



# CIVIL & ENVIRONMENTAL ENGINEERING UNDERGRADUATE HANDBOOK

(REVISED April 2016)

2100 Engineering  
5050 Anthony Wayne Dr.  
Detroit, MI 48202

Phone: (313) 577-3789  
Fax: (313) 577-3881  
<http://engineering.wayne.edu/cee>

## Purpose

The purpose of this handbook is to provide Civil and Environmental engineering students at Wayne State University a quick and complete source of information and guidelines to their departmental curriculum requirements. It is the intent of the Department to revise this handbook on a regular basis, unless deemed necessary to revise it more frequently. **Always consult the Academic Advisor, the Director of Undergraduate Studies, the Pre-Professional Handbook, or the Undergraduate Bulletin if this handbook cannot provide you with the proper guidelines or if you have any doubt or concern about your curriculum beyond the scope of this handbook.** This handbook can be downloaded from the department web site, <http://engineering.wayne.edu/cee/>

## Mission

The mission of the Civil and Environmental Department is to provide high quality, state-of-the-art educational and research programs. The Department strives for excellence in its academic programs, its research endeavors, and its university, community and professional service activities. The program is designed to prepare our graduates for success in their immediate, as well as long-term, professional careers as practitioners, for obtaining a professional license, and for pursuing advanced studies and life-long learning

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## CEE Department Faculty and Staff Directory

<u>Name</u>	<u>Areas of Expertise</u>	<u>Room</u>	<u>Phone (313)</u>	<u>Email</u>
Dr. Tapan Datta	Transportation	0504 EDC	577-3803	<a href="mailto:tdatta@eng.wayne.edu">tdatta@eng.wayne.edu</a>
Dr. Steve Remias	Transportation	2160 ENG	577-2086	<a href="mailto:sremias@wayne.edu">sremias@wayne.edu</a>
Dr. Chris Eamon	Structures	2166 ENG	577-3766	<a href="mailto:eo6111@wayne.edu">eo6111@wayne.edu</a>
Dr. Fatmir Menkulasi	Structures	2170 ENG	577-9950	<a href="mailto:fatmir.menkulasi@wayne.edu">fatmir.menkulasi@wayne.edu</a>
Dr. HC Wu	Structures	2162 ENG	577-0745	<a href="mailto:hcwu@eng.wayne.edu">hcwu@eng.wayne.edu</a>
Dr. Shawn McElmurry	Environmental	2158 ENG	577-3876	<a href="mailto:mcelmurry@eng.wayne.edu">mcelmurry@eng.wayne.edu</a>
Dr. Carol Miller	Environmental	2164 ENG	577-3842	<a href="mailto:cmiller@eng.wayne.edu">cmiller@eng.wayne.edu</a>
Dr. Yongli Zhang	Environmental	2168 ENG	577-9962	<a href="mailto:zhangyl@wayne.edu">zhangyl@wayne.edu</a>
Dr. Mumtaz Usman	Dept Chair	2170 ENG	577-3608	<a href="mailto:musman@eng.wayne.edu">musman@eng.wayne.edu</a>
Dr. Emrah Kazan	Construction Mgmt	2005 MEB	993-4369	<a href="mailto:ekazan@wayne.edu">ekazan@wayne.edu</a>

### STAFF

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Elizabeth Kondrat	Academic Advisor	2163 ENG	577-9850	<a href="mailto:ekondrat@wayne.edu">ekondrat@wayne.edu</a>
Liz Luzsinski	Program Specialist	2165 ENG	577-3789	<a href="mailto:elizabeth.luzsinski@wayne.edu">elizabeth.luzsinski@wayne.edu</a>

## **A brief note about the Curriculum on the following page**

The Board of Governors has each department come up with a suggested curriculum to follow so that a student can earn a bachelors degree in 4 years (8 semesters). Because of the higher than average number of credit hours that a student must complete to earn a Bachelors degree in Engineering, the following page should be used as a reference only. We suggest taking a lighter credit hour load due to the difficulty of the Math, Science, and Technical curriculum that is offered. The following page is helpful in determining a course sequence, and also gives a good general idea of which classes should be taken at a certain point in the program.

