

# Electrical Engineering

## ADDENDUM - 7/26/2024

The mission of the Department of Electrical & Computer Engineering is to offer undergraduate and graduate programs of excellence in engineering that serve the needs of the West Florida region, the state, and the nation. The goal of these programs is to prepare students for a successful professional career in their respective chosen discipline of study. All programs shall be revised continuously to improve quality and respond to current workforce needs.

The Bachelor of Science degree in Electrical Engineering program at UWF is accredited by the Engineering Accreditation Commission of ABET, <https://www.abet.org>. ABET is the recognized accreditor for college and university programs in applied science, computing, engineering and technology and is among the most respected accreditation organizations in the United States.

The program's educational objectives are to ensure:

- Graduates of the program will be successful in the professional practice of engineering or related fields and will advance in their chosen careers.
- Graduates of the program will be successful in pursuing advanced degrees in engineering or related fields.

Electrical Engineering is science-oriented and primarily concerned with all phases and development of the transmission and utilization of electric energy and intelligence. Because of the extremely rapid growth and changes relating to the application of electrical engineering principles, the curriculum is designed to concentrate on a solid core of foundation courses. Twelve hours of electives are included to permit a student to delve deeply into selected subject matter.

Electrical Engineers find career opportunities in a wide area of settings such as aerospace contractors, manufacturers of consumer electronics, telecommunications, energy distribution, and public-sector positions with federal, state, and local governments.

## Program Requirements

Students are required to have a laptop or tablet PC. Please visit our [department website](#) for information about minimum hardware configuration, [department scholarships](#), and other useful information.

In addition to the University's general requirements, students seeking the B.S.E.E. must meet the requirements listed below.

A minimum course grade of "C-" or better is required in all math and science courses. In addition, a "C" grade is required in the Electrical Engineering core courses as well as all engineering courses that serve as prerequisites to EGN, EGM, EML, EEL, and EEE prefixed courses and labs. See our program requirements for a list of all courses that require a minimum grade of a "C-" or a "C".

The Electrical Engineering curriculum is designed to yield a set of outcomes. Each upper-division course in the program contributes to at least one of these outcomes. A current list of our program outcomes and the courses that map to them can be found on the [Institutional Effectiveness website](#).

All students must complete an exit interview and submit a copy of their senior design report before graduating.

## General Education

In addition to the General Education requirements listed on this page, students must satisfy all additional University requirements, including the College-Level Communication and Computation, multicultural, and foreign language requirements. With appropriate planning and coordination with an academic advisor, students may satisfy some of the general University requirements through the General Education curriculum. For a complete listing of general degree requirements, refer to the [University Requirements](#) section of this catalog.

### General Education Curriculum:

#### Communication

ENC 1101	English Composition I (Core)	3
ENC 1102	English Composition II (Breadth)	3

#### Humanities

Choose one course from Group A (Core) and one additional course from either Group A or Group B (Breadth) 6

##### Group A (Core)

ARH 1000	Art Appreciation
LIT 2000	Introduction to Literature
MUL 2010	Music Appreciation
PHI 2010	Introduction to Philosophy
THE 2000	Theatre Appreciation

##### Group B (Breadth)

AML 2010	American Literature I
AML 2020	American Literature II
ARH 2050	Western Survey I: Prehistory to the Medieval Period
ARH 2051	Western Survey II: Renaissance to Contemporary
ART 1015C	Exploring Artistic Vision
ART 2821	The Self, Creativity, Your Career and Visual Culture
CRW 2001	Introduction to Creative Writing
ENL 2010	History of English Literature I
ENL 2020	History of English Literature II
IDH 1040	Honors Core: Humanities
LIT 2030	Introduction to Poetry
MUH 2930	The Music Experience: Special Topics
PHI 2103	Critical Thinking
PHI 2603	Ethics in Contemporary Society
REL 1300	World Religions
SPC 2608	Public Speaking
THE 2300	Survey of Dramatic Literature

#### Mathematics

Choose one course from Group A (Core) and one Additional course from either Group A or Group B (Breadth) 6

##### Group A (Core)

MAC 1105	College Algebra
MAC 1105C	College Algebra with Lab
MAC 2311	Analytic Geometry and Calculus I
MGF 1130	Mathematical Thinking
STA 2023	Elements of Statistics

## Group B (Breadth)

MAC 1114	Trigonometry
MAC 1140	Precalculus Algebra
MAC 1147	Precalculus with Trigonometry
MAC 2233	Calculus with Business Applications
MAC 2312	Analytic Geometry and Calculus II
MGF 1131	Mathematics in Context
STA 2360	Introduction to Data Science

