M.S. in Systems Engineering

Systems Engineering looks at the big picture of each project to understand the entire process, then works to achieve systems integration by matching customer needs to component designs. The Master of Science in Systems Engineering equips graduates to design, manage, and optimize complex systems in dynamic organizational environments.

The **Daytona Beach Campus** program is housed in the Electrical Engineering and Computer Science Department within the College of Engineering. The program provides an expert overview of systems engineering processes for developing and implementing solutions applicable to the aviation, aerospace, and transportation industries. There are two available tracks: the Technical Track and the Engineering Management Track. Students can choose between a thesis and a non-thesis option.

The **Worldwide & Online Campus** program is housed in the College of Aviation's School of Engineering. The Master of Science in Systems Engineering is designed for students who have previous knowledge and experience in a technical discipline and are looking to broaden their perspective and toolkit. Throughout the degree, students will be immersed in project management, encouraged to incorporate their experiences into their coursework, engaged in teamwork, and equipped to immediately apply new skills on the job. There are two available tracks: the Technical Track and the Engineering Management Track. Students may choose to complete a capstone project.

Program-Level Student Learning Outcomes

Students will:

- Integrate a systems engineering process to manage stakeholder needs and system requirements, considering technological, environmental, organizational, social, and economic factors throughout the system lifecycle.
- Apply systems engineering practice and/or modeling techniques that account for and validate design architectures, development, operation, and disposal of systems.
- Employ systems engineering management methods and techniques to plan, implement, and manage system development and related decision-making.
- Apply systems thinking principles to complex systems engineering, including subsystem interactions, feedback loops, emergent behaviors, decision-making processes, system performance, and real-world constraints.

Daytona Beach Program Requirements

Core Requirements	12
Areas of Concentration	18
Total Credits	**30**

Core Requirements

SYSE 500	Fundamentals of Systems Engineering	3
SYSE 530	System Requirements Analysis and Modeling	3
SYSE 560	Introduction to Systems Engineering Management	3
SYSE 625	System Quality Assurance	3
Total Credits		**12**

Areas of Concentration

Non-Thesis - Technical Track

SYSE 610	System Architecture Design and Modeling	3
SYSE 690	Systems Engineering Project	3
Choose Four of the Following:		12
AERO/BUAN/CESC/CIVE/ELEC/ENGP/MATH/MECH/MGMT/SCLM/SFTY/SFTW/SYSE 500-600 level courses		
Total Credits		**18**

Non-Thesis - Engineering Management Track

SYSE 660	Organizational Systems Management	3
SYSE 690	Systems Engineering Project	3
Choose Four of the Following:		12
AERO/BUAN/CESC/CIVE/ELEC/ENGP/MATH/MECH/MGMT/SCLM/SFTY/SFTW/SYSE 500-600 level courses		
Total Credits		**18**

Thesis oPTION

SYSE 700	Graduate Thesis	9
Choose Three of the Following:		9
AERO/BUAN/CESC/CIVE/ELEC/ENGP/MATH/MECH/MGMT/SCLM/SFTY/SFTW/SYSE 500-600 level courses		
Total Credits		**18**

Suggested Plans of Study

Non-Thesis Option - Technical Track

Year One

Requirements	Credits
SYSE 500 - Fundamentals of Systems Engineering	3
SYSE 530 - System Requirements Analysis and Modeling	3
Semester Hours	**6**

Requirements	Credits
SYSE 560 - Introduction to Systems Engineering Management	3
Elective	3
Elective	3
Semester Hours	**9**

Total Credits

Total Hours for All Requirements: 15

Year Two

Requirements	Credits
SYSE 625 - System Quality Assurance	3
SYSE 610 - System Architecture Design and Modeling	3
Elective	3
Semester Hours	**9**

Requirements	Credits
SYSE 690 - Systems Engineering Project	3
Elective	3
Semester Hours	**6**

Total Credits

Total Hours for All Requirements: 15

Non-Thesis Option - Engineering Management Track

Year One

Requirements	Credits
SYSE 500 - Fundamentals of Systems Engineering	3
SYSE 530 - System Requirements Analysis and Modeling	3
Semester Hours	**6**

Requirements	Credits
SYSE 560 - Introduction to Systems Engineering Management	3
Elective	3
Elective	3
Semester Hours	**9**

Total Credits

Total Hours for All Requirements: 15

Year Two

Requirements	Credits
SYSE 625 - System Quality Assurance	3
Elective	3
Elective	3
Semester Hours	**9**

Requirements	Credits
SYSE 660 - Organizational Systems Management	3
SYSE 690 - Systems Engineering Project	3
Semester Hours	**6**