**Civil & Environmental Suggested Undergraduate Curriculum  
Fall 2016 Curriculum**

**FRESHMAN YEAR**

**First Semester**

BE 1200--Basic Engineering 1: Design in Engineering: Cr.3

CHM 1225--(PS) General Chemistry 1: Cr.3

CHM 1230—(LB) General Chemistry 1 Laboratory: Cr.1

ENG 1020—(BC) Introductory College Writing: Cr.3

MAT 2010—(MC) Calculus 1: Cr.4

**Total Credits: 14**

**Second Semester**

BE 1500— Introduction to Programming and Computation for Engineers. Cr. 3

BIO 1510—(LS) Basic Life Mechanisms: Cr.3

MAT 2020—Calculus 2: Cr.4

PHY 2175—General Physics: Cr.4

American Society and Institutions (AI) course: Cr.3

**Total Credits: 17**

**SOPHOMORE YEAR**

**First Semester**

BE 2100—Basic Engineering 3: Probability and Stat. in Engineering: Cr.3

CE 2410 (ME 2410)--Statics: Cr.3

MAT 2030—Calculus 3: Cr.4

PHY 2185—General Physics: Cr.4

Visual and Performing Arts (VP) course: Cr.3

**Total Credits: 17**

**Second Semester**

ECO 2010--(SS) Principles of Microeconomics: Cr.3

Or

ECO 2020--(SS) Principles of Macroeconomics: Cr.3

ENG 3050--(IC) Technical Communication 1: Report Writing: Cr.3

MAT 2150—Differential Equations and Matrix Algebra: Cr.4

CE 2420 (ME 2420)--Mechanics of Materials: Cr.3

CE 3450—Civil Engineering Materials: Cr.4

**Total Credits: 17**

## **JUNIOR YEAR**

### **First Semester**

CE 3250—Applied Fluid Mechanics: Cr.4

CE 4400—Structural Analysis Cr.4

CE 4510—Introduction to Geotechnical Engineering: Cr.4

CE 4850—Engineering Economy: Cr.3

PHI 1050—(CT) Critical Thinking: Cr. 3\*

**Total Credits: 18**

### **Second Semester**

CE 4210—Introduction to Environmental Engineering: Cr.3

CE 4410—Steel Design: Cr.3

CE 4600—Transportation Engineering: Cr.3

PHI 1120—(PL) Professional Ethics: Cr.3

Historical Studies (HS) course: Cr.3

**Total Credits: 15**

## **SENIOR YEAR**

### **First Semester**

CE 4240—Environmental Engineering Design: Cr.3

CE 4420—Reinforced Concrete Design: Cr.3

CE 4640—Transportation Design: Cr.3

CE Technical Elective: Cr. 3

CE Design Elective: Cr.4

**Total Credits: 16**

### **Second Semester**

CE 4995—(WI) Senior Design Project: Cr.3

CE Technical Elective: Cr.3

CE Design Elective: Cr.4

ENG 3060—(OC) Technical Communication 2: Writing & Speaking: Cr.3

Foreign Culture (FC) course: Cr.3

**Total Credits: 16**

\* Many students satisfy the CT requirement by passing the Critical Thinking Competency Examination instead of taking PHI 1050.

**Total Program Credits: 130**

**Total Program Credits for a student who passed the Critical Thinking Competency Examination: 127**

## Gen Ed & CE Elective Info

**CT- Critical Thinking Exam:** This exam must be taken before moving from the pre-professional to the professional level. You can find information about this requirement by visiting <https://testing.wayne.edu/app/testinfo.cfm?eid=TECTC>

**Humanities and Social Science Electives:** See: [General Education Requirements](#) for socio-humanistic requirements

**CE Technical Electives:** Civil Engineering students are required to complete at least six credits in technical electives (CE3010, CE3070 or any CE course at 5000 or 6000 level, or any other course approved by the Undergraduate Program Coordinator)

**CE Design Electives:** Students are required to complete two courses from the following: CE5230, CE5510, CE5520, CE5610, CE6130, CE6150, CE6190, CE6340, CE6370, CE6410, CE6580, and CE6660.

A word on the CE electives: The CE undergraduate curriculum is intended to give students a solid base of knowledge throughout all areas of Civil Engineering. The elective system gives students a chance to explore areas in which they are most interested in, so that they can develop deeper understanding in an area of their choosing.

