Curriculum of the UMES Electrical Engineering Program

General requirements of the degree

The Engineering program consists of 120 total credit hours. The curricula include 39 credit hours of general education courses in English, arts and humanities, social and behavioral sciences, and emerging issues. An additional 12 credits in mathematics and physical sciences are required under the General Education program, which are included as a part of the requirements for the Engineering major. This makes the total credits for General Education to be 39 credit hours. The engineering curriculum also requires 19 credits of supportive math and physics courses. Students take 51 credit hours of core electrical engineering courses. Students choose 11 credit hours of specialization courses from one of the four different engineering specialization areas such as Electrical, Computer, Mechanical, and Aerospace. The program is on semester base.

Total number of credits and their distribution

	Category	***Distribution***
I.	General Education Courses	39 credit hours
II.	Supportive Math & Science Courses	19 credit hours
III.	Engineering Core Courses	51 credit hours
IV.	Elective Courses	11 credit hours

List of Courses by Title and Level

I. General Education Requirements **39 Credit Hours**

Curriculum Area 1 ***6 Credit Hours required***

Elective Arts course 3 hrs OR Elective Literature Course 3 hrs
(ARTS 101, ARTS 310, MUSI 100, MUSI 101, MUSI 109) *(ENGL 204, ENGL 205, ENGL 206, ENGL 207)*
ENGL 203 Fundamentals of Contemporary Speech 3 hrs

Curriculum Area 2 ***6 Credit Hours required***

Elective Social Sciences course 3 hrs
(GEOG 201, GEOG 202, HIST 101/101H, HIST 102/102H, HIST 201, HIST 202, PHIL 201, POLI 200/POLI 200H, POLI 220H, POLI342, SOCI 101/SOCI 101H, ECON 200/ECON 200H, ECON 201/ECON 201H)
Elective Behavioral Sciences course 3 hrs
(CRJS 101, HUEC 203, HUEC 220, HUEC 361, PSYC 100, SOCI 201)

Curriculum Area 3 ***7 Credit Hours Required***

CHEM 111/ CHEM 111H Chemistry I 3 hrs OR BIOL 111/ BIOL 111H Principles of Biology I 3hrs
PHYS 161/ PHYS 181H General Physics I 3 hrs
PHYS 163/ PHYS 183H General Physics Lab I 1 hr

Curriculum Area 4 ***4 Credit Hours Required***

MATH 112 Calculus I 4 hrs

Curriculum Area 5 ***9 Credit Hours Required***

ENGL 101/ ENGL 101H Principles of Composition I 3 hrs
ENGL 102/ ENGL 102H Principles of Composition II 3 hrs
ENGL 305/ENGL 305H Technical Writing 3 hrs OR ENGL 310/ENGL 310H Advanced Composition 3hrs

Curriculum Area 6 ***7 Credit Hours Required***

ENGE 100 First Year Orientations with Engineering 1 hr
BUAD 213/BUAD 212/EDTE 111 3 hrs
BUAD 311/ENGL 359/HUEC203 3 hrs

II. Supportive Science & Math Requirements **19Credit Hours**

MATH 211 Calculus II 4 hrs
MATH 212 Calculus III 4 hrs
MATH 241 Differential Equations 3 hrs
PHYS 262 General Physics II 3 hrs
PHYS 264 General Physics Lab II 1 hr
PHYS 263 General Physics III 3 hrs
PHYS 265 General Physics Lab III 1 hr

III. Engineering Core Requirements **51 Credit Hours**

ENGE 150 Modern Engineering Design	3 hrs
ENGE 170 Programming Concepts for Engineers	3 hrs
ENGE 240 Basic Circuit Theory	3 hrs
ENGE 241 Analog Circuits Lab	1 hr
ENGE 250 Digital Logic Design	3 hrs
ENGE 251 Digital Logic Lab	1 hr
ENEE 222 Elements of Discrete Signal Analysis	3 hrs
ENEE 354 Digital Circuits and Systems	3 hrs
ENGE 320 Statistics & Probability for Engineers	3 hrs
ENGE 340 Analog and Digital Electronics	3 hrs
ENGE 341 Analog and Digital Electronics Lab	1 hr
ENGE 370 Computational Methods in Engineering	3 hrs
ENEE 330 Signals and Systems	3 hrs
ENEE 348 Electromagnetic Theory	3 hrs
ENCE 350 Computer Organization	3 hrs
ENGE 382 Control Systems	3 hrs
ENGE 383 Control Lab	1 hrs
ENEE 342 Circuit Theory and Analysis	3 hrs
ENGE 475 Engineering Seminar	1 hr
ENGE 476 Senior Design Project I	2 hrs
ENGE 477 Senior Design Project II	2 hrs

