

Approved Electives for CE

Updated June 2016

MST Electives

Mathematics Electives

- MATH 2250 Elementary Linear Algebra (3)
- MATH 2300 Discrete Structures (3)
- MATH 3310 Applied Differential Equations II (3)
- MATH 3340 Introduction to Scientific Computing (3)
- MATH 3500 Algebra I: Introduction to Rings and Proofs (3)
- MATH 4230 Introduction to Complex Analysis (3)
- MATH 4255 Mathematical Theory of Probability (cross-listed with STAT 4255) (3)
- MATH 4300 Introduction to Mathematical Modeling (3)
- MATH 4340 Numerical Analysis (3)
- MATH 4400 Topics in Applied Math (3)
- MATH 4440 Partial Differential Equations I (3)
- MATH 4500 Matrix Theory (3)
- MATH 5310 Computational Methods in Applied Sciences I (3)
- STAT 4015 Regression Analysis (3)
- STAT 4025 Design and Analysis of Experiments I (3)
- STAT 4115 Time Series Analysis and Forecasting (3)
- STAT 4155 Fundamentals of Sampling (3)
- STAT 4265 Introduction to the Theory of Statistics (cross-listed with MATH 4260) (3)

Science Electives

- ASTR 2310 General Astronomy (4)
- ATSC 2000 Introduction to Meteorology (3)
- ATSC 2100 Atmospheric Change: Composition and Climate (3)
- ATSC 4001 Modeling the Earth System (3)
- ATSC 4031 Atmospheric Dynamics (3)
- ATSC 4033 Atmospheric Remote Sensing (3)
- ATSC 4035 Atmospheric Processes II (3)
- ATSC 4320 The Ocean Environment (3)
- ATSC 4400 The Physical Basis of Climate (3)
- ATSC 4410 Introduction to Micrometeorology (3)
- LIFE 1010 General Biology (4)
 - Plus all Biology, Botany, and Zoology courses that have LIFE 1010 as a prerequisite.
- CHEM 1030 General Chemistry II (4)
- CHEM 1060 Advanced General Chemistry II (4)
 - Plus all Chemistry courses that have CHEM 1020, 1030, 1050, or 1060 as a prerequisite.
- GEOL 1100 Physical Geology (4)
- GEOL 1110 Physical Geology for Engineers (4)
- GEOL 1500 Water, Dirt, and Earth's Environment (4)
- GEOL 1600 Global Sustainability (4)

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GEOL 2000 Geochemical Cycles and the Earth (4)

GEOL 3600 Earth and Mineral Resources (4)

GEOL 4113 Geological Remote Sensing (3)

GEOL 4444 Geohydrology (3)

Plus all Geology courses that have GEOL 1100 or 1200 as a prerequisite.

MOLB 2021 General Microbiology (4)

Plus all Molecular Biology courses that have MOLB 2021 as a prerequisite.

PHYS 1210 Engineering Physics I (only if taken before or concurrently with ES 2120) (4)

PHYS 1220 Engineering Physics II (4)

PHYS 2310 Physics III: Waves and Optics (3)

Plus all Physics courses that have PHYS 1210 or 1310 as a prerequisite.

AECL 2010 Introduction to Soil Science (4)

AECL 3030 Ecology of Plant Protection (3)

SOIL 2010 Introduction to Soil Science (4)

SOIL 3130 Environmental Quality (3)

SOIL 4100 Soil Physics (4)

SOIL 4130 Chemistry of the Soil Environment (4)

Technical Electives

ARE 1600 Architectural Design Studio I (freshmen and sophomores only)

ARE 2410 Fundamentals of Building Performance

ARE 2600 Architectural Design Studio II

ARE 3030 Architectural History

ARE 3300 Building Electrical and Plumbing

ARE 3360 Fundamentals of Transport Phenomena

ARE 3400 Heating, Ventilating and Air Conditioning of Buildings

ARE 3600 Architectural Design Studio III

CE 4100 Civil Engineering Applications in GIS

CE 4430 Environmental Engineering Chemistry

CE 4970 WYDOT Design Squad Cooperative Experience* (see p.5)