# Wayne State University: Civil Engineering

<sup>1</sup> CE 2410 Prerequisites: MAT 2020 and PHY 2175

<sup>2</sup> CE 4850 is open only to students enrolled in the professional engineering program

<sup>3</sup> CE 4600 Prerequisite: BE 2100

<sup>4</sup> CE 4420 Prerequisite: CE 4400

<sup>5</sup> CE 4995 is open only to students with senior standing in Civil Engineering

<sup>6</sup> ENG 3060 prerequisite: ENG 3050

Design Electives include: CE 5230, 5510, 5520, 5610, 6130, 6150, 6190, 6340, 6370, 6410, 6580, 6660 or other CE course with faculty approval

Technical Electives include: CE 3010, 3070, any CE course at the 5000 or 6000 level, or other course with faculty approval

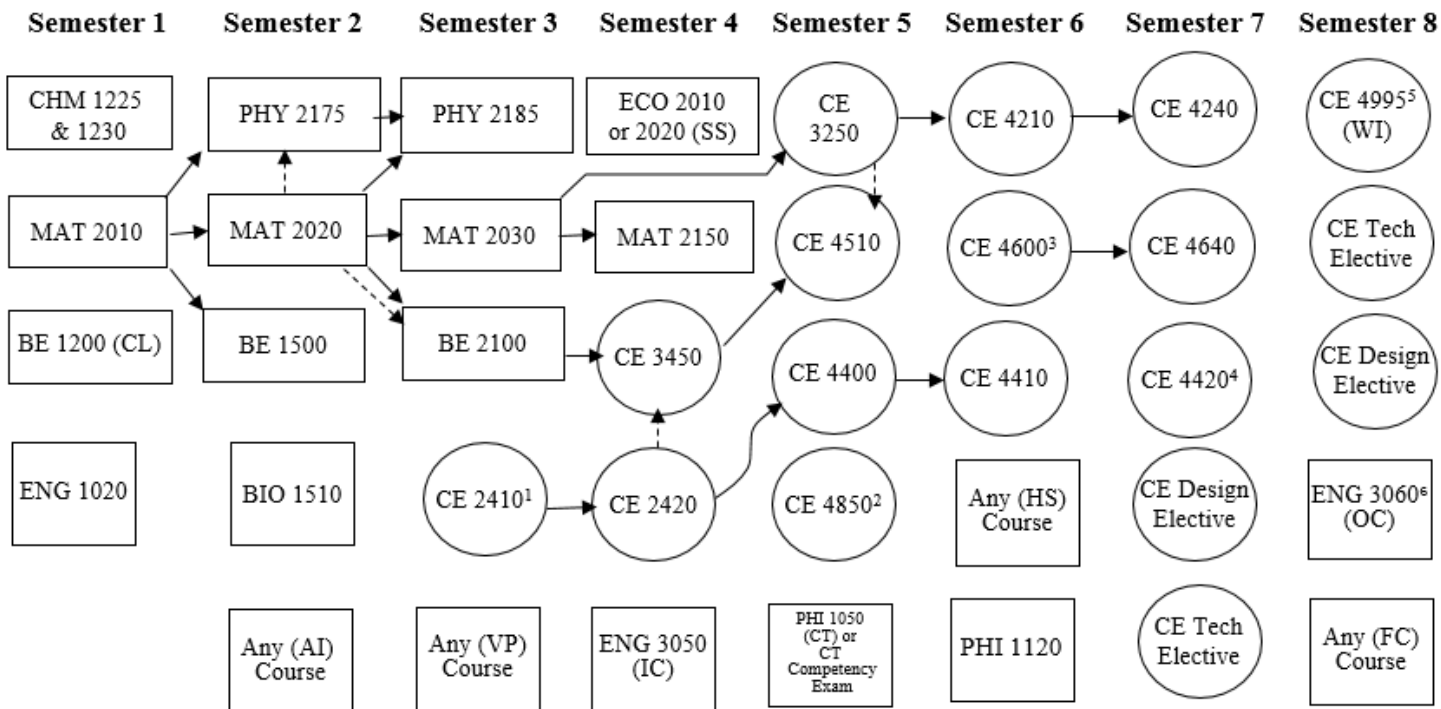
Common Engr.  
Curriculum

General  
Education  
Reqs.

Major  
Program  
Req.

