

Co-Terminal Degree Proposal, Form 802 Attachment

Bachelor of Science in Electrical Engineering

Master of Engineering in Energy Systems

Undergraduate Program

Undergraduate Program Type: Bachelor of Science in Electrical Engineering

Total Undergraduate Program Credit Hours (including shared credit): 131-134 hours

Program Description: Electrical engineering is concerned with the generation, transmission, and utilization of electrical energy and with the transmitting and processing of information. Electrical engineers are involved in the analysis, design, and production of electric power, radio, radar, television, computing, telecommunication, control, and information systems. These engineers find solutions to the challenging technical problems that arise in our rapidly changing society. They impact virtually every aspect of daily life, as evidenced by examples such as wireless communications, audio and video equipment, power distribution, computerized traffic control, noise pollution monitoring and abatement, and medical instrumentation.

Program Purpose: The co-terminal program between the BS in Electrical Engineering and Master of Engineering in Energy systems (MES) allows students interested in energy system applications to enter the job force very competitively positioned to pursue these opportunities within energy-focused industries.

Program Benefits: The Master of Engineering in Energy systems degree was one of six new interdisciplinary engineering degrees approved for Fall 2017. These interdisciplinary degrees reflect contemporary shifts in engineering education and increase the attractiveness of IIT with potential graduate students. By offering these new interdisciplinary graduate degrees as co-terminal programs with our current undergraduate degrees, we are providing our current undergraduate engineering students a path to greater competitiveness while they retain undergraduate financial aid benefits. Furthermore, engineering transfer students often face significant course sequencing challenges within engineering curriculums. Some transfer students solve this problem by pursuing co-terminal programs, and some choose to leave IIT. This co-terminal program will increase the options available to transfer students and potentially improve retention.

Course requirements and sample curriculum: Course requirements and a sample curriculum are included in this document.

Competitive Programs: BS EE is a competitive degree offered by many institutions. However, most schools do not offer a co-terminal BS EE and engineering management.

Market Analysis: BS EE is a competitive degree offered by many institutions. The Master of Engineering in Energy systems is a new degree program (Fall 2017). Please refer to the market analysis for the MES degree provided in the 2017 degree program application for further information.

Marketing and Advertising: Both degrees are currently marketed. The co-terminal degree will be included in current co-terminal degree marketing and additional marketing by the Armour College of Engineering.

Enrollment Estimates: Estimated enrollment in this co-terminal program is 2-6 new students/year.

Retention Estimates: It is anticipated that retention may be improved for transfer students as the co-terminal program allows more flexibility for scheduling each semester.

Economic Analysis: There are no additional costs for the co-terminal program. It is expected that this co-terminal program will draw from a group of students separate from those who pursue the other EE co-terminal programs. Therefore, it is expected that additional tuition revenue will be generated equivalent to 24 credits/student enrolled in the program.

Graduate Program

Graduate Program: Master of Engineering in Energy systems

Program Overview: With its reputation as having the first microgrid energy-distribution system of its kind in the country, Illinois Tech is well equipped to prepare students to meet the challenges of generating, storing, and converting energy. Microgrid Design and Operation is one of the courses offered in the energy conservation and buildings specialty within the Master of Engineering in Energy Systems program. Two additional specialty tracks—energy generation and sustainability, and energy transmission and markets—are taught by faculty who have set the bar in energy systems and will empower students to become the next energy pioneers.

Program Justification: The Armour College of Engineering is committed to be a lifelong educational partner with our community, from pre-college to professional advancement. The MES degree program contributes to this commitment by enhancing the overall offerings within the Armour College of Engineering. It is anticipated that approximately 20 students will enroll in the MES program Fall 2018. The BS co-terminal degree is anticipated to add 2-6 additional students. A detailed justification for the MES program can be found in the 2017 MES degree application.

Program Resources: The co-terminal program does not require additional resources. The MES curriculum includes existing courses and a few new courses that will be developed according to program demand.

Program description: A detailed list of courses required for each track in the co-terminal degree follows. Students should have a 3.0 GPA in order to be accepted into the co-terminal program. Students will be accepted into the program beginning Fall 2018.

