Approved ME Technical Electives

2025/9/15

The following list of approve ME Technical Electives includes undergraduate and graduate courses from the MEMS Departments, as well as ENGR courses and courses from other Swanson School of Engineering departments.

- 1) New courses will be added to this list as they are approved. See Heather Manns for an Elective Request form if there is a course that you think should be added to this list. Note that, in general, courses will be approved as ME Technical Electives only if (a) they are not part of another engineering program's sophomore curriculum and (b) they do not substantially overlap other courses in the mechanical engineering curriculum.
- 2) Dynamic Systems Electives are differentiated in the list below by an asterisk (*).
- 3) Study abroad courses are assessed on a case-by-case basis.
- 4) 2000-level courses are graduate courses and require permission from the Undergraduate Director.

ENGR 1090/1095 Cooperative Education; after completing three credits of work rotations and submitting a Coop Report

1010	Experimental Methods in MSE
1011	Structure and Properties Lab
1012	Computational Materials Science
1016*	Nonlinear Dynamical Systems
1020*	Mechanical Vibrations
1030	Material Selection
1032	Automotive Fabrication
1033	Fracture Mechanics
1035	Composites
1045*	Automatic Controls
1046*	Human Robotics and Control
1047	Finite Element Analysis
1048	Analysis and Characterization at the Nano-scale
1049*	Mechatronics
1051	Applied Thermodynamics
1053	Structure of Crystals and Diffraction
1055	Computer Aided Analysis of Transport Phenomena
1057	Micro/Nano Manufacturing
1058	Electromagnetic Properties of Materials
1059	Phase Equilibria in Materials
1060	Numerical Methods
1063	Phase Transformation and Microstructural Evolution
1065	Thermal Systems Design
1066	Methods for Material Characterization
1070	Mechanical Behavior of Materials
1071	Applied Fluid Mechanics
	1011 1012 1016* 1020* 1030 1032 1033 1035 1045* 1046* 1047 1048 1049* 1051 1053 1055 1057 1058 1059 1060 1063 1065 1066 1070

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CHE 0400 Reactive Process Engineering	BIOENG 1810	Biomaterials and Biocompatibility
CHE 0400 Reactive Process Engineering	CHE 0314	Taking Products to Market: The Next Step in Chemical Product Design
CHE 0500 Systems Engineering 1: Dynamics and Modeling	CHE 0400	
CTL 0300 Systems Engineering 1. Dynamics and Modering	CHE 0500	Systems Engineering 1: Dynamics and Modeling

CEE 1200	Construction Management
CEE 1203	Construction Professional Development
	Introduction to Structural Analysis
	Design of Structures
	Concrete Structures 1
	Steel Structures 1
	Open Channel Hydraulics
	Water Resources Engineering
	Introduction to Hydrology
	Water Treatment and Distribution System Design
	Environmental Engineering Processes Westerwater Callaction and Treatment Plant Design
	Wastewater Collection and Treatment Plant Design Air Pollution and Control
	Sustainable Materials
	Life Cycle Assessment Methods and Tools
	Engineering and Sustainable Development
	Design for the Environment
	Transportation Engineering
	Digitalization in Civil Engineering: From CAD to Virtual Reality
	Pavement Design and Analysis
CEE 1811	Principles of Soil Mechanics
CMNIANC 0211	Namel Chin Contagns 1 Fracing anima
	Naval Ship Systems 1 – Engineering
CMINA V S 0312	Naval Ship Systems 2 – Weapons
CS 0441	Discrete Structures for CS
	Introduction to Systems Software
	Algorithm Implementation
	Programming Languages for Web Applications
	Introduction to Deep Learning
CS 1076	introduction to Deep Learning
ECE 1110	Computer Organization and Architecture
	Systems and Project Engineering
	Computer Networks
	Information Security
	Embedded Systems Design
	Advanced Digital Design
	Electronic Circuit Design Laboratory
	Semiconductor Device Theory
	Electromagnetics
	Digital Signal Processing
	Linear Control Systems
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FCF 1701	Fundamentals of Electric Power Engineering
ECE 1701 ECE Elective	Fundamentals of Electric Power Engineering All ECE Elective courses
	CEE 1203 CEE 1330 CEE 1330 CEE 1340 CEE 1341 CEE 1401 CEE 1410 CEE 1412 CEE 1505 CEE 1513 CEE 1515 CEE 1515 CEE 1605 CEE 1609 CEE 1610 CEE 1618 CEE 1703 CEE 1712 CEE 1714 CEE 1811 CMNAVS 0311 CMNAVS 0311 CMNAVS 0312 CS 0441 CS 0449 CS 1501 CS 1520 CS 1678 ECE 1110 ECE 1150 ECE 1155 ECE 1175 ECE 1175 ECE 1212 ECE 1247 ECE 1259 ECE 1560 ECE 1560 ECE 1560 ECE 1673