Prerequisite —————>

Co-requisite - - - - ->



2-23-16



## Math & Science Course Pre-Requisite List

MAT 2010	Grade of C-minus or better in MAT 1800 taken at WSU; or satisfactory score on WSU mathematics placement exam; or validated ACT Math score of 29 or above
MAT 2020	MAT 2010
MAT 2030	MAT 2020
MAT 2150	MAT 2030
CHM 1225 & 1230	Passing score on chemistry placement exam or CHM 1040 with grade of C-minus or above
PHY 2175	MAT 2010; Co-Req: MAT 2020
PHY 2185	PHY 2175, MAT 2020
BIO 1510	BIO 1050 with grade of C-minus or above; or ACT score of 21 or above; or passing score on BIO placement exam; or BIO 1500 with grade of C-minus or above
BE 1200	Co-Req: MAT 1800
BE 1500	MAT 2010
BE 2100	Co-Req: MAT 2020
ENG 1020	Placement through ACT score; or English Qualifying exam; or passing grade in ENG 1010
ENG 3050	C or better in ENG 1020
ENG 3060	C or better in ENG 3050

## CE Course Pre-Requisite List

CE 2410	MAT 2020, PHY 2175
CE 2420	CE 2410
CE 3010	MAT 2020, BE 1200
CE 3070	PHY 2185
CE 3250	MAT 2030
CE 3450	BE 2100; Co-Req: CE 2420
CE 4210	CE 3250
CE 4240	CE 4210
CE 4400	CE 2410, CE 2420
CE 4410	CE 4400
CE 4420	CE 4400
CE 4510	CE 3450; Co-Req: CE 3250
CE 4600	BE 2100
CE 4640	CE 4600
CE 4850	Professional Program Standing
CE 4995	Senior Standing in CE
CE 5220	CHM 1225/1225, CHM 1240, PHY 2140/2175, and MAT 2020; or CE 4210
CE 5230	CE 4210
CE 5350	CE 4400
CE 5370	CE 4400 or ME 5600
CE 5510	CE 4510
CE 5520	CE 4510
CE 5610	CE 4640
CE 5810	Senior or Graduate Standing
CE 6010	CE 4850 or Consent of Instructor
CE 6050	CE 4850
CE 6060	CE 4450
CE 6130	CE 3250
CE 6150	CE 6130
CE 6190	CE 3250
CE 6330	CE 4410
CE 6340	CE 4420
CE 6370	CE 4420
CE 6410	CE 4420
CE 6660	CE 4640
CE 6880	CE 3010

**Bachelor of Science in Civil Engineering  
Degree Requirements**

Effective Fall 2016

Name: \_\_\_\_\_ 0

Student ID: \_\_\_\_\_ 0

**Basic Science and Math Courses**

	CR	Grade	Semester
* MAT 2010 (MC)	4		
* MAT 2020	4		
* MAT 2030	4		
MAT 2150 (or MAT 2250 + 2350)	4		
* CHM 1220/1225 <sup>1</sup>	3		
* CHM 1230	1		
* PHY 2170/2175 (PS)	4		
* PHY 2180/2185	4		
BIO 1510 (LS)	3		

**Civil Engineering Courses**

	CR	Grade	Semester
* CE 2410	3		
CE 2420	3		
CE 3250	4		
CE 4210	3		
CE 4240	3		
CE 4400	4		
CE 4410	3		
CE 4420	3		
CE 3450	4		
CE 4510	4		
CE 4600	3		
CE 4640	3		
CE 4850	3		
CE 4995 (WI/ST)	3		
CE XXXX (TE)	3		
CE XXXX (TE)	3		
<sup>2</sup> CE XXXX (Des)	4		
<sup>2</sup> CE XXXX (Des)	4		

Substandard Grades		

Pre-Professional GPA	> 2.5	#DIV/0!
Final College GPA	> 2.0	#DIV/0!
Total Degree Credits	127	0

With documentation, total degree credits may be less than 133 as long as at least 120.

\*This worksheet is for advising purposes only and is not meant to be an official audit of record

Students are responsible for verifying major requirements necessary for degree completion as listed in the WSU UG Bulletin

**Engineering Core**

	CR	Grade	Semester
* BE 1200 (CL)	3		
* BE 1500	3		
BE 2100	3		

**General Education**

	CR	Grade	Semester
ECO 2010/2020 (SS)	3		
PHI 1120 (PL/EI)	3		
AI	3		
FC	3		
HS	3		
VP	3		
* CT (Exam Recommended)	0		

**Technical Communication**

	CR	Grade	Semester
* ENG 1020 (BC)	3		
ENG 3050 (IC)	3		
ENG 3060 (OC)	3		

**Other (Substitution and/or AGRADE)**


Indicate whether counting as science/math or engineering credit if being used to satisfy these requirements.

<sup>1</sup> Transfer or original credit for CHM 1070 will be accepted as meeting the degree requirement.

