M.S. in Electrical and Computer Engineering

Introduction

The Master of Science in Electrical and Computer Engineering prepares students for advanced careers in the aerospace industry. Like its undergraduate counterparts, it focuses on developing engineers who possess not only technical mastery but also the knowledge and ability to execute systems-level design, whether in avionics systems, spacecraft electronics, or more earthbound computer design.

The program allows the student to focus either on electrical engineering or computer engineering. For each area of concentration, the program begins with a foundation of courses in linear systems, random processes, and systems engineering. Then, each area has its own core: digital communications plus avionics & radio navigation comprise the electrical engineering core; project management and computer systems safety, the computer engineering core. The student can tailor each area of concentration toward either professional practice or further graduate study. For those inclined toward research and later doctoral studies, the program offers a thesis option. For those more interested in entering or returning to the workplace, there is a non-thesis option.

Applicants must have an undergraduate degree in electrical and/or computer engineering, another engineering discipline, computer science, or the physical sciences. Any engineering degree earned in the United States must be from an ABET-accredited program. Students should possess a strong academic record, demonstrated by a 3.0 CGPA or better. Applicants may be admitted conditionally with the provision that they complete specific undergraduate courses prior to enrolling in graduate courses.

Each area of concentration consists of 15 credits of required courses, with 9 credits common to both areas. The thesis option requires 9 credits of thesis and allows 6 credits of restricted electives. The non-thesis option allows for 12 credits of restricted electives and requires completion of a 3-credit project. Restricted electives include core courses from the complementary area of concentration, advanced courses in both electrical engineering and computer engineering, and graduate subjects in software engineering, aerospace engineering, mechanical engineering, engineering physics, and mathematics.

Admissions Criteria

Students will:

- Apply fundamental electrical and computer engineering professional practices to analyze, design, and implement electrical and/or computer systems.
- Apply knowledge of advanced topics in electrical or computer engineering, as appropriate to their chosen concentration.
- Communicate effectively on issues pertaining to electrical and computer engineering.

MSECE (Thesis option)

Core courses		15
Electives		6
CEC 700	Graduate Thesis	9
or EE 700	Graduate Thesis	
Total Credits		**30**

MSECE (Non-thesis option)

Core courses		15
Electives		12
CEC 690	Graduate Project	3
or EE 690	Graduate Project	
Total Credits		**30**

Areas of Concentration

Electrical Engineering

This area includes avionics, communications, power electronics, electromagnetic systems, computing systems, control systems, and systems engineering.

Core Courses for Electrical Engineering Concentration		
EE 510	Linear Systems	3
EE 515	Random Signals	3
EE 525	Avionics and Radio Navigation	3
EE 620	Digital Communications	3
SYS 500	Fundamentals of Systems Engineering	3
Electives for Electrical Engineering Concentration *		
Thesis Option, choose two; Non-thesis Option, choose four of the following:		6-12
AE 514	Introduction to the Finite Element Method	
AE 526	Engineering Optimization	
AE 527	Modern Control Systems	
CEC 500	Engineering Project Management	
CEC 510	Digital Signal Processing	
CEC 526	Sensor Data Fusion	
CEC 530	Image Processing and Machine Vision	
CEC 610	State and Parameter Estimation	
EE 500	Digital Control Systems	
EE 505	Advanced Mechatronics	
EE 527	Modern Control Systems	
EE 528	Sensors and Data Links	
EE 529	Electro-Optical Systems	
EE 625	Satellite-Based Communications and Navigation	
EP 501	Numerical Methods for Engineers and Scientists	
EP 505	Spacecraft Dynamics and Control	
HFS 635	Human-Computer Interaction	
MA 510	Fundamentals of Optimization	
ME 503	Introduction to Autonomous Vehicle Systems	
ME 520	Sensor Processing with Applications	
ME 527	Modern Control Systems	
ME 613	Advanced Model-Based Control Design	
ME 615	Pattern Recognition and Machine Learning	
SE 500	Software Engineering Discipline	
SE 505	Model-Based Verification of Software	
SE 530	Software Requirements Engineering	
SE 535	User Interface Design and Evaluation	
SE 545	Specification and Design of Real-Time Systems	
SE 610	Software Systems Architecture and Design	
SE 625	Software Quality Engineering and Assurance	
SYS 505	System Safety and Certification	
SYS 530	System Requirements Analysis and Modeling	
SYS 560	Introduction to Systems Engineering Management	
SYS 610	System Architecture Design and Modeling	
SYS 625	System Quality Assurance	
SYS 660	Organizational Systems Management	
Total Credits		**21-27**

* Other electives may be approved by the degree program coordinator

Computer Engineering

This area includes the analysis, design, development and deployment of computer systems, particularly real-time, safety-critical, and high-reliability systems.

Core Courses for Computer Engineering Concentration		
CEC 500	Engineering Project Management	3
EE 510	Linear Systems	3
EE 515	Random Signals	3
SYS 500	Fundamentals of Systems Engineering	3
SYS 505	System Safety and Certification	3
Electives for Computer Engineering Concentration *		
Thesis Option, choose two; Non-thesis Option, choose four of the following:		6-12
AE 514	Introduction to the Finite Element Method	
AE 526	Engineering Optimization	
AE 527	Modern Control Systems	
CEC 510	Digital Signal Processing	
CEC 526	Sensor Data Fusion	
CEC 530	Image Processing and Machine Vision	
CEC 610	State and Parameter Estimation	
EE 500	Digital Control Systems	
EE 505	Advanced Mechatronics	
EE 525	Avionics and Radio Navigation	
EE 527	Modern Control Systems	
EE 528	Sensors and Data Links	
EE 529	Electro-Optical Systems	
EE 620	Digital Communications	
EE 625	Satellite-Based Communications and Navigation	
EP 501	Numerical Methods for Engineers and Scientists	
EP 505	Spacecraft Dynamics and Control	
HFS 635	Human-Computer Interaction	
MA 510	Fundamentals of Optimization	
ME 503	Introduction to Autonomous Vehicle Systems	
ME 520	Sensor Processing with Applications	
ME 527	Modern Control Systems	
ME 613	Advanced Model-Based Control Design	
ME 615	Pattern Recognition and Machine Learning	
SE 500	Software Engineering Discipline	
SE 505	Model-Based Verification of Software	
SE 530	Software Requirements Engineering	
SE 535	User Interface Design and Evaluation	
SE 545	Specification and Design of Real-Time Systems	
SE 610	Software Systems Architecture and Design	
SE 625	Software Quality Engineering and Assurance	
SYS 530	System Requirements Analysis and Modeling	
SYS 560	Introduction to Systems Engineering Management	
SYS 610	System Architecture Design and Modeling	
SYS 625	System Quality Assurance	
SYS 660	Organizational Systems Management	
Total Credits		**21-27**

* Other electives may be approved by the degree program coordinator.