Total Credits

Total Hours for All Requirements: 15

Thesis Option

Year One

Requirements	Credits
SYSE 500 - Fundamentals of Systems Engineering	3
SYSE 530 - System Requirements Analysis and Modeling	3
Semester Hours	**6**

Requirements	Credits
SYSE 560 - Introduction to Systems Engineering Management	3
Elective	3
Elective	3
Semester Hours	**9**

Total Credits

Total Hours for All Requirements: 15

Year Two

Requirements	Credits
SYSE 625 - System Quality Assurance	3
SYSE 700 - Graduate Thesis	3
Elective	3
Semester Hours	**9**

Requirements	Credits
SYSE 700 - Graduate Thesis	6
Semester Hours	**6**

Total Credits

Total Hours for All Requirements: 15

Worldwide Program Requirements

Core Requirements	12
Areas of Concentration	18
Total Credits	**30**

Program Details

The Master of Science in Systems Engineering requires successful completion of a minimum of 30 credit hours. Students enrolled in the Worldwide Graduate Online program may complete the degree in six terms, or approximately two years, assuming full-time enrollment and continuous progress. Students pursuing this graduate degree must earn a minimum cumulative grade point average (CGPA) of 3.00 for all work completed at the University. The courses required to earn this degree are listed below.

Students should be aware that many courses have prerequisites and/or corequisites. Students are responsible for ensuring that all prerequisite and degree requirements are satisfied prior to enrollment in advanced coursework. The suggested plan of study is provided as a guide. A student's actual plan of study may vary based on term of admission, course availability, transfer credit, and other academic considerations. Students should consult with their academic advisor to develop an individualized plan of study.

Students may complete either a thesis or non-thesis option and select the academic track that best aligns with their professional interests and career goals. Available options include the Technical Track, the Uncrewed Autonomous Systems Track (thesis only), and the Engineering Management Track (non-thesis only). Students should consult with their academic advisor to determine the appropriate track, elective coursework, and culminating experience to satisfy degree requirements.

Core Requirements

SYSE 500	Fundamentals of Systems Engineering	3
SYSE 530	System Requirements Analysis and Modeling	3
SYSE 560	Introduction to Systems Engineering Management	3
SYSE 625	System Quality Assurance	3
Total Credits		**12**

Areas of Concentration

Non-Thesis Option - Technical track

SYSE 610	System Architecture Design and Modeling	3
SYSE 650	Digital Engineering with Artificial Intelligence and Machine Learning	3
SYSE 690	Systems Engineering Project	3
Choose Three of the Following:		9
ASCI 602	The Air Transportation System	

ASCI 604	Human Factors in the Aviation/Aerospace Industry	
ASCI 645	Airport Operations and Management	
SPAC 511	Geospatial Analytics	
SPAC 512	Human Spaceflight Industry	
SPAC 514	Commercial and Governmental Space Infrastructure	
SPAC 520	Principles of Space Systems	
UNSY 531	Artificial Intelligence and Emerging Technologies in Aviation/Aerospace Systems	
SYSE 505	System Safety and Certification	
Total Credits		**18**

Non-Thesis Option - Engineering Management Track

SYSE 660	Organizational Systems Management	3
SYSE 690	Systems Engineering Project	3
Choose Four of the Following:		12
EMGT 500	Managing in the STEM Environment	
EMGT 520	Quality for Projects and Operations	
EMGT 530	Project Scheduling and Risk Management	
EMGT 620	Technology and Innovation Management	
SYSE 505	System Safety and Certification	
HROM 530	Modeling and Decision-Making	
PMGT 500	Foundations of Project Management	
PMGT 520	Fundamentals of Project Scope, Schedule, Cost, and Resource Management	
PMGT 530	Fundamentals of Project Quality, Communication, Stakeholder, Resource, and Procurement Management	
PMGT 613	Assessing and Managing Project Risk	
Total Credits		**18**

Thesis Option - Technical Track

SYSE 610	System Architecture Design and Modeling	3
SYSE 650	Digital Engineering with Artificial Intelligence and Machine Learning	3
SYSE 700A	Graduate Thesis I	3
SYSE 700B	Graduate Thesis II	3
Choose Two of the Following:		6
AWEN 502	Airworthiness Process and Procedures	
ASCI 693	Current Research Problems in Aviation/ Aerospace	
ASCI 602	The Air Transportation System	
ASCI 604	Human Factors in the Aviation/Aerospace Industry	
ASCI 645	Airport Operations and Management	
RSCH 665	Statistical Analysis	
SPAC 511	Geospatial Analytics	
SPAC 514	Commercial and Governmental Space Infrastructure	
SPAC 520	Principles of Space Systems	
SYSE 505	System Safety and Certification	
UNSY 531	Artificial Intelligence and Emerging Technologies in Aviation/Aerospace Systems	
Total Credits		**18**