IV. Electrical Engineering Elective Requirements **11 Credit Hours**

Students will take 3 elective courses and 1 elective lab below:

ENEE 450 Electronic Circuit Design Lab	2hrs	ENEE 460 Digital Signal Processing	3 hrs
ENEE 385 Power Electronics	3hrs	ENEE 464 Embedded System Design Lab	2 hrs
ENEE 448 Electromagnetic Wave Propagation	3hrs	ENEE 465 Remote Sensing and Image Processing	3 hrs
ENEE 387 Simulation & Virtual Reality	3hrs	ENEE 468 Robotics	3 hrs
ENEE 422 Introduction to Machine Learning	3hrs	ENEE 469 Robotic & Automation Design Lab	2 hrs
ENEE 444 Communications Design Lab	2hrs	ENEE 443 Communication Systems	3 hrs
ENEE 452 Artificial Intelligence	3hrs	ENCE 456 Microprocessors Design Lab	2 hrs
ENEE 372 Computer Networks	3hrs	ENEE 490 Principle of Wireless Communications	3hrs
ENCE 352 Microprocessors and Microcomputers	3 hrs	ENEE 304 Introduction to Micro and Nanoelectronics	3hrs
ENCE 458 VLSI Design	3 hrs	ENCE 454 Computer System Architecture	3hrs
ENEE 462 Digital Control System	3 hrs	ENEE 472 Selected Topics in Engineering	3hrs
ENEE 301 Introduction to Device Physics	3 hrs	ENEE 462 Digital Control Systems	3hrs

RECOMMENDED COURSE SEQUENCE	MAJOR: Electrical Engineering				TOTAL: 120
FRESHMAN YEAR					
FIRST SEMESTER				**SECOND SEMESTER**	
CHEM 111	Chemistry I	3		ENGL 102	Basic Composition II	3
				MATH 211	Calculus II	4
MATH 112	Calculus I	4		PHYS 161	General Physics I	3
ENGE 150	Modern Engineering Design	3		PHYS 163	General Physics I Lab	1
ENGL 101	Basic Composition I	3		ENGE 170	Programming Concepts for Engineers	3
ENGE 100	First year Orientation with Engineering	1			General Edu (Arts and Humanities)	3
TOTAL		14		**TOTAL**		17
SOPHOMORE YEAR					
FIRST SEMESTER				**SECOND SEMESTER**	
MATH 241	Differential Equations	3		PHYS 263	Physics III	3
PHYS 262	Physics II	3		PHYS 265	Physics III Lab	1
PHYS 264	Physics II Lab	1		ENGE 240	Basic Circuit Theory	3
ENGE 250	Digital Logic Design	3		ENGE 241	Analog Circuits Lab	1
ENGE 251	Digital Logic Lab	1		MATH 212	Calculus III	4
ENEE 222	Elements of discrete signal analysis	3			General Edu (Social & Behavioral 2.1)	3
ENGL 203	Fundamentals of Contemporary Speech	3				
TOTAL		17		**TOTAL**		15
JUNIOR YEAR					
FIRST SEMESTER				**SECOND SEMESTER**	
ENGE 370	Computational Methods in Engineering	3		ENEE 348	Electromagnetic Theory	3
ENGE 340	Analog and Digital Electronics	3		ENEE 342	Circuit Theory and Analysis	3
ENGE 341	Analog and Digital Electronics Lab	1		ENEE 354	Digital Circuit and System	3
ENGE 320	Statistics & Probability for Engineers	3		ENGE 382	Control Systems	3
ENEE 330	Signals and Systems	3		ENGE 383	Control Lab	1
ENGL 305	Technical Writing	3			General Edu (Social & Behavioral 2.2)	3
TOTAL		16		**TOTAL**		16
SENIOR YEAR					
FIRST SEMESTER				**SECOND SEMESTER**	
	EE Elective (462/452)	3			EE Elective (460/468/352)	3
	EE Elective Lab (464)	2			EE Elective (443/465)	3
	Gen Ed (JEDI)	3		ENGE 477	Senior Design Project II	2
ENGE 476	Senior Design Project I	2		ENGE 475	Engineering Seminar	1
ENCE 350	Computer Organization	3			General Education (Computer)	3
TOTAL		13		**TOTAL**		12