NOTES <sup>2</sup> Design electives must be selected from CE 5230, 5510, 5520, 5610, 6130, 6150, 6190, 6340, 6370, 6410, 6580 or 6660.

\* Course included in pre-professional requirements.

Math/Science Credits	32	34
Engineering Credits	48	69

(Minimum number for ABET given in italics)

Revised 10/15

## CE COURSES GUIDE

Please note: Always check the current class schedule <http://www.classschedule.wayne.edu> to verify when a course is being offered.

**NOTE: 2000 through 4000 level courses are for undergraduate credit only. 5000 through 6000 level courses can be taken for undergraduate as well as graduate credit. 7000 through 9000 level courses are strictly for graduate credit and are not open to undergraduate students.**

### **2410 (M E 2410) Statics Cr. 3**

Prereq: MAT 2020 and PHY 2175. Basic concepts and principles of statics with applications to Newton's Laws of Motion to engineering problems. Forces, moments, equilibrium, couples, free body dia-grams, trusses, frames, fluid statics, friction, area and mass moment of inertia.

### **2420 (M E 2420) Elementary Mechanics of Materials Cr. 3**

Prereq: ME 2410 or CE 2410. Elastic relationships between external forces acting on deformable bodies and the associated stresses and deformations; structural members subjected to axial load, torsion, and bending; column buckling; combined stresses; repeated loads; unsymmetrical bending.

### **3010 Introduction to CAD in Civil Engineering. Cr. 3**

Prereq: MAT 2020, BE 1200 or equiv. Open only to students enrolled in professional engineering programs. Principles of computer graph-ics and utilization of computers in the design process. Civil engineer-ing applications of AutoCAD.

### **3070 Surveying. Cr. 3**

Prereq: PHY 2185. Open only to students enrolled in professional engineering programs. Principles of plane surveying; measurement of horizontal and vertical distance, directions and angles, traverses, areas. Material Fee As Indicated In The Schedule of Classes

### **3250 Applied Fluid Mechanics. Cr. 4**

Prereq: MAT 2030. Open only to students enrolled in professional engineering programs. Application of theoretical fluid mechanics to problems of special interest to civil engineers including pipe flow, open channel flow, forces on submerged bodies, and flow measure-ment. Laboratory component of course provides experimental verifi-cation of theories and computer visualization. Material Fee As Indicated In The Schedule of Classes

**3450 Civil Engineering Materials. Cr. 4**

Prereq: BE 2100. Prereq or coreq: CE 2420. Structure, composition and engineering properties of aggregates, cement concrete, asphalt, asphalt concrete, and other civil engineering materials. Mix design, testing, and quality control. Material Fee as indicated in the Schedule of Classes. Material Fee as indicated in the Schedule of Classes.

**4210 Introduction to Environmental Engineering. Cr. 3**

Prereq: CE 3250. Open only to students enrolled in professional engineering programs. Introduction to environmental laws; reaction kinetics; principles of mass balances; plug-flow and completely stirred tank reactors; Stoke's Law; Streeter-Phelps oxygen sag curves; water chemistry; hydrologic cycle; population growth models; elements of soil waste management and air pollution. Material Fee As Indicated In The Schedule of Classes

**4240 Environmental Engineering Design. Cr. 3**

Prereq: CE 4210. Design of engineered environmental systems, including drinking water distribution systems, sanitary and storm water sewer systems, and municipal waste disposal sites.

**4400 Structural Analysis. Cr. 4**

Prereq: CE 2410 and CE 2420. Open only to students enrolled in professional engineering programs. Basic concepts of structural analysis; reactions, forces, and stresses in trusses and beams; influence lines; elastic deflections; introduction to indeterminate structures; computer applications.

**4410 Steel Design. Cr. 3**

Prereq: CE 4400. Open only to students enrolled in professional engineering programs. First course in design of steel structures. Introduction to the concepts, requirements, and fundamental skills for steel building structural design.

**4420 Reinforced Concrete Design. Cr. 3**

Prereq: CE 4400. Open only to students enrolled in professional engineering programs. First course in design of concrete structures. Design and analysis of reinforced concrete beams, columns, and other structural members; ACI code requirements, cost concerns, safety, industry practices; introduction to prestressed concrete.

