ELECTRICAL AND COMPUTER ENGINEERING, B.S.E.E.

Contact: Dr. Prabir Patra, Chair
patrap@marshall.edu

The Marshall University Bachelor of Science in Electrical and Computer Engineering (B.S.E.E.) program goals are as follows:

1. Practice the electrical and computer engineering discipline successfully within community accepted standards.
2. Demonstrate teamwork and communication skills for a successful career.
3. Fulfill professional and ethical responsibilities in the practice of electrical and computer engineering, including social, environmental and economic considerations.
4. Engage in professional service, such as participation in professional society and community service.
5. Engage in lifelong learning activities, such as graduate studies or professional workshops.
6. Develop a professional career in the prevailing market that meets personal goals, objectives and desires.

The student outcomes of the B.S.E.E. are:

1. An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics.
2. An ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors.
3. An ability to communicate effectively with a range of audiences.
4. An ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts.
5. An ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives.
6. An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions.
7. An ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

Co-operative Education

Students may elect to participate in the co-operative education program. Students in the program will have periodic full-time work experiences in their area of interest with participating companies. Information on the program can be obtained from the division chair or academic advisor.

Admission Requirements

- Meet Marshall University admission requirements
- Admission to the B.S.E.E. program requires a minimum composite ACT score of 21 with a math score of 24, or a minimum SAT composite of 1060 with a math SAT of 570.
- Transfer students must have completed MTH 127 College Algebra-Expanded/MTH 130 College Algebra and MTH 132 Precalculus with Sci Applica.

Students not meeting the ACT/SAT score requirements above may enroll in Pre-Engineering. Requirements for Pre-Engineering are a minimum composite ACT score of 19 with a math score of 19-23, or a minimum SAT composite of 990 with a math SAT of 510-560. Students who are admitted to the Pre-Engineering program generally will require an additional calendar year to complete the requirements for the B.S.E.E. degree. Transfer students must be eligible to take MTH 127 College Algebra-Expanded/MTH 130 College Algebra and MTH 132 Precalculus with Sci Applica.

Graduation Requirements

The B.S.E.E. degree program requires a minimum of 132 credit hours of coursework. In addition to fulfilling the university's requirements for graduation, B.S.E.E. students must maintain a minimum GPA of 2.0 in all professional courses. These professional courses include mathematics (MTH 229 Calculus/Analytic Geom I (CT) or above), required science courses, core engineering (ENGR) courses, electrical and computer engineering courses (EE), and courses used as technical electives. Entering students with a Math ACT of 24-26 are required to take MTH 132 Precalculus with Sci Applica. Such students will likely need an extra semester or summer term to satisfy B.S.E.E. requirements.

- General Education Course

- Milestone course: a key success marker for your major. See your advisor to discuss the importance of this course in your plan of study.

The Core Curriculum is designed to foster critical thinking skills and introduce students to basic domains of thinking that transcend disciplines. The Core applies to all majors. Information on specific classes in the Core can be found at https://www.marshall.edu/gened/.

Course Requirements

Code	Title	Credit Hours
Core Curriculum		
Core 1: Critical Thinking		
FYS 100	First Yr Sem Critical Thinking	3
MTH 229	Calculus/Analytic Geom I (CT)	5
Critical Thinking Course		3
Core 2		
ENG 101	Beginning Composition	3
ENG 201	Advanced Composition	3
CMM 103	Fund Speech-Communication	3
MTH 229	Calculus/Analytic Geom I (CT)	5
PHY 211	University Physics I (Physical/Natural Science)	4
Core II Humanities		3
Core II Social Science		3

