

Approved Electives for CE

Updated March 2014

MST Electives

Mathematics Electives

MATH 2250 Elementary Linear Algebra (3)
MATH 2300 Discrete Structures (3)
MATH 3000 Fundamental Concepts of Mathematics (3)
MATH 3310 Applied Differential Equations II (3)
MATH 3500 Applied Algebra (3)
MATH 3550 Introduction to Abstract Algebra (3)
MATH 4200 Mathematical Analysis I (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 Vector Calculus (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 4010 Atmospheric Processes I (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 1200 Historical Geology (4)
GEOL 1500 Water, Dirt, and Earth's Environment (4)

Approved Electives for CE

Updated March 2014

GEOL 1600 Global Sustainability (4)

GEOL 2000 Foundations of Geology (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 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)

ENTO 1100 The Biodiversity Crisis (3)

SOIL 4130 Chemistry of the Soil Environment (4)

SOIL 4100 Soil Physics (4)

Technical Electives

ARE 2100 Architectural Graphics (freshmen and sophomores only)

ARE 2200 Building Materials and Construction Methods

ARE 2410 Fundamentals of Building Performance

CHE 2060 Intr Chem Eng Comp

CHE 3000 Chemical Process Analysis

CHE 3015 Multicomponent Thermodynamics

CHE 3025 Transport Phenomena

CE 2074 Ethics for the Professional Surveyor

CE 2083 GIS for Surveyors

CE 2085 Public Land Surveys

CE 2088 Writing Legal Descriptions

CE 2089 Basic Geodesy for Today's Land Surveyor

CE 2090 GPS for Surveyors

CE 3710 Route Surveying

CE 3720 Advanced Surveying

CE 3740 Survey Boundary Control and Legal Principles

CE 3750 Surveying Evidence and Procedures for Boundary Location

CE 4430 Environmental Engineering Chemistry

CE 4100 Civil Engineering Applications in GIS

CE 4700 coastal Water Boundaries

CE 4740 Advanced Public Land Surveys

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

CE 5700 Sustainability in the Built Environment 3

COSC 1030 Computer Science I

COSC 2150 Computer Organization

COSC 2300 Discrete Structures

DSCI 3210 Production and Operations Management

DSCI 4240 Computer Applications in Decision Science

EE 3150 Electromagnetics

Approved Electives for CE

Updated March 2014

EE 3310 Introduction to Electronics
EE 4510 Power Systems
ES 2210 Electric Circuit Analysis
ENR 2000 Environment and Society
ENR 3900 ENR Seminar
ENR 4000 Approaches to ENR Problem Solving
ENR 4500 Risk Analyses and Management
ENR 4900 ENR Assessment Practice
FIN 3250 Managerial Finance
FIN 4610 Real Estate and Urban Economics
LAW 6860 Water Rights
ME 2020 Design of Experiments Lab
ME 2160 Thermofluids Laboratory I
ME 3010 Intermediate Mechanics of Materials
ME 3040 Thermodynamics II
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 3210 Management and Organization
PETE 2060 Intro Pete Computing

Approved Electives for CE

Updated March 2014

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 4 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
CE 4410 Design of Wastewater Treatment Facilities
CE 4440 Solid Waste Engineering
CE 5410 Advanced Biological Wastewater Treatment
CE 5425 Environmental Engineering Microbiology
CE 5435 Environmental Transport Processes
ENVE 5440 Hazardous Waste Management Engineering
CE 5445 Hazardous Waste Site Remediation
ENVE 5450 Advanced Physical-Chemical Treatment
CE 5455 Project Management for Environmental Engineers
CE 5700 Nanotechnology and the Environment

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

Approved Electives for CE

Updated March 2014

Structural Engineering

One of the following is required:

- CE 4250 Structural Steel Design
- CE 4260 Structural Concrete Design

Beyond the above, any of the following

- CE 4200 Structural Analysis II
- CE 4280 Reinforced Masonry Design
- CE 4295 Structural Timber Design
- CE 5010 Advanced Mechanics of Materials
- CE 5020 Finite Element Analysis
- CE 5200 Advanced Structural Analysis
- CE 5220 Structural Dynamics
- CE 5230 Advanced Materials
- CE 5240 Structural System Design
- CE 5260 Prestressed Concrete Design
- CE 5270 Highway Bridge Design
- CE 5280 Behavior of Reinforced Concrete
- CE 5290 Earthquake Engineering
- CE 5295 Structural Timber Design
- ME 4210 Introduction to Composite Materials

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
- CE 4555/5555 Geometric Design of Highways
- CE 4530/5530 Traffic Engineering: Operations

Beyond the above, any of the following

- CE 4970 WYDOT Design Squad Cooperative Experience*
- CE 5540 Traffic Control
- CE 5560 Traffic Safety
- CE 5570 Transportation Planning
- CE 5575 Intelligent Transportation Systems
- CE 5585 Pavement Management Systems
- CE 5590 Pavement Materials
- CE 5700 Network Analysis

* 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
- CE 4820 Groundwater and Drainage Engineering
- CE 5300 Open Channel Hydraulics 3
- CE 5310 Hydraulics of Closed Conduits 3
- CE 5330 Design of Hydraulic Structures 3

Approved Electives for CE

Updated March 2014

- CE 5700 Uncertainty in Hydrology
- CE 5810 Groundwater Hydrology
- CE 5820 Design of Small Earth Dams
- CE 5830 Flow in Porous Media
- CE 5860 Soil Erosion and Conservation
- CE 5865 Deterministic Hydrology
- CE 5870 Water Resources Engineering
- CE 5875 Deterministic Hydrology
- CE 5880 Advanced Hydrology

Comprehensive Design Experience (CDE) Courses

One of the following is required:

- CE 4900 CDE in Environmental
- CE 4900 CDE in Structural Engineering
- CE 4900 CDE in Transportation
- CE 4900 CDE in Water Resources
- CE 5820 Design of Small Earth Dams