**4510 Introduction to Geotechnical Engineering. Cr. 4**

Prereq: CE 3450. Prereq. or coreq: CE 3250. Open only to students enrolled in professional engineering programs. Composition, engineering properties and behavior of soils. Principles of soil mechanics. Experimental determination of engineering classification, strength and deformation characteristics of natural and artificially placed soils. Material Fee As Indicated In The Schedule of Classes

**4600 Transportation Engineering. Cr. 3**

Prereq: BE 2100. Open only to students enrolled in professional engineering programs. Transportation functions; transportation systems including highways, railways and airways. Techniques of transportation systems analysis including optimization, network flows and queueing theory. Material Fee As Indicated In The Schedule of Classes

**4640 Transportation Design. Cr. 3**

Prereq: CE 4600. Open only to students enrolled in professional engineering programs. A description of design elements of various system components of transportation; including the driver, vehicle and roadway. Traffic flow design elements including volume, density and speed; intersection design elements including delay, capacity and accident countermeasures and terminal design elements including inflow, outflow and circulation.

**4850 (I E 4850) Engineering Economy. Cr. 3**

Open only to students enrolled in professional engineering programs. Economic analysis of engineering projects. Selection of appropriate interest rates and methods of analysis, analysis and evaluation of alternatives, depreciation and tax considerations, and use of accounting data in comparison of investment alternatives. Material Fee As Indicated In The Schedule of Classes

**4990 Directed Study. Cr. 1-4 (Max. 6)**

Prereq: written consent of chairperson. Open only to students enrolled in professional engineering programs. Supervised study and instruction in civil engineering. Written report required.

**4995 (WI) Senior Design Project. Cr. 3**

Prereq: senior standing in civil engineering. Open only to students enrolled in professional engineering programs. Capstone design experience through civil engineering projects. Satisfies General Education Writing Intensive requirement.

**5220 Environmental Chemistry. Cr. 3**

Prereq: C E 4210. Fundamentals of chemical principles and their application to unit operations and process encountered in the treatment of water and waste water. Material fee as indicated in the Schedule of Classes

**5230 Water Supply and Wastewater Engineering. Cr. 4**

Prereq: CE 4210. Open only to students enrolled in professional engineering programs. Analysis and design of water supply and wastewater treatment systems; water distribution systems; treatment of municipal water supplies, including sedimentation, softening, filtration and disinfection; design of sanitary and storm sewers; primary, secondary and tertiary treatment plant design; sludge handling. Material Fee As Indicated In The Schedule of Classes

**5350 Introduction to Structural Dynamics. Cr. 4**

Prereq: CE 4400. Dynamic properties of structures, modeling of dynamic loads. Structural response to dynamic loading. Structural design requirements for dynamic loads. Fundamental techniques of dynamic system analysis.

**5370 Finite Element Analysis Fundamentals. Cr. 4**

Prereq: C E 4400 or M E 5600. Matrix structural analysis, discretization of continuous structural systems, stress analysis. Commercial finite element software preprocessing for developing finite element models; postprocessing for evaluating analysis results.

**5510 Geotechnical Engineering I. Cr. 4**

Prereq: C E 4510. Site investigation, site improvement, bearing capacity and settlement of shallow foundations, axial capacity and lateral deflection of deep foundations, design of conventional earth retaining walls, and basics of slope stability analyses.

**5520 Geotechnical Engineering II. Cr. 4**

Prereq: C E 4510. Lateral earthpressure theories, design of conventional earth-retaining walls and of reinforced earth walls, anchored sheet-pile walls and cofferdams, fundamentals of soft-ground tunneling, two- and three-dimensional slope stability analyses, and static design of earth dams.

**5610 Highway Design. Cr. 4**

Prereq: C E 4640. Application of standards, theory and practice in design of streets and highways. Design of streets and highways including cross section elements, shoulder and roadside features. Pavement design and rehabilitation work.

**5810 Legal Aspects of Engineering and Construction. Cr. 3**

Open only to seniors and graduate students. Business of contracting, construction, liabilities of owner, architect, engineer and contractor. Rights in land, boundaries and foundations. Case studies. Material fee as indicated in the Schedule of Classes

**5830 Business of Engineering. Cr. 3**

Prereq: C E 4850. Defining the engineering company, creating the organization, support services, business development, project management, scheduling, budgeting and profitability, operations, financial management and risk management.

**5995 Special Topics in Civil Engineering I. Cr. 1-4**

Prereq: consent of chairperson. Topics to be announced in Schedule of Classes

**6010 Introduction to Construction Management. Cr. 3**

Prereq: CE 4850. An introduction to the organization and management of design and construction firms. Organizational and managerial theories. Problems of organization management, operation and control of engineering systems, case studies. Material Fee As Indicated In The Schedule of Classes

**6050 Construction Cost Estimating. Cr. 3**

Prereq: CE 4850. Estimating construction costs of engineering projects including materials, man-hours, equipment and overhead. Emphasis on construction equipment, including productivity and planning. Bidding and bid documents.

