MASTER OF SCIENCE IN SYSTEMS ENGINEERING

Graduates of the Master of Science in Systems Engineering are capable of designing and managing complex multidisciplinary engineering systems with a rigorous systems engineering approach. The research component of the thesis- and project-based M.S. programs equip students with cutting edge skills in specific focus areas, preparing them for future career opportunities. Choose from more than 40 course options, and attend online, in-person, or hybrid. Engage with industry-connected professors and peers on transformative engineering projects.

- The Plan A degree prepares students for research, offering skills applicable in academia and industry. Students will design and manage complex multidisciplinary engineering systems using a rigorous systems engineering approach. A thesis enables students to focus on a specific area of their choice, preparing them for the next level of graduate education or a robust career in industry.
- The Plan B degree prepares students for careers as researchers or practitioners in industry. It requires completion of a project with formal report. The required final project will focus on a specific problem or system of their choice, and will demonstrate readiness for advancement in an industry career.

Learning Objectives

Upon successful completion, students will be able to:

1. Effectively analyze, design, or implement integrated system solutions.
2. Effectively use SE tools such as modeling and simulation of a system.
3. Analyze systems interfaces between stakeholder, technical domains effectively and efficiently.
4. Exemplify a variety of roles in multi-disciplinary teams including systems engineer, technical expert, and leader.
5. Contribute technically to the systems engineering field of knowledge, governance, policy, program management, or planning.

Plan A Effective Fall 2025

Code	Title	Credits
Courses in Depth - Select 15 credits:		**15**
ENGR 502	Engineering Project and Program Management	
or CIS 600A	Project Management: Information Technology	
or CIS 670	Advanced IT Project Management	
ENGR 510	Engineering Optimization: Method/ Application	
ENGR 520	Intelligent Decision Support Systems	
ENGR 525	Intellectual Property and Invention Systems	
ENGR 531	Engineering Risk Analysis	
ENGR 533	Spaceflight and Biological Systems	
ENGR 535	Modeling Human Systems Behavior	
ENGR 540	Design Analysis of Engineering Experiments	
ENGR 546	AR/VR Biometrics and Sensing for Training	
ENGR 565/ ECE 565	Electrical Power Engineering	
ENGR 570	Coupled Electromechanical Systems	
MECH 513	Simulation Modeling and Experimentation	
ECE 566	Grid Integration of Wind Energy Systems	
SYSE 501	Foundations of Systems Engineering	
SYSE 505	Systems Thinking for the Real World	
SYSE 511	Control Engineering for System Engineers	
SYSE 512	Systems Sensing and Imaging Analysis	
SYSE 530	Overview of Systems Engineering Processes	
SYSE 532/ ECE 532	Dynamics of Complex Engineering Systems	
SYSE 534	Human Systems Integration	
SYSE 536	Space Mission Analysis and Design	
SYSE 541	Engineering Data Design and Visualization	
SYSE 544	Systems-Based AR/VR Environmental Realism	
SYSE 545	Augmented/Virtual Reality Systems Development	
SYSE 548	Security Engineering for Systems Engineers	
SYSE 549	Secure Vehicle and Industrial Networking	
SYSE 555	Transitions in Energy Systems	
SYSE 567	Systems Engineering Architecture	
SYSE 569	Cybersecurity Awareness for Systems Engineers	
SYSE 571	Analytics in Systems Engineering	
SYSE 573	Cost Optimization for Systems Engineers	
SYSE 602	Systems Requirements Engineering	
SYSE 603	Introduction to Systems Test and Evaluation	
SYSE 667	Advanced Model-Based Systems Engineering	
Technical Electives [1]		**6**
Thesis		
SYSE 699	Thesis	9
Program Total Credits:		**30**

A minimum of 30 credits are required to complete this program.

[1] Select technical elective credits with approval by student's advisor. SE Department maintains an extensive list of possible suggested electives, or new courses may be approved on an individual basis. A maximum of 6 credit hours are permitted at the 400-level. The remainder must be at the 500-level or above.