**Natural Sciences**

Choose one course from Group A (Core) and one additional course from either Group A or Group B (Breadth) 6

## Group A (Core)

AST 1002	Descriptive Astronomy
BSC 1005	General Biology for Non-Majors *
BSC 1085	Anatomy and Physiology I *
BSC 2010	Biology I
CHM 1020	Concepts in Chemistry *
CHM 2045	General Chemistry I *
ESC 2000	Introduction to Earth Science *
EVR 2001	Introduction to Environmental Science
GLY 2010	Physical Geology
PHY 1020	Conceptual Physics
PHY 2048	Calculus-Based Physics I **, **
PHY 2048C	Calculus-Based Physics I Studio ***
PHY 2053	Algebra-Based Physics I **, **

## Group B (Breadth)

ANT 2511	Biological Anthropology *
AST 2037	Life in the Universe
BOT 2010	General Botany
BSC 1050	Fundamentals of Ecology
BSC 1086	Anatomy and Physiology II *
BSC 2011	Biology II
BSC 2311	Introduction to Oceanography and Marine Biology *
CGS 2020	Introduction to Machine Learning
CHM 2046	General Chemistry II *
CIS 2530	Introduction to Cybersecurity
IDH 1043	Honors Core: Natural Sciences
MCB 1000	Fundamentals of Microbiology *
PHC 2082	Informatics and Your Health
PHY 2049	Calculus-Based Physics II **, **
PHY 2054	Algebra-Based Physics II **, **

\* May be taken with or without lab.

\*\* Algebra-Based Physics is usually recommended for non-science majors, while Calculus-Based Physics is recommended for science majors.

\*\*\*Although students receive 5 semester hours credit for PHY 2048C, an additional 3 semester science course will be needed to meet General Education requirements.

**Social Sciences**

Choose one course from Group A (Core) and one additional course from either Group A or Group B (Breadth) 6

## Group A (Core)

AMH 2010	United States to 1877
AMH 2020	United States Since 1877
ANT 2000	Introduction to Anthropology
ECO 2013	Principles of Economics Macro
POS 2041	American Politics
PSY 2012	General Psychology

## Group B (Breadth)

ANT 2100	Introduction to Archaeology
ANT 2400	Current Cultural Issues
CCJ 2002	Survey of Crime and Justice
COM 2023	Death and Communication
CPO 2002	Comparative Politics
DEP 2004	Human Development Across the Lifespan
EUH 1000	Western Perspectives I
EUH 1001	Western Perspectives II
FIN 2104	Personal Financial Planning
GEA 2000	Nations and Regions of the World
GEB 1011	Introduction to Business
HIS 2050	Explore History: Special Topics
IDH 1041	Honors Core: Social Sciences
INR 2002	International Politics
MMC 2000	Principles of Mass Communication
PLA 2013	Survey of American Law
SOW 2192	Understanding Relationships in the 21st Century
SPM 2010	Sport in Global Society
SYG 2000	Introduction to Sociology
SYG 2010	Current Social Problems

**General Education Electives**

Choose an additional course from two of the five areas of Communication, Mathematics, Social Sciences, Humanities, and Natural Sciences.

In order to minimize the number of courses required, students should consult with their academic advisor for courses which will satisfy both the General Education requirements and common prerequisites. For example, students can take MAC 2311 Analytic Geometry and Calculus I or MAC 2312 Analytic Geometry and Calculus II to complete the Mathematics requirement. The sciences listed in the Common Prerequisites section will also fulfill the General Education Natural Science requirement. To maximize the overlap, one of the two General Education Electives should be taken in the Natural Sciences, specifically CHM 2045 General Chemistry I, PHY 2048 Calculus-Based Physics I, or PHY 2049 Calculus-Based Physics II.

**Multicultural Requirement****Multicultural Courses**

An important component of a liberal education is the study of cultures other than one's own. As such, multiculturalism encompasses the appreciation of the values, expressions, and modes of organization of diverse cultural communities. To further such study, the University

of West Florida requires all students pursuing a bachelor's degree to complete at least one course that explores one or more of the dimensions of another culture (language, religion, socio-economic structures, etc.). Students are exempt from this requirement if they have completed an A.A. degree, the general education program at a Florida public institution, or a baccalaureate degree.

The requirement is satisfied by the successful completion of a multicultural course designated on the following list. Several of the selections are General Education courses, and students may enroll in these to meet both the General Education and the multicultural requirements.

*\*\*Passed by UWF Faculty Senate on 11/08/2002*

This list is continually updated and students are encouraged to check with their advisors for alternative options.

