







Systems Engineering Courses Available as Undergraduate Electives: Summer 2026

Course # / Title	Instructor / Prereqs	Description	Interest Categories
ENGR 502 Engineering Project and Program Management	Micheal Botyarov / Senior Standing, 3.0 GPA	Engineering program management fundamentals, program planning and control strategies, risk assessment, work breakdown structures and costing options. This course is part of the Project Management Institute's Authorized Training Partner (ATP) program. May be eligible to be applied to the SE Certificate of Practice and an SE degree.	
SYSE 530 Overview of Systems Engineering Processes	Jeremy Daily / Senior Standing, 3.0 GPA & STAT 301/303/315 or equivalent	Helps students develop a conceptual understanding of the SE life-cycle process and familiarity with analysis techniques used in that process. Introduces concepts of reliability and robustness, and rigorous tools for analysis and design with them in mind. Utilizes real-world experience and case studies of working with a system through all phases of the system design process. May be eligible to be applied to the SE Certificate of Practice or the Model-Based Systems Engineering certificate and an SE degree.	 
SYSE 552 (prev. 581A3) Humanitarian Engineering	Aaron Brown / Senior Standing & Completion of AUCC Cat. 2 (Junior writing)	Engineering skills in the context of solutions for developing communities, with emphasis placed on a systems approach. Methods and implementation used in humanitarian engineering, including relevant community development methodologies, appropriate design, development strategy, sustainable community guidelines, emergency response, and design for vulnerable communities.	  

All courses above are eligible to be applied to a graduate degree with a grade of “B” or better, as long as the credential is completed within 10 years (see the RAMPUP policies here: <https://graduateschool.colostate.edu/future-students/ramp-up/>).

Key:



Decision Support and Lifecycle



Energy



Environment and Sustainability



Management



Modeling



Transportation and Urban Design

SE advising contact:

Deb Dandaneau


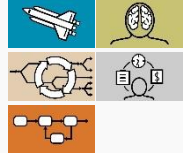

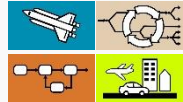
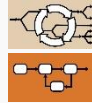
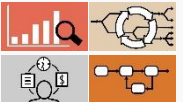
debrakd@colostate.edu











SE Suite 202 in Engineering (by the LSC)



SYSTEMS ENGINEERING
COLORADO STATE UNIVERSITY

Systems Engineering Courses Available as Undergraduate Electives: Fall 2026

Course # / Title	Instructor / Prereqs	Description	Interest Categories
ENGR 380A1 Principles of Nuclear Engineering	Vincent Paglioni / MATH 159 or 160 & PHYS 121 or 141 or equivalent	Radiation science and protection, nuclear reactor engineering, and introductory operating principles of nuclear power plants, including processes, reactor design and operation, the fuel cycle, and the power enterprise. Considers critical nuclear news and events. Is not eligible to be applied to a graduate credential.	
SYSE 501 Foundations of Systems Engineering	Bo Marzolf / Senior Standing, 3.0 GPA	Introductory overview of the SE perspective to set the conceptual and practical framework of the SE graduate programs. Covers foundational components, concept development stages, and the process steps of the engineering development stage. Several issues related to post-development and special topics areas are presented. Finishing this course with at least a B+ allows you to bypass the INCOSE knowledge exam for ASEP or CSEP certification. May be eligible to be applied to the SE Certificate of Practice and an SE degree.	
ENGR 502 Engineering Project and Program Management	Micheal Botyarov / Senior Standing, 3.0 GPA	Engineering program management fundamentals, program planning and control strategies, risk assessment, work breakdown structures and costing options. This course is part of the Project Management Institute's Authorized Training Partner (ATP) program. May be eligible to be applied to the SE Certificate of Practice and an SE degree.	
ENGR 510 Engineering Optimization: Method/Application	Dan Herber / Senior Standing, 3.0 GPA, MATH 229 + Math 261 or equivalent	Introductory optimization course for all engineers covers linear programming, simplex algorithm, nonlinear optimization, interior-point and penalty approaches, derivative-free methods, genetic algorithms, and optimization of systems. A broad range of examples is shown, including problems in transportation, scheduling, machine learning, mechanics, and aerospace.	
SYSE 530 Overview of Systems Engineering Processes	Jeremy Daily / Senior Standing, 3.0 GPA, STAT 301/303/315 or equivalent	Helps students develop a conceptual understanding of the SE life-cycle process and familiarity with analysis techniques used in that process. Introduces concepts of reliability and robustness, and rigorous tools for analysis and design with them in mind. Utilizes real-world experience and case studies of working with a system through all phases of the system design process. May be eligible to be applied to the SE Certificate of Practice or the Model-Based Systems Engineering certificate, and an SE degree.	
ENGR 531 Engineering Risk and Reliability	Vincent Paglioni / Junior Standing, 3.0 GPA, STAT 301/303/315 or equivalent	Successful engineering project management includes estimation and proactive risk identification and development of mitigation techniques. System uncertainty is reduced when project risks are identified, quantified, and mitigation strategies implemented. Tools, techniques, and methodologies used by successful project managers will be examined. May be eligible to be applied to the SE Certificate of Practice and an SE degree.	

Course # / Title	Instructor / Prereqs	Description	Interest Categories
ENGR 537 Spaceflight Experimentation and Commerce	Steve Simske / Junior Standing, 3.0 GPA, completion of AUCC Cat. 2 (Junior writing)	Advanced experimentation in spaceflight, including commercialization, intellectual property generation, cybersecurity, and analytics associated with space experimentation. Considers fundamental differences in performing experimentation in space (loss of gravity, loss of convection and buoyancy, radiation, etc.) and various motivators for spaceflight research including commercial aspects and benefits to earth-bound citizens. Specifics of analysis, security, and experiment lifecycle are covered.	  
SYSE 541 Engineering Data Design and Visualization	Erika Gallegos / Senior Standing, 3.0 GPA, STAT 301/303/315 or equivalent	Data design, aggregation and filtering, intuitive data exploration, effective communication of patterns, summaries, and findings, and methods of archiving for engineers.	 
SYSE 580B2 Systems Modeling for Digital Twins	Marie Vans / Senior Standing, 3.0 GPA, SYSE 501	Systems engineering principles to develop Digital Twin models. Analyze closed-loop control, sensor integration, predictive analytics, and system verification/validation (V&V). Develop a system lifecycle model for a complex system using data from physical assets to virtual objects using Virtual Reality or other suitable simulation approach for visualization.	
SYSE 580B3 Network-Based Complex Systems Engineering	Yinshuang Xiao / STAT 301/303/315 or MATH 160 or MATH/DSCI 369 or CS 345	Integrates network-based models and deep learning to solve complex systems engineering problems. Analyzes system architecture through graph metrics, motifs, and probabilistic models. Creates predictive frameworks using Artificial Neural Networks (ANN) and Graph Neural Networks (GNN) to support the design and analysis of large-scale complex systems.	   

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Key:



Aerospace



Artificial Intelligence & Machine Learning



Data Analysis



Decision Support and Lifecycle



Energy



Human Factors



Management



Radiation and Health



Systems Modeling



Security



Transportation and Urban Design

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SYSTEMS ENGINEERING
 COLORADO STATE UNIVERSITY