

# 2014-2015 SHORT SIGNATURE SHEET



UNC CHARLOTTE

Date: 22 January 2015

Subject: Catalog Change for Electrical Engineering

Originating Department: ECE

TYPE OF PROPOSAL: UNDERGRADUATE X GRADUATE \_\_\_\_\_ UNDERGRADUATE & GRADUATE \_\_\_\_\_  
 (Separate proposals sent to UCCC and Grad. Council)

DATE RECEIVED	DATE FORWARDED	COMMENTS: APPROVED, APPROVED WITH REVISIONS, ETC.	SIGNATURES
	20 Mar 2015		<b>PERSON ORIGINATING PROPOSAL</b>  [print name here:] Ryan Adams
	3/25/2015	Approved	<b>DEPARTMENT CHAIR</b>  [print name here:] ASIS NASIPURI
		Approved	<b>COLLEGE CURRICULUM COMMITTEE CHAIR</b>  [print name here:] Mehdi Miri
	4/23/15	Approved	<b>COLLEGE DEAN</b>  [print name here:]
		Approved	<b>GENERAL EDUCATION</b> (if applicable; for General Education courses only) [print name here:]
		Approved	<b>HONORS COLLEGE</b> (if applicable; for Honors courses & programs) [print name here:]
		Approved	<b>UNDERGRADUATE COURSE &amp; CURRICULUM COMMITTEE CHAIR</b> (for undergraduate courses only)
		Approved	<b>GRADUATE COUNCIL CHAIR</b> (for graduate courses only)
			<b>FACULTY GOVERNANCE ASSISTANT</b> (received and processed in Academic Affairs)



# UNC CHARLOTTE

## SHORT FORM COURSE AND CURRICULUM PROPOSAL

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\*To: Dr. Mehdi Miri

From: Dr. Ryan Adams

Date: 22 January 2015

Re: Catalog Change for Electrical Engineering

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**SUMMARY:** This proposal intends to make several changes to the electrical engineering program to align better with our educational objectives and desired student outcomes. These changes include the following:

- 1) The department has found over the past several years that some students have chosen to take technical electives that are at a lower level than was intended by the faculty. After reviewing the catalog verbiage, it was determined to implement the intended policy that 4 of the 5 technical electives should be selected from 4000-level ECGR courses. This way graduates will have more extensive knowledge in their chosen subject area and be more prepared for employment and graduate study.
- 2) Change in the name of ECGR 2181 to avoid confusion.
- 3) It has been found that electrical engineering students that have not yet completed ECGR 3121 perform more poorly in senior design. Unfortunately, computer engineering students are not required to complete this course. So, we are proposing to create two new courses ECGR 4231 Electrical Engineering Senior Design I and ECGR 4241 Electrical Engineering Senior Design II where the pre-requisite for ECGR 4231 includes ECGR 3121.
- 4) Student performance in most junior level classes have suggested that the material covered in MATH 2164 Matrices and Linear Algebra will improve student performance. So, this course is proposed to be added to the curriculum.

### **FOR CONSULTATION WITH OTHER DEPARTMENTS:**

1. Does the proposed change affect other departments (including additions and/or changes to degree requirements or prerequisites offered in other departments)?

Yes  No

2. If Yes, please list the other departments affected by the proposed change:

Mathematics and Economics.

3. Have you consulted with each department listed in item 2 regarding the proposed change?

Yes  No

Result(s) of Consultation(s) (please attach documentation):

The mathematics department has confirmed that they can support the addition of MATH 2164 as a required course in the curriculum (see attached email confirmation).

The economics department has confirmed that they will support allowing our students to choose between ECON 2101 and 2102 (please see attached email confirmation).

4. For a new course or for major modification of an existing course, include Consultation on Library Holdings.

5. For proposals involving Honors courses or programs, include written consultation with the Honors Council.

### **RESOURCES:**

1. For a new course or revisions to an existing course, check all the statements that apply:

This course will be cross listed with another course.

There are prerequisites for this course.

There are co-requisites for this course.

This course is repeatable for credit.

This course will affect the number of credits hours for its program.

This proposal results in the deletion of an existing course(s) from the degree program and/or catalog.

This proposal will alter an agreement with a North Carolina community college.

For all items checked above, applicable statements and content must be reflected in the proposed catalog copy.

2. Indicate the additional resources required, if any, to implement and maintain the proposed change.

None

### **CREDIT HOUR (Mandatory if new and/or revised course in proposal):**

Review statement and check box once completed.

The appropriate faculty committee has reviewed the course outline/syllabus and has determined that the assignments are sufficient to meet the University definition of a credit hour.