ENGR 0034	Pitt in Florence: Engineering Renaissance
ENGR 0240	Nanotechnology and Nano-Engineering
ENGR 1017	Manufacturing for the Future
ENGR 1029	Introduction to Engineering for Humanity
ENGR 1050	Product Realization
ENGR 1060	Social Entrepreneurship – Engineering for Humanity
ENGR 1061	Intrapreneurship: Entrepreneurship within the Corporation
ENGR 1062	Start Up Fundamentals
ENGR 1066	Introduction to Solar Cells and Nanotechnology
ENGR 1080	Innovating for Commercial Impact
ENGR 1256	Engineering in the Americas
ENGR 1276	Engineering Design for Social Change: South Africa
ENGR 1281	Clean Energy Grid Engineering: Scandinavia
ENGR 1282	German Engineering Culture
ENGR 1450	Engineering the German Way
ENGR 1620	Product Design and Development
ENGR 1625	Engineering Business Collaborations in India
ENGR 1700	Introduction to Nuclear Engineering
ENGR 1701	Fundamentals of Nuclear Reactors
ENGR 1702	Nuclear Plant Technology
ENGR 1905	Current Issues in Sustainability
ENGR 1907	Sustainability Capstone
ENGR 1909	Sustainable Food Systems
ENGR 1933	Engineering a Craft Brewery
ENGR 2811	Innovating for Public Impact
IE 1013	Manufacturing Process Engineering
IE 1014	Data Base Design
IE 1015	Geographic Information Systems
IE 1035	Engineering Management
IE 1051	Engineering Product Design
IE 1055	Facilities Layout and Material Handling
IE 1061	Human Factors Engineering
IE 1080	Supply Chain Analysis
IE 1081	Operations Research
IE 1082	Probabilistic Methods in Operations Research
IE 1102	Lean Six Sigma I (Green Belt)
IE 1103	Lean Six Sigma II (Black Belt)
IE 1104	Frugal Engineering and Value Analysis
IE 1108	Health Systems Engineering: Quantitative Analytics
IE 1123	Project Management for Engineers
IE 1171	Data for Social Good
IE 1203	Warehouse Operations
IE 1301	Introduction to Safety Engineering

MATH 1070	Numerical Mathematical Analysis
MATH 1080	Numerical Math: Linear Algebra
MATH 1101	An Introduction to Optimization
MATH 1360	Modeling in Applied Mathematics 1
MATH 1550	Vector Analysis and Applications
PETE 1097	Special Projects
PETE 1160	Petroleum Reservoir Engineering
PETE 1205	Petroleum Production Engineering
PETE 1206	Oil Recovery Techniques
PETE 1207	Petroleum and Natural Gas Processing
PETE 1208	Petroleum Drilling and Well Completion
PETE 1209	Hydraulic Fracturing Mechanics and Applications

Approved Engineering Electives

The courses approved as Engineering Electives are listed below.

- 1) New courses will be added to this list as they are approved. See Heather Manns for an Elective Request form if there is a course that you think should be added to this list. Note that, in general, courses will be approved as Engineering Electives only if (a) they are offered within the Swanson School of Engineering and (b) they do not substantially overlap other courses in the mechanical engineering curriculum.
- 2) Study abroad courses are assessed on a case-by-case basis.

All of the courses approved as ME Technical Electives are also approved Engineering Electives.

The following courses are additionally approved as Engineering Electives.

MEMS 1121 (x3) Applied Engineering Simulation in Design Workshop; three 1-credit sections of this course can be used to fulfill the Engineering Elective requirement

BIOENG 1000	Statistics for Bioengineering
BIOENG 1070	Introductory Cell Biology 1
BIOENG 1071	Introduction to Cell Biology 2
CEE 1105	Materials of Construction
CEE 1503	Introduction to Environmental Engineering
CHE 0100	Foundations of Chemical Engineering
CHE 0214	Introduction to Chemical Product Design
CMPINF 0401	Intermediate Programming
CS 0445	Data Structures
CS 0447	Computer Organization and Assembly Language
ECE 0102 ECE 0132 ECE 0142 ECE 0201 ECE 0202 ECE 0257 ECE 0301 ECE 0302 ECE 0401 ECE 0402	Microelectronic Circuits Digital Logic Computer Organization Digital Circuits & Systems Embedded Processors & Interfacing Analysis and Design of Electronic Circuits ECE Problem Solving with C++ Data Structures & Algorithms ECE Analytical Methods Signals, Systems & Probability

ENGR 0021	Probability and Statistics for Engineers
ENGR 0023	Plus 3 Costa Rica
ENGR 0024	International Field Project – China
ENGR 0025	International Field Project – Czech Republic
ENGR 0026	International Field Project – Germany
ENGR 0027	International Field Project – France
ENGR 0031	Plus 3 Italy
ENGR 0032	International Field Project – Brazil
ENGR 0033	International Field Project – Vietnam
ENGR 0035	Plus 3 Korea
IE 0015	Introduction to Information Systems Engineering
IE 1040	Engineering Economic Analysis
IE 1052	Manufacturing Processes and Analysis
IE 1054	Productivity Analysis
IE 1070	Probability, Random Variables, and Distributions
IE 1071	Statistical Testing and Regression