Plan B Effective Fall 2025

Code	Title	Credits
Courses in Depth - Select 15 credits:		**15**
ENGR 502	Engineering Project and Program Management	

or CIS 600A	Project Management: Information Technology
or CIS 670	Advanced IT Project Management
ENGR 510	Engineering Optimization: Method/ Application
ENGR 520	Intelligent Decision Support Systems
ENGR 525	Intellectual Property and Invention Systems
ENGR 531	Engineering Risk Analysis
ENGR 533	Spaceflight and Biological Systems
ENGR 535	Modeling Human Systems Behavior
ENGR 540	Design Analysis of Engineering Experiments
ENGR 546	AR/VR Biometrics and Sensing for Training
ENGR 565/ ECE 565	Electrical Power Engineering
ENGR 570	Coupled Electromechanical Systems
MECH 513	Simulation Modeling and Experimentation
ECE 566	Grid Integration of Wind Energy Systems
SYSE 501	Foundations of Systems Engineering
SYSE 505	Systems Thinking for the Real World
SYSE 511	Control Engineering for System Engineers
SYSE 512	Systems Sensing and Imaging Analysis
SYSE 530	Overview of Systems Engineering Processes
SYSE 532/ ECE 532	Dynamics of Complex Engineering Systems
SYSE 534	Human Systems Integration
SYSE 536	Space Mission Analysis and Design
SYSE 541	Engineering Data Design and Visualization
SYSE 544	Systems-Based AR/VR Environmental Realism
SYSE 545	Augmented/Virtual Reality Systems Development
SYSE 548	Security Engineering for Systems Engineers
SYSE 549	Secure Vehicle and Industrial Networking
SYSE 555	Transitions in Energy Systems
SYSE 567	Systems Engineering Architecture
SYSE 569	Cybersecurity Awareness for Systems Engineers
SYSE 571	Analytics in Systems Engineering
SYSE 573	Cost Optimization for Systems Engineers
SYSE 602	Systems Requirements Engineering
SYSE 603	Introduction to Systems Test and Evaluation
SYSE 667	Advanced Model-Based Systems Engineering
Technical Electives [1]	**12**
Research	
SYSE 695	Independent Study [2] 3
Program Total Credits:	**30**

A minimum of 30 credits are required to complete this program.

1 Select technical elective credits with approval by student's advisor. SE Department maintains an extensive list of possible suggested electives, or new courses may be approved on an individual basis. A maximum of 6 credit hours are permitted at the 400-level. The remainder must be at the 500-level or above.

2 SYSE 695 requires the student to complete a systems engineering project, in collaboration with a faculty member, with a formal report on the results. This culminating project will incorporate a range of skills learned in SE coursework, and can be academic or applied in nature. The project is evaluated by the student's committee to meet the scholarly expectations for a Plan B degree.

Requirements for All Graduate Degrees

For more information, please visit Requirements for All Graduate Degrees (https://catalog.colostate.edu/general-catalog/graduate-bulletin/graduate-study/procedures-requirements-all-degrees/) in the Graduate and Professional Bulletin (https://catalog.colostate.edu/general-catalog/graduate-bulletin/).

Summary of Procedures for the Master's and Doctoral Degrees

NOTE: Each semester the Graduate School publishes a schedule of deadlines. Deadlines are available on the Graduate School website (https://graduateschool.colostate.edu/deadline-dates/). Students should consult this schedule whenever they approach important steps in their careers.

Forms (https://graduateschool.colostate.edu/forms/) are available online.

Step	Due Date
1. Application for admission (online)	Six months before first registration
2. Diagnostic examination when required	Before first registration
3. Appointment of advisor	Before first registration
4. Selection of graduate committee	Before the time of fourth regular semester registration
5. Filing of program of study (GS Form 6)	Before the time of fourth regular semester registration
6. Preliminary examination (Ph.D. and PD)	Two terms prior to final examination
7. Report of preliminary examination (GS Form 16) - (Ph.D. and PD)	Within two working days after results are known
8. Changes in committee (GS Form 9A)	When change is made
9. Application for Graduation (GS Form 25)	Refer to published deadlines from the Graduate School Website
9a. Reapplication for Graduation (online)	Failure to graduate requires Reapplication for Graduation (online) for the next time term for which you are applying
10. Submit thesis or dissertation to committee	At least two weeks prior to the examination or at the discretion of the graduate committee
11. Final examination	Refer to published deadlines from the Graduate School Website

12. Report of final examination (GS Form 24)	Within two working days after results are known; refer to published deadlines from the Graduate School website
13. Submit a signed Thesis/ Dissertation Submission Form (GS Form 30) to the Graduate School and Submit the Survey of Earned Doctorates (Ph.D. only) prior to submitting the electronic thesis/ dissertation	Refer to published deadlines from the Graduate School website.
14. Submit the thesis/dissertation electronically	Refer to published deadlines from the Graduate School website
15. Graduation	Ceremony information is available from the Graduate School website