Thesis Option - Uncrewed Autonomous Systems Track

SYSE 610	System Architecture Design and Modeling	3
UNSY 500	Introduction to Uncrewed Aircraft Design	3
UNSY 606	Uncrewed and Autonomous Systems Interoperability and Control	3
UNSY 638	Human Factors in Uncrewed Aerospace Systems	3
SYSE 700A	Graduate Thesis I	3
SYSE 700B	Graduate Thesis II	3
Total Credits		**18**

Suggested Plans of Study

Non-Thesis Option - Technical Track

One-Year Plan

Year One

Requirements	Credits
SYSE 500 - Fundamentals of Systems Engineering	3
SYSE 530 - System Requirements Analysis and Modeling	3
Semester Hours	**6**

Requirements	Credits
SYSE 560 - Introduction to Systems Engineering Management	3
SYSE 610 - System Architecture Design and Modeling	3
Semester Hours	**6**

Requirements	Credits
Elective	3
SYSE 625 - System Quality Assurance	3
Semester Hours	**6**

Requirements	Credits
Elective	3
SYSE 650 - Digital Engineering with Artificial Intelligence and Machine Learning	3
Semester Hours	**6**

Requirements	Credits
Elective	3
SYSE 690 - Systems Engineering Project	3
Semester Hours	**6**

Total Credits

Total Hours for All Requirements: 30

Two-Year Plan

Year One

Requirements	Credits
SYSE 500 - Fundamentals of Systems Engineering	3
Semester Hours	**3**

Requirements	Credits
SYSE 530 - System Requirements Analysis and Modeling	3
Semester Hours	**3**

Requirements	Credits
SYSE 560 - Introduction to Systems Engineering Management	3
Semester Hours	**3**

Requirements	Credits
Elective	3
Semester Hours	**3**

Requirements	Credits
SYSE 625 - System Quality Assurance	3
Semester Hours	**3**

Total Credits

Total Hours for All Requirements: 15

Year Two

Requirements	Credits
SYSE 610 - System Architecture Design and Modeling	3
Semester Hours	**3**

Requirements	Credits
SYSE 650 - Digital Engineering with Artificial Intelligence and Machine Learning	3
Semester Hours	**3**

Requirements	Credits
Elective	3
Semester Hours	**3**

Requirements	Credits
Elective	3
Semester Hours	**3**

Requirements	Credits
SYSE 690 - Systems Engineering Project	3
Semester Hours	**3**

Total Credits

Total Hours for All Requirements: 15

Non-Thesis Option - Engineering Management Track

One-Year Plan

Year One

Requirements	Credits
SYSE 500 - Fundamentals of Systems Engineering	3
SYSE 530 - System Requirements Analysis and Modeling	3
Semester Hours	**6**

Requirements	Credits
SYSE 560 - Introduction to Systems Engineering Management	3
Elective	3
Semester Hours	**6**

Requirements	Credits
SYSE 625 - System Quality Assurance	3
SYSE 660 - Organizational Systems Management	3
Semester Hours	**6**

Requirements	Credits
Elective	3
Elective	3
Semester Hours	**6**

Requirements	Credits
Elective	3
SYSE 690 - Systems Engineering Project	3
Semester Hours	**6**

Total Credits

Total Hours for All Requirements: 30

Two-Year Plan

Year One

Requirements	Credits
SYSE 500 - Fundamentals of Systems Engineering	3
Semester Hours	**3**

Requirements	Credits
SYSE 530 - System Requirements Analysis and Modeling	3
Semester Hours	**3**

Requirements	Credits
SYSE 560 - Introduction to Systems Engineering Management	3
Semester Hours	**3**

Requirements	Credits
Elective	3
Elective	3
Semester Hours	**6**

Requirements	Credits
Elective	3
Semester Hours	**3**

Total Credits

Total Hours for All Requirements: 18

Year Two

Requirements	Credits
SYSE 625 - System Quality Assurance	3
Semester Hours	**3**

Requirements	Credits
Elective	3
Semester Hours	**3**

Requirements	Credits
SYSE 660 - Organizational Systems Management	3
Semester Hours	**3**

Requirements	Credits
Elective	3
Semester Hours	**3**

Requirements	Credits
SYSE 690 - Systems Engineering Project	3
Semester Hours	**3**