**PROPOSED CATALOG COPY:** For existing courses copy and paste the current catalog copy and use the Microsoft Word "track changes" feature (or use red text with "strikethrough" formatting for text to be deleted, and adding blue text with "underline" formatting for text to be added). For new courses, draft comprehensive catalog copy.

# BACHELOR OF SCIENCE IN ELECTRICAL Engineering (B.S.E.E.)

A Major in Electrical Engineering leading to the B.S.E.E. degree consists of a total of 127 credit hours.

## Degree Requirements

### General Education Courses (21 hours)

ECON 2101 Principles of Economics – Macro (3) or ECON 2102 Principles of Economics – Micro (3)  
LBST 110x The Arts and Society (3)  
LBST 2101 Western Cultural and Historical Awareness (3)  
LBST 2102 Global and Intercultural Connections (3)  
LBST 221x Ethical Issues and Cultural Critique (3)  
UWRT 1101 Writing and Inquiry in Academic Contexts I (3)  
UWRT 1102 Writing and Inquiry in Academic Contexts II (3)

*Note: The liberal studies electives must be chosen to satisfy the University General Education Requirements and to meet the objectives of a broad education consistent with the educational goals of the profession.*

### Pre-Major Courses (18 hours)

CHEM 1251 General Chemistry I (3)  
CHEM 1251L General Chemistry I Lab (1)  
ENGR 1201 Introduction to Engineering Practices and Principles I (2)  
ENGR 1202 Introduction to Engineering Practices and Principles II (2)  
MATH 1241 Calculus I (3)  
MATH 1242 Calculus II (3)  
PHYS 2101 Physics for Science and Engineering I (3)  
PHYS 2101L Physics for Science and Engineering I Lab (1)

### Major Courses (5154 hours)

ECGR 2103 Computer Utilization in C++ (3)  
ECGR 2111 Network Theory I (3)  
ECGR 2112 Network Theory II (3)  
ECGR 2155 Instrumentation and Networks Lab (1) (W)\*  
ECGR 2156 Logic and Networks Lab (1) (W)\*  
ECGR 2181 Logic Systems Design-I (3)  
ECGR 2252 Electrical Engineering Design-I ECE Sophomore Design (2) (O)  
ECGR 3111 Signals and Systems (3)  
ECGR 3112 System Analysis II (3) or ECGR 3181 Logic System Design-II (3)  
ECGR 3121 Introduction to Electromagnetic Fields (3)  
ECGR 3122 Electromagnetic Waves (3)  
ECGR 3131 Fundamentals of Electronics and Semiconductors (3)  
ECGR 3132 Electronics (3)  
ECGR 3142 Electromagnetic Devices (3) or ECGR 3133 Solid State Microelectronics I (3)  
ECGR 3155 Systems and Electronics Lab (1) (W)\*  
ECGR 3156 Electromagnetic and Electronic Devices Lab (1) (W)\*  
ECGR 3157 Electrical Engineering Design-II ECE Junior Design (2) (O)  
ECGR 3159 Professional Practice (2)  
ECGR-3253 Senior Design I (2) (O, W)  
ECGR-3254 Senior Design II (3) (O, W)  
ECGR 4123 Analog and Digital Communication (3) or ECGR 4124 Digital Signal Processing (3)  
ECGR 4231 Electrical Engineering Senior Design I (2) (O, W)  
ECGR 4241 Electrical Engineering Senior Design II (3) (O, W)

*\*The laboratory courses are designed to: (1) teach the basic techniques of instrumentation; (2) develop skills in communications; and (3) relate the analytical methods developed in the classroom to the performance of real physical systems.*

### Related Courses (2249 hours)

ENGR 3295 Multidisciplinary Professional Development (1)  
MATH 2171 Differential Equations (3)  
MATH 2241 Calculus III (3)

MEGR 3111 Thermodynamics I (3)  
PHYS 2102 Physics for Science and Engineering II (3)  
PHYS 3141 Introduction to Modern Physics (3)  
STAT 3128 Probability and Statistics for Engineers (3)  
MATH 2164 Matrices and Linear Algebra (3)

### Electives (15-8 hours)

Four ECGR 4xxx Electrical Engineering Electives (312)  
One Four-Technical Electives (123)\*\*  
One Science/Math-Elective (3)\*\*\*

*\*\*The technical electives should be at or above the 3000-level for ECGR courses not specified in the curriculum, or of which 3 hours may be a non-ECGR course at or above the 3000-level. These electives are chosen by students in consultation with their academic adviser. Students can use these electives to obtain significant depth within a particular concentration area of electrical or computer engineering in order to prepare for the careers of their interests, or for graduate work in electrical or computer engineering. The technical electives must contain at least 3-12 hours of coursework dealing with engineering science, analysis, synthesis, or design. The contents of the technical electives should be at levels higher than those required by the student's curriculum.*

*\*\*\*A science elective must be chosen from college-level chemistry, physical, or biological science courses. A math elective must be chosen from college-level, non-remedial mathematics or statistics courses. This elective course should complement the student's overall educational plan, and its content should be at a level above what is required by the student's academic plan of study.*

### Grade Requirements

All non-elective Freshman-year courses must be completed with C or above prior to enrolling in any Junior-level courses.

