



The University of Cincinnati

Masters of Engineering Degree Program Schedule

Admission Requirements

Admissions are controlled by the School in which the prospective student wishes to focus their program of study.

Individuals with the following qualifications will be admitted into the MEng program:

- Must hold a BS degree from an ABET accredited college (or equivalent if from an international university) in a corresponding engineering discipline and must provide transcripts from the institution where the degree was obtained;
- Minimum undergraduate grade point average (GPA) of 3.0;
- Submit GRE scores
- 2 letters of recommendation;
- Statement of purpose.

International students are required to submit TOEFL scores. Students must meet minimum requirements established by the University.

Individuals may request a waiver of some of the above requirements (e.g., undergraduate GPA less than 3.0, or undergraduate degree not in engineering) and admission to the program if they provide sufficient evidence to the graduate program director that they have had sufficient experience to warrant a waiver. It is up to the program to accept or decline this request.

Curriculum

The curriculum in the Master of Engineering Program is structured to provide a foundation of advanced engineering topics while allowing students flexibility to meet their specific educational objectives. The Master of Engineering requires a minimum of 30 semester hours including:

- **Program core courses** taken by all Master of Engineering students
- **Track required courses** from the discipline of interest (number of credit hours required depends upon the discipline)
- **Elective courses** depth or interdisciplinary focus depending on student educational objectives (number of credit hours available depends upon the discipline)
- **Capstone project** demonstrates applications of skills and synthesis of knowledge

MEng Curriculum Requirements		
<u>Program Core</u>	<u>Track Required Courses</u>	<u>Elective Courses</u>
3 courses (6-9 cr hrs)	4-5 courses (12 – 15 cr hrs)	1-3 courses (2-9 cr hrs)
	<u>Capstone Project</u> 0-4 credit hours typical	

Core Curriculum

The core curriculum is required of all Master of Engineering students, regardless of which track they pursue. The core provides skills in the effective practice of engineering recognizing that for experienced practitioners, effectiveness includes technical skills, project and task management skills, and interpersonal skills. Students are required to take 1 course from the Project / Task Management set, 1 course from the Interpersonal set, and 1 from the Advanced Technical set. **The Advanced Technical Skills courses may be satisfied with discipline specific courses.**

Project / Task Management Development (1 required)

MECH6074	Quality Control	Fall	<i>On Line</i>
ENGR6014	Eng Project Management	Spring	
AEEM6067	Entrepreneurship and Tech Law	Spring	
AEEM6099	System Eng & Analysis	Spring	
CVE 6044	Construction Law	Fall	
OM 7011	Management of Operations	Fall	

Interpersonal Skill Development (1 required)

ENGR6002	Management of Professionals	Fall	
ENGR6050	Fundamentals of Leadership	Fall and Spring	
CVE 6038	Leadership / Decision Making	Spring	
ENGR6010	Effectiveness in Tech Orgs	Fall & Spring	<i>On Line</i>
OLHR6050	Teams	Fall	
MGMT7014	leadership & Organizations	Fall	

Advanced Technical Skill Development (1 required)

Advanced Courses from the Discipline

MECH6011	Computational Design I	Spring
MECH6021	Modeling & Simulation of Solids	Spring
	(background in elasticity or solid mechanics recommended)	
BANA6021	Optimization	Fall
BANA6035	Simulation Modeling	Fall
MATH6006	Numerical Analysis	Fall

Other courses may be appropriate – please check with your advisor.