CE 4965 Undergraduate Research

CE 4975 Civil and Architectural Engineering Internship

CE 5700 Sustainability in the Built Environment

CHE 2005 Chemical Process Analysis

CHE 2060 Intro to Chemical Engineering Computing

CHE 3015 Multicomponent Thermodynamics

CHE 3025 Transport Phenomena

CHE 4000 Environment, Technology and Society

COJO 3010 Business and Professional Communication

COSC 1030 Computer Science I

COSC 2150 Computer Organization

COSC 2300 Discrete Structures

DSCI 3210 Production and Operations Management

DSCI 4230 Purchasing and Supply Management

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DSCI 4240 Computer Applications in Decision Science
DSCI 4250 Revenue Management
DSCI 4260 Project Management
EE 3150 Electromagnetics
EE 3310 Introduction to Electronics
EE 4510 Power Systems
ENR 1200 Environment
ENR 1300 Foundations of Sustainability
ENR 2000 Environment and Society
ENR 2330 Environmental Ethics
ENR 2345 Natural Resource Ethics
ENR 3900 ENR Seminar
ENR 4000 Approaches to ENR Problem Solving
ENR 4500 Risk Analyses and Management
ENR 4900 ENR Assessment Practice
ES 2210 Electric Circuit Analysis
FIN 3250 Corporate Finance
FIN 4610 Real Estate and Urban Economics
LAW 6860 Water Rights
LS XXXX Any class in the Land Surveying program
ME 3005 Engineering Experimentation
ME 3010 Intermediate Mechanics of Materials
ME 3020 System Dynamics
ME 3040 Thermodynamics II
ME 3060 Numerical Methods for Engineers
ME 3160 Thermal/Fluid Science Lab
ME 3360 Fundamentals of Transport Phenomena
ME 4010 Mechanical Vibrations
ME 4020 Design of Mechanical/Electronic Systems
ME 5440 Fluid Mechanics
MGT 1040 Legal Environment of Business
MGT 2000 Introduction to Business
MGT 3110 Business Ethics
MGT 3210 Management and Organization
PETE 2050 Introduction to Petroleum Engineering
PETE 2060 Introduction to Petroleum Engineering Computing

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Professional Development Elective (PDE) Guidelines

18 hours of structured Professional Development Electives (PDE) are required.

A CDE activity must be included in those 18 hours.

One Structural PDE is required.

Electives are to be selected from at least three (3) areas of emphasis.

Areas of Emphasis within the Civil Engineering Program:

1. Environmental Engineering
2. Geotechnical Engineering
3. Structural Engineering
4. Transportation Engineering
5. Water Resources Engineering

Professional Development Elective (PDE) Courses

Environmental Engineering

- CE 4400 Design of Water Treatment Facilities (every 3rd semester)
- CE 4410 Design of Wastewater Treatment Facilities (every 3rd semester)
- CE 4440 Solid Waste Engineering
- CE 5400 Advanced Water Treatment
- CE 5410 Advanced Biological Wastewater Treatment
- CE 5425 Environmental Engineering Microbiology
- CE 5430 Environmental Engineering Chemistry
- CE 5435 Environmental Transport Processes
- CE 5445 Hazardous Waste Site Remediation
- CE 5450 Advanced Physical-Chemical Treatment
- CE 5455 Project Management for Environmental Engineers
- CE 5700 Civil Engineering Problems (see schedule)

Geotechnical Engineering

If a Geotechnical course is selected, the first PDE must be one of the following:

- CE 4610 Foundation Engineering
- CE 4620 Soil and Rock Slope Engineering
- CE 4630 Geotechnical Engineering
- CE 5620 Design of Earth Retaining Structures

Beyond the above, any of the following:

- CE 5820 Design of Small Earth Dams
- CE 5830 Flow in Porous Media
- SOIL 2010 Introduction to Soil Science
- SOIL 4100 Soil Physics

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Structural Engineering

One of the following is required:

- CE 4250 Structural Steel Design (fall only)
- CE 4260 Structural Concrete Design (spring only)

Beyond the above, any of the following

- CE 4200 Structural Analysis II (fall only)
- CE 4280 Reinforced Masonry Design (every 3rd semester)
- CE 4295 Structural Timber Design (every 3rd semester)
- CE 5010 Advanced Mechanics of Materials
- CE 5200 Advanced Structural Analysis
- CE 5220 Structural Dynamics (every 3rd semester)
- CE 5255 Advanced Steel (every 3rd semester)
- CE 5260 Prestressed Concrete Design
- CE 5270 Highway Bridge Design
- CE 5290 Earthquake Engineering
- CE 5295 Structural Timber Design
- ME 4215 Composite Materials Design and Manufacturing

Transportation Engineering

If a Transportation course is selected, the first PDE must be one of the following:

- CE 4510/5510 Pavement Design for Airports and Highways (every 3rd semester)
- CE 4555/5555 Geometric Design of Highways (every 3rd semester)
- CE 4530/5530 Traffic Engineering: Operations

Beyond the above, any of the following

- CE 4970 WYDOT Design Squad Cooperative Experience*
- CE 5560 Traffic Safety (every 3rd semester)
- CE 5570 Transportation Planning
- CE 5575 Intelligent Transportation Systems
- CE 5585 Pavement Management Systems
- CE 5590 Pavement Materials
- CE 5700 Civil Engineering Problems (see schedule)

* CE 4970 may be used for PDE if taken along with CE 4510/5510, 4530/5530 or CE 4555/5555. CE 4970 may be used for CDE if it is taken with the other course requirements and with a paper, design and presentation.

Water Resources Engineering

- CE 4350 Design of Hydraulic Engineering Systems
- CE 4800 Hydrology (every 3rd semester)
- CE 4820 Groundwater and Drainage Engineering
- CE 5300 Open Channel Hydraulics 3
- CE 5700 Civil Engineering Problems (see schedule)
- CE 5810 Groundwater Hydrology
- CE 5820 Design of Small Earth Dams
- CE 5830 Flow in Porous Media

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CE 5850 Advanced Subsurface Hydrology
CE 5865 Deterministic Hydrology
CE 5870 Water Resources Engineering
CE 5875 Deterministic Hydrology
CE 5880 Advanced Hydrology
CE 5885 Hydrometeorology

Comprehensive Design Experience (CDE) Courses

One of the following is required:

CE 4900 CDE in Environmental (fall only)
CE 4900 CDE in Structural Engineering (spring only)
CE 4900 CDE in Transportation (fall only)
CE 4900 CDE in Water Resources (spring only)