Total Credits

Total Hours for All Requirements: 15

Thesis Option - Technical Track

One-Year Plan

Year One

Requirements	Credits
SYSE 500 - Fundamentals of Systems Engineering	3
SYSE 530 - System Requirements Analysis and Modeling	3
Semester Hours	**6**

Requirements	Credits
SYSE 560 - Introduction to Systems Engineering Management	3
Elective	3
Semester Hours	**6**

Requirements	Credits
SYSE 625 - System Quality Assurance	3
SYSE 610 - System Architecture Design and Modeling	3
Semester Hours	**6**

Requirements	Credits
SYSE 650 - Digital Engineering with Artificial Intelligence and Machine Learning	3
SYSE 700A - Graduate Thesis I	3
Semester Hours	**6**

Requirements	Credits
Elective	3
SYSE 700B - Graduate Thesis II	3
Semester Hours	**6**

Total Credits

Total Hours for All Requirements: 30

Two-Year Plan

Year One

Requirements	Credits
SYSE 500 - Fundamentals of Systems Engineering	3
Semester Hours	**3**

Requirements	Credits
SYSE 530 - System Requirements Analysis and Modeling	3
Semester Hours	**3**

Requirements	Credits
SYSE 560 - Introduction to Systems Engineering Management	3
Semester Hours	**3**

Requirements	Credits
Elective	3
Semester Hours	**3**

Requirements	Credits
SYSE 625 - System Quality Assurance	3
Semester Hours	**3**

Total Credits

Total Hours for All Requirements: 15

Year Two

Requirements	Credits
SYSE 610 - System Architecture Design and Modeling	3
Semester Hours	**3**

Requirements	Credits
SYSE 650 - Digital Engineering with Artificial Intelligence and Machine Learning	3
Semester Hours	**3**

Requirements	Credits
Elective	3
Semester Hours	**3**

Requirements	Credits
SYSE 700A - Graduate Thesis I	3
Semester Hours	**3**

Requirements	Credits
SYSE 700B - Graduate Thesis II	3
Semester Hours	**3**

Total Credits

Total Hours for All Requirements: 15

Thesis Option - Uncrewed Autonomous Systems Track

One-Year Plan

Year One

Requirements	Credits
SYSE 500 - Fundamentals of Systems Engineering	3
SYSE 530 - System Requirements Analysis and Modeling	3
Semester Hours	**6**

Requirements	Credits
SYSE 560 - Introduction to Systems Engineering Management	3
UNSY 638 - Human Factors in Uncrewed Aerospace Systems	3
Semester Hours	**6**

Requirements	Credits
UNSY 500 - Introduction to Uncrewed Aircraft Design	3
UNSY 606 - Uncrewed and Autonomous Systems Interoperability and Control	3
Semester Hours	**6**

Requirements	Credits
SYSE 610 - System Architecture Design and Modeling	3
SYSE 700A - Graduate Thesis I	3
Semester Hours	**6**

Requirements	Credits
SYSE 625 - System Quality Assurance	3
SYSE 700B - Graduate Thesis II	3
Semester Hours	**6**

Total Credits

Total Hours for All Requirements: 30

Two-Year Plan

Year One

Requirements	Credits
SYSE 500 - Fundamentals of Systems Engineering	3
Semester Hours	**3**

Requirements	Credits
SYSE 560 - Introduction to Systems Engineering Management	3
Semester Hours	**3**

Requirements	Credits
UNSY 500 - Introduction to Uncrewed Aircraft Design	3
Semester Hours	**3**

Requirements	Credits
SYSE 530 - System Requirements Analysis and Modeling	3
Semester Hours	**3**

Requirements	Credits
SYSE 625 - System Quality Assurance	3
Semester Hours	**3**

Total Credits

Total Hours for All Requirements: 15

Year Two

Requirements	Credits
SYSE 610 - System Architecture Design and Modeling	3
Semester Hours	**3**

Requirements	Credits
UNSY 638 - Human Factors in Uncrewed Aerospace Systems	3
Semester Hours	**3**

Requirements	Credits
UNSY 606 - Uncrewed and Autonomous Systems Interoperability and Control	3
Semester Hours	**3**

Requirements	Credits
SYSE 700A - Graduate Thesis I	3
Semester Hours	**3**

Requirements	Credits
SYSE 700B - Graduate Thesis II	3
Semester Hours	**3**

Total Credits

Total Hours for All Requirements: 15

Estimated Cost of Attendance

California Student Information (https://catalog.erau.edu/student-life/student-affairs/california-student/)