### Suggested Curriculum

For a suggested curriculum for this degree to map out a path toward completing the major, please see the Academic Plan of Study available online at [academics.uncc.edu](http://academics.uncc.edu).

**ECGR 2181. Logic Systems Design I. (3)** Prerequisite: MATH 1242 with a grade of C or above or permission of department. Introduction to Boolean algebra; mixed logic; design of combinational circuits; introduction to sequential systems; MSI building blocks; digital systems design and test; design of multi-input based controller systems; programmable logic devices; includes laboratory design projects.

**ECGR 2252. ECE Sophomore Design Electrical Engineering Design I. (2) (O)** Prerequisites: ECGR 2111 and ECGR 2155 or equivalents. Pre- or corequisites: ECGR 2112 and ECGR 2181 or equivalents. Introduction to the electrical engineering design process including teamwork, design specifications, conceptual design, detailed design, design integration, cost estimation and market considerations. Product design projects are completed and laboratory prototypes are developed and tested by design teams. Oral presentations and written technical reports on the design projects are required.

**ECGR 3157. Electrical Engineering ECE Junior Design II. (2) (O)** Prerequisites: ECGR 2252, ECGR 3111 and ECGR 3131, each with a grade of C or better. ~~ECGR 2112, ECGR 2252, and ECGR 2181.~~ Pre- or corequisites: ~~ECGR 3111 and ECGR 3131,~~ or permission of the department. Application of conceptual design; circuit design; parameter sensitivity analysis; cost-performance tradeoff analysis and interconnection compatibility design. A design project completed in a laboratory setting and a written technical report and oral presentation on the project are required.

**ECGR 4231. Electrical Engineering Senior Design I. (2)** Prerequisites: Senior standing in electrical engineering, ECGR 3121 and ECGR 3157, each with a grade of C or above. A project-oriented course stressing the planning and design of experiments to support the student's project. Formation of the design problem and specification. Credit will not be given for ECGR 4231 where credit has been given for ECGR 4232.

**ECGR 4232. Computer Engineering Senior Design I. (2)** Prerequisites: Senior standing in computer engineering, ECGR 3101 and ECGR 3157 each with a grade of C or above. A project-oriented course stressing the planning and design of experiments to support the student's project. Formation of the design problem and specification. Credit will not be given for ECGR 4232 where credit has been given for ECGR 4231.

**ECGR 4241. Electrical Engineering Senior Design II. (3)** Prerequisites: ECGR 4231, with a grade of C or above. A continuation of ECGR 4231 consisting of project development and analysis, culminating in written and oral presentations. Credit will not be given for ECGR 4241 where credit has been given for ECGR 4242.

**ECGR 4242. Computer Engineering Senior Design II. (3)** Prerequisites: ECGR 4232, with a grade of C or above. A continuation of ECGR 4232 consisting of project development and analysis, culminating in written and oral presentations. Credit will not be given for ECGR 4242 where credit has been given for ECGR 4241.

**ACADEMIC PLAN OF STUDY (UNDERGRADUATE ONLY):** Does the proposed change impact an existing Academic Plan of Study?

- Yes. If yes, please provide updated Academic Plan of Study in template format.  
 No.

**STUDENT LEARNING OUTCOMES (UNDERGRADUATE & GRADUATE):** Does this course or curricular change require a change in SLOs or assessment for the degree program?

- Yes. If yes, please provide updated SLOs in template format.  
 No.

**TEXTBOOK COSTS:** It is the policy of the Board of Governors to reduce textbook costs for students whenever possible. Have electronic textbooks, textbook rentals, or the buyback program been considered and adopted?

- Yes. Briefly explain below.  
 No. Briefly explain below.

The use of electronic textbooks has been considered throughout the program and adopted wherever appropriate. The department will continue to look for opportunities to use electronic textbooks in the future.

**IMPORTANT NOTE:** A Microsoft Word version of the final course and curriculum proposal should be sent to [facultygovernance@uncc.edu](mailto:facultygovernance@uncc.edu) upon approval by the Undergraduate Course and Curriculum Committee and/or