**6060 Construction Techniques and Methods. Cr. 3**

Prereq: CE 4450. Construction techniques and methods for excavation, foundations, concrete, wood, steel, masonry, heavy construction, wastewater treatment plants, highways and roads, high rise structures, bridges, and tunnelling projects.

**6130 Open Channel Hydraulics. Cr. 4**

Prereq: C E 3250 or equiv. Theoretical development of equations governing flow in open channels. Application to real-world engineering problems involving water surface profiles, flood studies, and river.



**6150 Hydrologic Analysis and Design. Cr. 4**

Prereq: C E 6130. Principles of surface water hydrology and their application for evaluation of floods and the design of surface runoff control system; watershed characteristics; design storms and SCS methods; unit hydrographs; hydrologic models; application of computer methods.

**6190 Groundwater. Cr. 4**

Prereq: CE 3250. Historical background, aquifers and aquitards, saturated and unsaturated flow, sources of ground water contamination, artificial recharge of ground water, development of ground water basins and efficient use of ground water resources.

**6270 Environmental Management and Sustainable Development. (HWM 6270) Cr. 4**

Prereq: C E 4210. Review Introduction to engineering design and development within sustainability constraints: theoretical, regulatory and practical implications: Detroit and global applications

**6330 Advanced Structural Analysis. Cr. 4**

Prereq: C E 4410. Effect of axial loads on stiffness of flexural members. Buckling of trusses and rigid frames. Matrix method of analysis. Complex structures. Computer applications.

**6340 Bridge Design and Evaluation. Cr. 4**

Prereq: C E 4420. Concepts, procedures, methods of design and condition evaluation for modern highway bridges, according to current specifications. Entire system is covered, including superstructure, substructure, and their connections.

**6370 Advanced Reinforced Concrete Design. Cr. 4**

Prereq: C E 4420. Theory and design of two-way slabs, footings, retaining walls, shear walls, and composite beams using ultimate strength design. Precast and prestressed concrete fundamentals.

**6410 Advanced Steel Design. Cr. 4**

Prereq: C E 4420. Advanced topics of structural steel design: thin walled rolled and built-up members, beam columns, lateral torsional buckling, steel fatigue design, connection details. Steel design project.

**6580 Geoenvironmental Engineering I. Cr. 4**

Prereq: C E 4510. Properties and test methods for natural and synthetic materials used in landfills; analysis of chemical interactions, flow mechanisms, stability and settlement for the design of landfill components.

**6660 Pavement Management Systems: Principles and Practices Cr. 4**

Prereq: C E 4640. Principles and practices used in pavement management systems, including pavement serviceability, pavement design, priority programming.

**6880 Building Information Modeling (BIM). Cr. 3**

Prereq: CE 3010 or equiv. Lectures, hands-on demonstrations and lab exercises to familiarize students with concepts and tools in Revit Architecture 2010 software; how software integrates 3D and 2D modeling.

**6910 (PSC 6910) Pharmaceutical Waste: Environmental Impact and Management. Cr. 2-3**

Prereq: graduate student in engineering; or advanced standing in Pharmacy program or in College of Pharmacy and Health Sciences. Course designed for advanced professional and graduate students with sufficient chemistry and/or biological sciences background who are interested in the environmental impact, management, and regulation of waste pharmaceuticals as emerging issues.

## Undergraduate Academic Performance Regulations

### Pre-professional and Professional Programs

(For details see “Handbook for Pre-Professional Students,” downloadable from College of Engineering website)

Students must first complete the pre-professional program (basically the freshman and sophomore years: See the courses with the red shaded boxes next to them in the degree requirements sheet on page 11) before applying to the professional program (basically the junior and senior years). Students are allowed to register for 3000-, 4000-, or 5000-level CE engineering courses ONLY AFTER they are admitted to the professional program. **Pre-professional requirements include earning a C-minus or better, and a minimum 2.5 overall GPA, in the following courses: MAT 2010, 2020 and 2030; CHM 1225 and 1230; PHY 2175 and 2185; BE 1200, BE 1500; ENG 1020; CE 2410, and successfully passing the Critical Thinking Exam.**

Students who complete the pre-professional curriculum but do not meet the necessary GPA requirement should meet with the Associate Dean for Academic Affairs to determine if a Plan of Work can be developed that will allow the student to demonstrate greater academic mastery of the technical subjects and also elevate his/her GPA. This Plan of Work may include repeating courses, or taking additional courses that may not count towards the degree requirements. Students who do not complete the Plan of Work so as to raise their GPA to the required level within a stipulated period of time will be excluded from the College.

