters, adders, comparators, and computer organization. Prerequisite, C or better in either CS 2114 or ENGR 2423. Fall.

**EE 3343.Engineering Fields and Waves I** Study of time invariant electric and magnetic fields in free space and in materials, electrical current flow as a function of electric field, magnetic flux, interaction of magnetic fields with electrical current and voltage, electrical and magnetic potentials, time changing electric and magnetic fields, and introduction to Maxwell’s Equations. Prerequisites, C or better in MATH 3254 and EE 3313. Fall.

**EE 3353.Continuous and Analog Systems** Methods of analysis of continuous and analog systems and associated synthesis, simulation, and design, system response in the time and frequency domains, Laplace transforms, Fourier series and transforms, transfer functions, and convolution. Prerequisite, C or better in EE 3313. Corequisite, MATH 4403. Fall.

**EE 3363.Semiconductor Materials and Devices I** Semiconductor materials and theory of solid state electronic devices. Semiconductor growth and processing techniques. Semiconductor parameters such as bandgap, mobility, carrier densities, diffusion length, carrier lifetime, and en-ergy level distribution. Pn junctions and Schottky barriers. Constraints and limitations on practical

devices. Prerequisite, C or better in CHEM 1013, PHYS 2034, and C or better in EE 3403 and

ENGR 3443. Spring, even

**EE 3383.Principles and Practices in Electrical Engineering** Principles of and good practices in electrical engineering, professional organizations, literature, intellectual property, licensure, ethics and regulations, vendors, products, specifications, procurement, communications and human relations, resource management, product certification and manufacturability, and modern and tools and issues. Prerequisite, C or better in EE 3313. Spring.

**EE 3401.Electronics I Laboratory** Basic laboratory experiments in electronic circuits and solid state electronic devices. Corequisite, EE 3403. Prerequisite, C or better in ENGR 2421. Fall.

**EE 3403.Electronics I** Theory, analysis, and introductory design of diode, bipolar junction transistor, operational amplifier, and field effect transistor devices and circuits. Prerequisite, C or better in ENGR 2423. Fall.

**EE 4303.Engineering Field and Waves II** Study of electromagnetic waves in free space, dielectrics, and conductors, transmission lines, polarization, reflection, refraction, diffraction, waveguides, resonators, antennas, and radiation. Prerequisites, C or better in MATH 4403 and EE 3343. Dual listed as EE 5303. Demand.

**EE 4313.Control Systems** Analysis and design of linear feedback systems. Transfer func-tions, transient and steady state characterization, stability determination. Closed loop analysis and design using root locus and frequency domain methods. Prerequisites, C or better in EE 3403. Corequisite, EE 3353. Dual listed as EE 5313. Demand.

**EE 4333.Communications Theory** Frequency spectra of time signals. Review of Fourier series and transforms. Signal mixing, modulation, and demodulation. AM and FM broadcasting techniques and bands. Pulsed and digital communication modes. Prerequisite, C or better in EE 3353 and EE 3403. Dual listed as EE 5333. Demand.

**EE 4321.Electrical Machinery Laboratory** Experiments dealing with motor, generators, transformers, and associated measurements and controls. Prerequisite, C or better in ENGR 2421. Corequisite, EE 4323. Demand.

**EE 4323.Electrical Machinery** Introduction to the analysis and design of electromechanical energy conversion systems, magnetic circuit theory, general transformer and machinery theory, and DC and AC motors and generators. Prerequisite, C or better in EE 3313 or ENGR 3473, and ENGR 3423. Dual listed as EE 5323. Demand.

**EE 4344.Microprocessor and PLC Applications** A microcomputer and programmable logic controller course for junior and senior level engineers. A survey of small computers and their engineering functions including control, sensing, and computation. The concept of using control programming languages is introduced. Prerequisites, C or better in EE 3333 and EE 3401, or consent of instructor. Dual listed as EE 5344. Demand.