OKLAHOMA CHRISTIAN UNIVERSITY

GRADUATE ACADEMIC CATALOG
ADDENDUM - SPRING 2026

Updated January 2026

CONTENTS

Program Updates

COLLEGE OF ENGINEERING AND COMPUTER SCIENCE

GRADUATE SCHOOL OF ENGINEERING AND COMPUTER SCIENCE

AREAS OF STUDY

Computer Engineering (CENG)
Computer Science (CMSC)
Electrical Engineering (ELEC)
Engineering (ENGR)
Mathematics (MATH)
Mechanical Engineering (MECH)

DEGREES OFFERED

M.S.C.S. Master of Science in Computer Science
Emphasis in Artificial Intelligence
Emphasis in Cyber Security
Emphasis in Data Science
Emphasis in Software Engineering
M.S.E. Master of Science in Engineering
M.S.S.E. Master of Science in Systems Engineering

FACULTY

Jeff Bigelow, Ph.D., Chair, Electrical and Computer Engineering; Professor of Electrical and Computer Engineering
Jennifer Bryan, Ph.D., Chair, Mathematics; Professor of Mathematics
Curtis Coleman, Ph.D. candidate, Assistant Professor of Computer Science
Colin Doyle, Ph.D., Assistant Professor of Electrical and Computer Engineering
Daniel Griffin, B.S.C.E., Instructor of Computer Science
Steven Maher, M.S.E.E., Associate Professor of Electrical and Computer Engineering
Robert Nix, Ph.D., Associate Professor of Computer Science
David North, M.S., Chair, Computer Science; Associate Professor of Computer Science
Kevin Plumlee, Ph.D., Chair, Mechanical Engineering; Associate Professor of Mechanical Engineering
Pat Smith, M.S., Associate Professor of Computer Science
David Waldo, Ph.D., Professor of Electrical and Computer Engineering

DEAN

Byron Newberry, Ph.D., Dean, College of Engineering and Computer Science; Chair, Graduate School of Engineering and Computer Science; Professor of Mechanical Engineering

LOCATION

Prince Engineering Center

PURPOSE AND OBJECTIVES

The M.S.C.S., M.S.E. and M.S.S.E. programs in the Graduate School of Engineering and Computer Science seek to fulfill the mission of OC to transform lives for Christian faith, scholarship, and service. Both are rigorous educational programs with a broad selection of classes that will enhance the abilities of new computer science and engineering graduates and practicing professionals who aspire to make significant contributions in technology, innovation, and productivity. The program is designed to allow a student to select areas that will add depth and breadth to their technical and business knowledge.

The graduate of the M.S.C.S., M.S.E. and M.S.S.E. programs at OC should have the following characteristics:

1. Increased depth of knowledge in the chosen computer science or engineering major, including a blend of current theory and practice.
2. Increased breadth of knowledge extending beyond the chosen computer science or engineering major into other business, computer science, engineering, and/or mathematics topics.
3. Enhanced communication skills within the practice of computer science or engineering and the management of technology.
4. Knowledge of issues of ethics and social responsibility and an understanding of Christian values and faith.

SUMMARY

The M.S.C.S. requires a minimum of 30 credit hours of coursework for students possessing an accredited undergraduate degree in computer science. Those who have a degree in a closely related field like mathematics or engineering will be considered for admission based on their college work and an appropriately proposed plan of study. To be successful in the M.S.C.S. program, a student should have a background in mainstream computer science. This includes experience with procedural and OO programming languages (e.g., Ada, C, C++, Java, Pascal, or Smalltalk) and a background in computer architecture or assembly language, data structures, operating systems, software engineering, and database and related mathematics (e.g., mathematical logic, discrete mathematics, and calculus). A student who lacks experience in these areas may be admitted with deficiencies and required to take courses to remedy the deficiencies.