AML 2010	American Literature I	3	EUH 1001	Western Perspectives II	3
AML 2020	American Literature II	3	EUH 3334	Emperors, Sultans, Dictators, and Democrats: The Balkans	3
AML 3604	African American Literature	3	EUH 3411	Rome and the Mediterranean World	3
AML 3624	Black Women Writers	3	EUH 3576	Soviet Union since 1917	3
AML 4015	Topics in Nineteenth-Century American Literature	3	FOL 3501	Global Cinema	3
AML 4640	Topics in Native American Literature	3	GEA 2000	Nations and Regions of the World	3
ANT 1001	Anthropology as a Profession	1	GEB 4361	International Business	3
ANT 2000	Introduction to Anthropology	3	GEO 3421	Cultural Geography	3
ANT 2301	Human Sexuality and Culture	3	GEO 3471	Geography of World Affairs	3
ANT 3212	Peoples and Cultures of the World	3	HSC 2622	Introduction to Global Health Sciences	3
ANT 3312	North American Indians	3	HIS 2050	Explore History: Special Topics	3
ANT 3363	Japanese Culture	3	HIS 4262	Rise and Fall of the Portuguese Empire	3
ANT 4006	Anthropology of Human Rights	3	IDH 1040	Honors Core: Humanities	3
ANT 4025	Ritual Use of Human Remains	3	IDH 1041	Honors Core: Social Sciences	3
ANT 4403	Environmental Anthropology	3	INR 2002	International Politics	3
ANT 4516	Modern Human Physical Variation	3	LAH 4135	Spanish Conquest of the Americas	3
ARH 1000	Art Appreciation	3	LAH 4131	'Atlantic Indians': How Indigenous and African Peoples Shaped Europe & the Americas	3
ARH 2050	Western Survey I: Prehistory to the Medieval Period	3	LAH 4451	Greater Mexico: Central America from Conquest to the 20th Century	3
ARH 3201	Art and Culture in The Global Middle Ages	3	LAH 4728	Gender and Sexuality in Latin America from Colonization to Today	3
ARH 2051	Western Survey II: Renaissance to Contemporary	3	LIT 2000	Introduction to Literature	3
ARH 3590	Non-Western Art	3	LIT 2030	Introduction to Poetry	3
ARH 3607	Native American Art	3	LIT 4036	Topics in Poetry and Poetics	3
ARH 4412	The Age of Revolution to Romanticism in Europe: 1750-1850	3	LIT 4385	Feminist Theory	3
ARH 4450	Modern Art: 1850-1980	3	MAN 4102	Management of Diversity	3
ARH 4470	Contemporary Art	3	MAR 4156	Seminar in International Marketing	3
ARH 4563	Art of Japan	3	MMC 3743	Communicating Fear: Horror Films and Popular Culture	3
CCJ 3678	Race, Gender, Ethnicity, and Crime	3	MMC 3745	Communicating Fear Abroad: International Horror Films & Popular Culture	3
COM 3014	Gender Communication	3	MMC 4601	Minorities and the Mass Media	3
COM 3461	Intercultural Communication	3	MUH 2930	The Music Experience: Special Topics	3
COM 4242	Communication and Christianity	3	MUL 2010	Music Appreciation	3
CPO 2002	Comparative Politics	3	NUR 4615	Patient Centered Population Health	3
CRW 2001	Introduction to Creative Writing	3	NUR 4636	Population-based Public Health Nursing	3
EDF 2085	Teaching Diverse Populations	3	PHI 3790	African Philosophy	3
ENG 4013	Introduction to Literary Theory	3	PUR 3404	International Public Relations	3
ENL 2020	History of English Literature II	3	PSY 3860	Positive Psychology	3
EUH 1000	Western Perspectives I	3	SOP 3730	Psychology, Culture, and Society	3
			SOW 4233	Human Diversity and Social Justice	3
			SPN 3400	Advanced Stylistics	3
			SPN 4520	Latin American Culture and Civilization	3
			SYO 4421	Sociology of Health, Illness and Health Care	3
			SYO 4530	Inequality in America	3

## Civic Literacy Requirement

The 2017 Florida Legislature amended [Section 1007.25, Florida Statutes](#), to require students **initially entering a State University System (SUS) and/or Florida College System (FCS) institution in 2018-2019** and thereafter to demonstrate competency in civic literacy.

The 2021 Legislature further amended Florida Statutes, requiring students to complete both a civic literacy course and an exam. As a result, there are three cohorts of students currently matriculating at Florida public institutions subject to varying requirements. As demonstrated in the table below, the exact civic literacy requirements are based on the academic term in which a student first enrolled in a Florida public institution.