Core II Fine Arts		3
Additional University Requirements		
Writing Intensive		3
Writing Intensive		3
Multicultural or International		3
EE 420	Capstone Design	3
Major-Specific		
MTH 229	Calculus/Analytic Geom I (CT)	5
MTH 230	Calculus/Analytic Geom II	4
MTH 231	Calculus/Analytic Geom III	4
MTH 335	Ordinary Diff Equations	3
MTH 220	Discrete Structures	3
CHM 211	Principles of Chemistry I	3
PHY 211	University Physics I	4
PHY 213	University Physics II	4
PHY 204	General Physics 2 Laboratory	1
ENGR 103	Freshman Engineering Seminar	1
ENGR 104	The Engineering Profession	1
ENGR 217	Engineering Career Preparation	1
ENGR 201	Circuits I	4
ENGR 222	Engr Cost Analysis & Economy	3
ENGR 335	Adv Engineering Analysis	3
CS 110	Computer Science I	3
EE 202	Circuits II	3
EE 204	Intro to Digital Systems	3
EE 210	Programming Lab	3
EE 211	Intro to Computer Engineering	3
EE 310	Electromagnetic Fields	3
EE 320	Analysis of Signals & Systems	3
EE 330	Random Signals and Systems	3
EE 340	Computer Architecture & Design	4
EE 350	Elect Properties of Materials	3
EE 360	Control Systems	3
EE 370	Electric Machinery	3
EE 375	Communcation Systems I	3
EE 380	Microprocessor Design	3
EE 401	Communication Systems II	3
EE 415	Intro VHDL Design & HW Systems	3
EE 425	Electric Power Systems	3
EE 440	Digital Control Systems	3
EE 410	Electrical Engineering Design [1]	3
or EE 412	Computer Engineering Design	
EE 420	Capstone Design [2]	3
Technical Electives		
Select at least 2 technical elective courses related to the area of emphasis. The courses must be approved by the student's advisor and the division chair.		6
Suggested Electives:		
EE 445	Radio Freq & Microwave Engr	
EE 447	Real-Time Digital Processing	
EE 448	Power Electronics	
ME 465	Mechatronics	
CS 412	Embedded Systems	
CS 430	Cyber Security	
CS 440	Digital Image Processing	

[1] To be eligible for EE 410 Electrical Engineering Design or EE 412 Computer Engineering Design students must have senior standing in BSEE and have completed the following courses: EE 370 Electric Machinery, EE 375 Communcation Systems I, and EE 380 Microprocessor Design.

[2] To be eligible to take the capstone design course, students must have completed EE 410 Electrical Engineering Design or EE 412 Computer Engineering Design.

Major Information

- Course offerings and course attributes are subject to change each semester. Please consult each semester's schedule of courses for availability and attributes.
- Students are required to know and track their degree requirements for graduation or for entrance to a professional school.
- The B.S.E.E. degree program requires a minimum of 132 credit hours of coursework to graduate.

- General Education Course

- Milestone course: a key success marker for your major. See your advisor to discuss the importance of this course in your plan of study.

Semester Plan

Electrical and Computer Engineers design and maintain electrical control systems and components. They are multi-skilled and are able to work in projects from the design phase, through development, implementation, testing, up to client follow-up. The impact of their work is seen all over the building industry, services, transportation, manufacturing, and production and distribution of power.

First Year

First Semester		**Credit Hours**
CHM 211	Principles of Chemistry I	3
MTH 229	Calculus/Analytic Geom I (CT)	5
ENGR 103	Freshman Engineering Seminar	1
ENGR 104	The Engineering Profession	1
ENG 101	Beginning Composition	3
FYS 100	First Yr Sem Critical Thinking	3
UNI 100	Freshman First Class	1
	Credit Hours	**17**
Second Semester		
CS 110	Computer Science I	3
MTH 230	Calculus/Analytic Geom II	4
PHY 211	University Physics I	4
CMM 103	Fund Speech-Communication	3
MTH 220	Discrete Structures	3
	Credit Hours	**17**

Second Year		
First Semester		
EE 210	Programming Lab	3
ENGR 201	Circuits I	4
MTH 231	Calculus/Analytic Geom III	4
PHY 213	University Physics II	4
PHY 204	General Physics 2 Laboratory	1
ENGR 217	Engineering Career Preparation	1
	Credit Hours	**17**
Second Semester		
EE 202	Circuits II	3
ENGR 222	Engr Cost Analysis & Economy	3
EE 204	Intro to Digital Systems	3
EE 211	Intro to Computer Engineering	3
MTH 335	Ordinary Diff Equations	3
Core II Social Science (MC/I, WI)		3
	Credit Hours	**18**
Third Year		
First Semester		
ENGR 335	Adv Engineering Analysis	3
EE 310	Electromagnetic Fields	3
EE 340	Computer Architecture & Design	4
EE 350	Elect Properties of Materials	3
EE 320	Analysis of Signals & Systems	3
	Credit Hours	**16**
Second Semester		
ENG 201	Advanced Composition	3
EE 360	Control Systems	3
EE 330	Random Signals and Systems	3
EE 375	Communcation Systems I	3
EE 370	Electric Machinery	3
EE 380	Microprocessor Design	3
	Credit Hours	**18**
Fourth Year		
First Semester		
EE 401	Communication Systems II	3
EE 410 or EE 412	Electrical Engineering Design or Computer Engineering Design	3
EE 425	Electric Power Systems	3
EE 440	Digital Control Systems	3
Core II Humanities (WI, CT)		3
	Credit Hours	**15**
Second Semester		
EE 420	Capstone Design	3
EE 415	Intro VHDL Design & HW Systems	3
Technical Elective		3
Technical Elective		3
Core II Fine Arts		3
	Credit Hours	**15**
	Total Credit Hours	**133**