Description of courses shared between Undergraduate and Graduate programs:

a) Shared required courses:

b) Shared elective courses:

UG: ECE 418 (Professional Elective) as GRAD: Core Course

AND

Energy Generation & Sustainability Specialization:

UG: ECE 411 or ECE 412 (Professional Elective) as GRAD: Track Elective

Energy Conservation & Building Specialization:

UG: ECE 580 or ECE 581 (Professional Elective) as GRAD: Track Elective

Energy Transmission & Markets Specialization:

UG: ECE 411 or ECE 412 (Professional Elective) as GRAD: Track Elective

c) Course substitutions or exceptions:

Bachelor of Science in Electrical Engineering

Required Courses

	Credit Hours		
	<i>UG</i>	<i>grad</i>	<i>total</i>
Electrical Engineering Core Requirements ECE 100, 211, 213, 218, 242, 307, 308, 311, 312, 319	36	0	36
Master of Engineering in Energy systems Core Requirements (9 cr) MMAE 522, CHE 543, ECE 418	3	9	9
Energy Generation & Sustainability Specialization^{a, b} (select 4 courses min) MMAE 425, 433, 453, 523, CHE 541, ECE 411, 412 , 539, 552, 580	4	12-14	12-14
Energy Conservation & Buildings Specialization^{a, b} (select 4 courses min) CAE 513, 515, 526, CHE 541, ECE 580, 581 , 581, MMAE 525	3	12-14	12-14
Energy Transmission Specialization^{a, b} (select 4 courses min) ECE 411, 412 , 551, 555, 556, 561, 562, 564, 597	4	12-14	12-14
Master of Engineering in Energy systems Electives^b (9 cr) Additional courses from any specialization	0	9	9
Electrical and Computer Engineering Requirement ECE 211 or 218	3-4	0	3-4
Physics Requirements PHYS 123, 221, 224	11	0	11
Chemistry Requirements CHEM 122	3	0	3
Computer Science Requirements CS 115, 116	4	0	4
Professional ECE Elective^b (17-20 cr)	17-20	6-7	17-20
Technical Elective	3	0	3
Science Elective BIOL 105, 114, CHEM 126, MS 201	3	0	3
Engineering Science Requirement MMAE 200 or 320	3	0	3
Mathematics Requirements MATH 151, 152, 251, 252, 333, 374	24	0	24
Humanities and Social Science Requirements	21	0	21

IPRO	6	0	6
Total	131-134	30-32	155-159

(131-134 EE UG) + 30-32 (MES) - 6-7 (shared credits) = 155-159 (total)

^aOnly one track is required for the MES program

^bshared courses between undergraduate and graduate curricula (6-7 cr)

ECE 418 applied as UG Professional Elective and MES Core

ECE 411, 412, 580 or 581 applied as UG Professional Elective and MES Track Elective

Sample Schedule

Semester 1	Credits	Semester 2	Credits
ECE 100	3	MATH 152	5
MATH 151	5	PHYS 123	4
CHEM 122	3	CS 116	2
CS 115	2	Science Elective	3
Humanities 200- level Course	3	Social Science Elective	3
Total	16	Total	17
Semester 3	Credits	Semester 4	Credits
MATH 252	4	MATH 251	4
PHYS 221	4	PHYS 224	3
ECE 211	3	ECE 213	4
ECE 218	4	ECE 242	3
		Social Science Elective (300+)	3
Total	15	Total	17
Semester 5	Credits	Semester 6	Credits
MATH 333	3	ECE 308	3
ECE 307	4	ECE 312	4
ECE 311	4	ECE 319	4
IPRO Elective I	3	MATH 374	3
Humanities Elective (300+)	3	Social Science Elective (300+)	3
Total	17	Total	17
Semester 7		Semester 8	
Professional ECE Elective	4	CHE 543 (MES Core)	3
ECE 418 (MES Core)	3	MCE Elective	3
ECE 411 (MES Specialization)	4	MCE Specialization	3
MCE Specialization	3	MCE Specialization	3
		MCE Elective	3
Total	14	Total	15
Semester 9		Semester 10	
IPRO Elective II	3	MMAE 200 or 320	3
MMAE 522 (MES Core)	3	Professional ECE Elective	4
Professional ECE Elective	3-4	MCE Elective	3
Technical Elective	3	Hum/SS Elective	3
Humanities Elective (300+)	3		
Total	15-16	Total	13