Students Included in Cohort	Civic Literacy Competency Requirement
Cohort 1: Students first entering the SUS or FCS prior to fall 2018	None
Cohort 2: Students first entering the SUS or FCS in fall 2018 – summer A 2021	Complete a course <b>or</b> exam (course options AMH 2020, POS 2041 )
Cohort 3: Students first entering the SUS or FCS in summer B 2021 (on or after July 1, 2021) and thereafter	Complete both a course <b>and</b> exam (course options AMH 2020, POS 2041)

Additionally, the 2021 Legislature made two additional exceptions: approving the use of accelerated mechanisms for meeting the course competency requirement and exempting high school students who pass the Florida Civic Literacy Exam in high school from the postsecondary exam requirement. These two changes are in effect for Cohort 3.

There are multiple ways to satisfy this requirement. Students should work with their academic advisor to determine which option is best for their degree requirements/degree plan.

Additional information can be found on our [Civic Literacy](#) website, SUS regulation [BOG 8.006](#) and Florida Statute [s.1007.25\(4,a-b\)](#).

## Mathematics Pathway

Students are advised to complete the following courses to fulfill the mathematics pathway that aligns with the mathematics skills needed for success in their program and their career goals. Students should refer to their academic advisor for questions about the math pathway for their program. For information about this requirement, refer to the catalog page for [Mathematics Pathways](#). These courses may also fulfill requirements for General Education and Common Prerequisites.

### Algebra through Calculus

Students will be placed on a starting point based on their mathematics placement.

MAC 1105	College Algebra	3-4
	or MAC 1105CCollege Algebra with Lab	
	or MAC 1140 Precalculus Algebra	
	or MAC 1114 Trigonometry	
	or MAC 1147 Precalculus with Trigonometry	
	or MAC 2311 Analytic Geometry and Calculus I	
MAC 1140	Precalculus Algebra	3-4
	or MAC 1114 Trigonometry	
	or MAC 1147 Precalculus with Trigonometry	
	or MAC 2311 Analytic Geometry and Calculus I	
	or MAC 2312 Analytic Geometry and Calculus II	

## Common Prerequisites

State-mandated common prerequisites must be completed prior to graduation, but are not required for admission to the program. See the [Common Prerequisite Manual](#) for course substitutions from Florida colleges and universities.

The following courses and labs require a minimum grade of a "C-".

CHM 2045+L	General Chemistry I (+Lab) *	4
MAC 2311	Analytic Geometry and Calculus I *	4
MAC 2312	Analytic Geometry and Calculus II *	4
MAC 2313	Analytic Geometry and Calculus III	4
MAP 2302	Differential Equations	3
PHY 2048+L	Calculus-Based Physics I (+Lab) *	4
PHY 2049+L	Calculus-Based Physics II (+Lab) *	4
<b>Total Hours</b>		<b>27</b>

\* Indicates common prerequisites which can be used to satisfy General Education requirements.

Note that all of the math and science common prerequisites do not have to be taken before students begin taking the major courses below. However, students do have to complete the specific math and science courses (with a minimum grade of a "C-") that are listed as prerequisites for any engineering course they would like to take.

## Major

EEE 3308+L	Electronic Circuits I (+Lab) <sup>+,c</sup>	4
EEE 4306+L	Electronic Circuits II (+Lab) <sup>+</sup>	4
EEL 3111+L	Circuits I (+Lab) <sup>+,c</sup>	4
EEL 3112	Circuits II <sup>+,c</sup>	3
EEL 3135	Discrete-Time Signals and Systems <sup>+,c</sup>	3
EEL 3211+L	Basic Electric Energy Engineering (+Lab) <sup>+</sup>	4
EEL 3472	Electromagnetic Fields and Applications I <sup>+,c</sup>	3
EEL 3701+L	Digital Logic and Computer Systems (+Lab) <sup>+,c</sup>	4
EEL 4514+L	Communication Systems and Components (+Lab) <sup>+</sup>	4
EEL 4657+L	Linear Control Systems (+Lab) <sup>+</sup>	4
EEL 4744+L	Microprocessor Applications (+Lab) <sup>+</sup>	4
EEL 4834	Programming for Engineers <sup>+,c</sup>	3
EGM 2500	Engineering Mechanics-Statics <sup>+</sup>	3
EGM 4313	Intermediate Engineering Analysis <sup>+,c</sup>	3
EGN 3204	Engineering Software Tools <sup>+,c</sup>	1
EGN 4950	Capstone Design I <sup>+,c</sup>	1
EGN 4952L	Capstone Design II <sup>+,c</sup>	2
EGS 4032	Professional Ethics <sup>+</sup>	3
EEL/EEE Electives <sup>1, +</sup>		12
Choose one of the following <sup>+</sup>		3
	EEE 3396 Solid-State Electronic Devices	
	or EEE 4310/LSI Circuit Design	
<b>Total Hours</b>		<b>72</b>