The M.S.E. and M.S.S.E. are obtained by completing a minimum of 30 credit hours of coursework. The programs are offered on campus, though some classes are also offered online. The degree allows flexibility so that recent graduates and those who have been working in their careers for some time will have the ability to incorporate academic topics that are most useful for their future directions.

CURRICULAR PRACTICAL TRAINING

Completion of 30 credit hours with a GPA of 3.0 or greater is required for graduation from the M.S.C.S., M.S.E., and M.S.S.E. programs. Students will be allowed to select a practicum option if they wish to make industry experience part of their educational plan. Students are allowed to enroll in up to three hours of Graduate Computer Science Practicum or Graduate Engineering Practicum. Students selecting this option will be responsible for locating an appropriate industry opportunity themselves. The student will need to work closely with the program chair to receive necessary approvals PRIOR to starting the practicum.

ADMISSION DETAILS

Admission Requirements for Degree-Seeking Applicants

Requirements are as follows:

- Completed application
- An accredited bachelor's degree from a university in the United States that aligns with the program being pursued (refer to the list below). Degrees from international universities must be evaluated to determine U.S. equivalency.
- To pursue an M.S.C.S. degree, a student must have a B.S. degree in computer science. If a student does not have a B.S. degree in computer science, up to four leveling classes may be required in addition to the 10 M.S.C.S. classes.
- To pursue an M.S.E. or M.S.S.E. degree, a student must have a B.S. degree in computer, electrical, or mechanical engineering. Other closely related degrees will be considered.
- Official transcripts for all degrees received.
- Official transcripts for any courses not listed in the degree transcripts that might be relevant to the graduate program. (If such transcripts are not submitted, leveling courses may be required.)
- Minimum undergraduate GPA of 2.5 required.
- Minimum GRE test score of 285 with a 3.0 writing component, taken within the past five years.
- For international applicants, please see additional requirements on page 10.

GRE test scores are NOT needed if you have:

- A minimum undergraduate GPA of 3.0
- Five years of documented technical work experience
- At least nine hours of "B" or better graduate work from aregionally-accredited university

This requirement of GRE test scores can be waived by the Chair of the Graduate School of Engineering and Computer Science if appropriate.

PROVISIONAL ADMISSION

Students may be provisionally admitted if they meet all admission requirements, but have an academic background that is not closely aligned with the program to which they are applying. The provisional admission letter will specifically state the leveling work (may be multiple classes) required to pursue the program. Provisional admission is not allowed for other deficiencies in the admission requirement.

AUDIT ADMISSION

Students may be admitted to audit classes only. An application for admission must be submitted, but no official academic credentials are required.

OTHER CONSIDERATIONS

Undergraduate students in computer science and engineering programs at OC may be accepted into an OC graduate program during their junior or senior year as part of a dual undergraduate/graduate degree program. Students should refer to the dual degree requirements in OC's Undergraduate Academic Catalog.

All leveling courses required by the chair for admission, including undergraduate courses, must be completed with a grade of "C" or higher. In certain cases, the student's graduate committee may approve a 3000 or 4000 level course that is not cross listed for the plan of study. The Graduate School of Engineering and Computer Science maintains a list of undergraduate courses that may be appropriate.

TRANSFER CREDIT

Up to nine semester hours of graduate credit may be transferred into the M.S.C.S., M.S.E., and M.S.S.E. programs upon approval of the faculty. The classes should be taken at a regionally or nationally accredited university. Engineering courses must be taken at a school with ABET accredited programs. A grade of "B" or higher is required and the work must have been completed within the last seven years.

M.S.S.E. DEGREE IN ENGINEERING
30 HOURS*

The Master of Science in Systems Engineering (M.S.S.E.) degree prepares students to design, develop, integrate, and manage complex technical systems across diverse domains. The program aligns with the International Council on Systems Engineering (INCOSE).