### Repeating Courses

**Students must earn a grade of C- or higher in all courses that count towards earning the Bachelors of Science in Civil Engineering degree, including Gen Ed classes.** If a substandard grade is earned in any such required course, the student MUST repeat the course in the next regular semester (Fall or Winter) that the course is offered. The grade earned in a repeated course will replace the original grade in GPA calculation, but the original grade will remain on the transcript.

Students who have studied only at Wayne State will be *allowed only five repeats* in their pre-professional and professional programs. If a sixth repeat is required to complete the required curriculum, exclusion proceedings will be initiated.

Transfer students will earn one allowed repeat for every 24 credits earned at Wayne State.

Students will be *allowed only two repeats* in a single course. Students who receive three (3) substandard grades in a single class will be subject to exclusion considerations from the College.

## **Probation and Exclusion**

Any student whose University or College GPA falls below 2.0 will be placed on probation, and is given a warning letter or e-mail, and is required to meet with their academic advisor. The letter will explain that the student has one semester in which to bring up his/her GPA or he/she will risk exclusion from the College of Engineering.

Any student who has (a) not met the conditions of the probation, (b) exceeded the number of repeated courses allowed or (c) received three (3) substandard grades, will be considered for exclusion from The College of Engineering and issued a letter to this effect. Following exclusion, the privilege of registering in Engineering will be withheld for at least one calendar year.

## **Transferring Courses towards an Engineering Degree**

Students who have been accepted to the College of Engineering after completing college-level coursework at another institution may apply for the courses to be transferred into the University and applied to the degree program. Requests for an evaluation of transfer credit must be made through the Transfer Credit Evaluation Office. Courses with known equivalencies (which are noted in the Transfer Equivalency Tables at [www.transfercredit.wayne.edu](http://www.transfercredit.wayne.edu)) will be assessed by the central University office. The Transfer Credit Evaluation Office will forward to the appropriate department any courses for which there is not an established equivalent so that they may be evaluated.

When examining the Transfer Equivalency Tables, please make note of any date limitations regarding the equivalency of a course. This is particularly important for courses that may satisfy General Education requirements. The General Education category of courses is noted, if applicable, in the Table. The University conducts periodic reviews of courses at other universities to determine if they continue to meet Wayne State General Education objectives, and changes to these assessments will be noted. The applicability of these changes to a student's transfer record is based on the semester in which he/she took a course, not the semester during which he/she entered Wayne State.

**A minimum of 34 credits of a student's undergraduate program must be earned at Wayne State.** Most of the engineering degree programs have additional restrictions regarding the transfer of upper-level (4000- level and 5000-level) engineering courses towards an undergraduate degree.

**NOTE: In order for transfer credit of any course to be applied towards an engineering degree at Wayne State, a grade of C or higher must have been earned. A grade of C- will not be accepted for transfer of these courses\***

Any request for reconsideration of the evaluation of transfer credits accepted by the College of Engineering should be made in writing within *one year of the date of the student's first enrollment in the College of Engineering*. A College of Engineering Academic Petition should be provided first to the Director of Undergraduate Studies in a student's major department. Additional appeals may be made to the Associate Dean for Academic Affairs.

**After a student enrolls at Wayne State, all technical courses and prerequisites to technical courses must be taken at the University. Any exceptions to this policy must receive approval from the Director of Undergraduate Studies in the student's major department.** Enrolled students must receive prior approval for all courses to be transferred in and applied towards a Wayne State degree. This approval may be obtained through a Michigan Uniform Guest Permit, which must be signed by the Associate Dean for Academic Affairs. Approval of the Guest Permit by the Registrar's Office does not insure that the course will be counted towards engineering requirements.

*Occasionally, errors have been found in the Transfer Equivalency Tables. The College reserves the right to correct such errors and make appropriate adjustments to a student's transfer record. The decision of the College of Engineering concerning course equivalency will be final for Engineering Courses.*

\* This policy applies as of Fall 2006 for all degree requirements. Prior to Fall 2006, courses taken to satisfy AI, FC, HS, and VP requirements will be accepted for transfer based on University policy