<sup>1</sup> EEL/EEE Elective restrictions: These electives must begin with the EEL or EEE prefix and cannot be otherwise required for the

program. A limited set of preapproved Mechanical Engineering courses may also be used. See your advisor for details. A maximum of 3 semester hours (sh) in EEL 4949 Co-Op Work Experience, 3 sh in EEL 4905, and 3 sh of EEL 4940 Engineering Internship will be accepted as EEL/EEE elective credits. In addition, combined experiential learning credits (EEL 4940 Engineering Internship and EEL 4949 Co-Op Work Experience) are limited to a maximum of 3 sh toward electives. Consult the department for the current list of approved EEL/EEE Elective courses. The department feels that licensure is an important step in an Engineer's career. To encourage our students to pursue their professional license, our students may take an FE review course toward their electives (3 sh maximum).

<sup>2</sup> Note that EGN 4950 Capstone Design I and EGN 4952L Capstone Design II are the senior design project courses. This final project is the culmination of the engineering education. As such, this sequence of courses must be taken in the last 2 semesters (excluding summers) of a student's program. Seniors must see an academic advisor in order to register for them. Note that even though they aren't prerequisites, we highly recommend that our students complete both EEL 4744 Microprocessor Applications and EEE 3308 Electronic Circuits I prior to taking EGN 4952L Capstone Design II.

### Major-Related

Consult the department for the current list of approved professional development elective courses.

EGS 1006	Introduction to Engineering <sup>3, +</sup>	1
EGS 3441	Engineering Statistics	3
General Engineering elective, choose one of the following: <sup>5, +</sup>		3
EGM 3401	Engineering Mechanics-Dynamics <sup>+</sup>	
	or EIN 4354 Engineering Economy	
<b>Total Hours</b>		<b>7</b>

<sup>3</sup> Transfer students or non-freshmen may choose to substitute a professional development elective. Work with your academic advisor to choose an elective that will aid you in your career objectives. Typical courses for this elective include, but are not limited to, professional writing courses, courses from STEM departments (not already required for our program), FE review or courses geared toward obtaining certifications, and additional EEL/EEE/EML/EGM elective credits beyond those specifically listed above.

<sup>4</sup> Other calculus-based statistics courses may also be acceptable.

<sup>5</sup> Other Engineering courses are also acceptable, including any engineering certification or FE review courses taken for credit. See the department advisor for a full list. Note that any courses used for EEL/EEE electives cannot also be used for this elective.

c These courses require a minimum grade of a "C". Note "C-" isn't acceptable. Other courses may also require a "C" if they are prerequisites to electives that you choose.

+ Courses included in the major GPA.

course and its prerequisite during the same semester. Students must complete MAC 2311 Analytic Geometry and Calculus I, MAC 2312 Analytic Geometry and Calculus II, MAC 2313 Analytic Geometry and Calculus III, MAP 2302 Differential Equations, and PHY 2049 Calculus-Based Physics II with a "C-" or better. Students must also take and pass PHY 2049L Calculus-Based Physics II Lab, but the "C-" is not required.

Students seeking the Minor in Electrical Engineering must have a minimum course grade of "C" or better in all electrical engineering courses.

Students in the minor may take MAS 3105 Linear Algebra or its equivalent or PHZ 4113 Mathematical Physics I or EGM 3344 Numerical Methods instead of EGM 4313 Intermediate Engineering Analysis as a prerequisite or corequisite for EEL 3112 Circuits II. A minimum grade of "C" is required in whichever course is taken.

EEL 3111+L	Circuits I (+Lab)	4
EEL 3112	Circuits II	3
EEE 3308+L	Electronic Circuits I (+Lab)	4
EGN 3204	Engineering Software Tools	1
3000/4000 EEL/EEE elective		3
<b>Total Hours</b>		<b>15</b>

### Electrical Engineering Minor

The Minor in Electrical Engineering provides an opportunity for students majoring in other areas to take a limited number of electrical engineering courses to complement their majors. The Minor in Electrical Engineering is open to all UWF students with the exception of computer and electrical engineering majors. Students applying for the minor must have a declared major. Students may not take a