A graduate of the Master of Science in Systems Engineering (M.S.S.E.) degree will be able to:

1. Apply INCOSE SEBoK and ASEP competency frameworks to analyze complex, multidisciplinary systems engineering challenges.
2. Implement MBSE methodologies per INCOSE standards to design, simulate, and validate system architectures using formal modeling languages.
3. Evaluate system risks across lifecycle phases using quantitative and qualitative techniques to formulate evidence-based decisions.
4. Solve multi-objective optimization problems to evaluate design alternatives and justify trade-offs balancing performance, cost, schedule, and requirements.
5. Lead cross-functional teams and facilitate stakeholder collaboration to integrate diverse perspectives in complex systems development.
6. Evaluate systems engineering decisions through ethical frameworks and advocate for responsible practices that serve the public interest.

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30 HOURS SYSTEMS ENGINEERING

SYSE-5003 Professional Ethics in Systems Engineering
SYSE-5013 Systems Engineering Foundations
SYSE-5023 Systems Engineering Management
SYSE-5033 Operations Research in Systems Engineering
SYSE-5043 Failure and Risk Analysis in Systems Engineering
SYSE-5053 Software Systems Engineering
SYSE-5063 Quality Management in Systems Engineering
SYSE-5073 MBSE I – Model Foundations
SYSE-5083 MBSE II – Model Architecture
SYSE-5093 MBSE III – Digital Twin Analysis

COURSE DESCRIPTIONS

SYSTEMS ENGINEERING (SYSE)

5003 PROFESSIONAL ETHICS IN SYSTEMS ENGINEERING
Examination of professional responsibility in systems engineering, including safety, public welfare, data and AI governance, and organizational ethics. Students analyze cases and apply ethical frameworks to lifecycle decisions across requirements, verification, operations, and decommissioning.

5013 SYSTEMS ENGINEERING FOUNDATIONS
Introductions to the systems engineering life cycle and core processes. Topics include stakeholder needs, requirements basics, architecture views, trade studies decision management, tailoring, and baselines. Establishes vocabulary and methods used across the program.

5023 SYSTEMS ENGINEERING MANAGEMENT
Planning, assessment, and control for engineering programs: scope, schedule, cost, risk, decision analysis, configuration/information management, and reviews. Emphasis on TPMs and governance of baselines.

5033 OPERATIONS RESEARCH IN SYSTEMS ENGINEERING
Operations research methods for systems decisions, including linear and integer programming, queuing and Markov models, simulation, and multi-criteria decision analysis. Emphasis on formulation, interpretation, and application to trade studies.

5043 FAILURE AND RISK ANALYSIS IN SYSTEMS ENGINEERING
Analyzing failures and risk of failure throughout the systems engineering life cycle for complex systems. Topics include root cause analysis (RCA), FTA, FMEA, quantitative risk methods, probabilistic risk assessment, safety cases, and quantifying reliability. Integration with verification and validation planning with emphasis on both corrective and preventive actions.

5053 SOFTWARE SYSTEMS ENGINEERING
Engineering of software-intensive systems with emphasis on architecture, interfaces, quality attributes, integration, verification, and sustainment. Bridges software engineering practice with the systems engineering life cycle and assurance.

5063 QUALITY MANAGEMENT IN SYSTEMS ENGINEERING
Quantitative methods to plan, measure, and improve system quality and reliability across the life cycle. Topics include SPC, process capability, DOE, Six Sigma concepts, and integration of quality metrics into verification planning.

5073 MSBE I – MODEL FOUNDATIONS
Principles and methods of model-based systems engineering with SysML notation. Students translate stakeholder needs into structural and behavioral models and maintain traceability to requirements.

5083 MSBE II – MODEL ARCHITECTURE
Development of multi-view system architectures with parametric analysis and integration to analysis and verification data. Establishes a digital thread from requirements to architecture and test evidence.

5093 MSBE III – DIGITAL TWIN ANALYSIS
Advanced MBSE and digital engineering methods coupling models with live or simulated data streams to create a digital twin. Students compile a professional portfolio and present a brief oral defense of their digital-twin package.