MEng Program Options

Aerospace Engineering	Biomedical Engineering	Chemical Engineering
Civil Engineering	Computer Engineering	Computer Science
Electrical Engineering	Environmental Engineering	
Material Science Engineering	Mechanical Engineering	

Typical Schedule for Full-Time MEng Program

	Fall Semester	Winter Semester
Core Courses	Core Course #1	Core Course #3
	Core Course #2	
Track Required Courses¹	Track Course #1	Track Course #3
	Track Course #2	Track Course #4
Elective Courses²	Elect Course #1	Elect Course #2
Capstone Project		Capstone Project
Credit Hours	15	15

¹ *Discipline specific course*

² *At the discretion of the program, student and the advisor*

MEng Graduate Program Curriculum Aerospace Engineering

The Aerospace Engineering and Engineering Mechanics Masters of Engineering degree is meant to be extremely flexible so as to meet the needs of prospective students. The coursework requirements are:

MEng Core Courses – 3 courses (see page 1)

Fundamental AEEM Courses - at least 4 courses selected from the following

AEEM 6001	Adv Strength of Materials
AEEM 6003	Analytical Dynamics
AEEM 6010	Satellite Technology
AEEM 6011	Combustion
AEEM 6015	Modern Control
AEEM 6022	Optimal Control
AEEM 6041	Comp Flow & Thermodyn
AEEM 6098	Unmanned Air Systems
AEEM 6099	Systems Eng Analysis
AEEM 7027	NonDestructive Test
AEEM 7035	Physics of Gases
AEEM 7050	Turbomachinery Flow
AEEM 7074	Advanced Finite Element Methods
AEEM 8030	Advanced Propulsion
EGFD 7041	Viscous Flow and Heat Transfer
EGFD 7051	Nu Meth Aero FI Mech

Capstone Project – 1 course

With permission of their advisor, students may select some of their elective credit hours in areas outside of Aerospace Engineering. Independent studies or projects in advanced topics may also be arranged.

MEng Graduate Program Curriculum Biomedical Engineering

The Biomedical Engineering Masters of Engineering has two focus areas students can select from: Medical Imaging or Tissue Engineering. There are a number of common courses required of all BME students as well as focus area specific courses.

MEng Core Courses – 3 courses

Track Required Courses

BME6011	MRI & SPECT	Fall
BME6012	BIO SIG & IMAG PRO	Fall
BME6024	J BIOMECH & MEAS	Spring

Capstone Project – 1 course

Elective Courses

BME6030	Funct Tissue Eng	Spring
BME6050	Biomed Ultrasound	Spring
BME7002C	Bioinstrumentation	Spring
BME7005	Biomed Research Design	Spring
BME7021	Tissue Biomech	Fall
BME7061	Biostats in Research	Fall
BE7064		

With permission of their advisor, students may select some of their elective credit hours in areas outside of Chemical Engineering. Independent studies or projects in advanced topics may also be arranged.

MEng Graduate Program Curriculum Civil Engineering

A total of at least 30 semester credit hours are required for an MEng degree in Civil Engineering. Of these, 3 credit hours can be counted for the Capstone Project, if available. Students in the Civil Engineering program can choose between a targeted program that provides significant depth and a program that adds breadth within the practice of Civil Engineering. Students seeking to strengthen their area of expertise can choose either a focus on Infrastructure Design (with emphasis on Structures or Geotechnical) or on Infrastructure Systems (with emphasis on Construction, Pavements, or Transportation). *Note that some courses are only offered in even years or in odd years, thus in some cases a minimum of three semesters will be necessary to fulfill all requirements.*

Students who have taken any of the 6000 level courses listed herein as part of their undergraduate degree at the University of Cincinnati will identify suitable substitutes in consultation with their academic advisor.

The total number of credit hours taken as independent study and/or project courses may not exceed 6.

Final Comprehensive Examination OR Capstone Project – 1 course

Take a final comprehensive examination (0 semester credit hours) OR, if available, work on a Capstone Project (3 semester credit hours) that represents the synthesis of what was learned during the formal classwork.

Civil Engineering Depth Programs – Required Classes

Option 1 - Structures

CVE 7011	Structural Mechanics	Fall
CVE 7012	Finite Element Analysis	Spring
CVE 7081	Theory and Design of Concrete Structures I	Fall 2013
CVE 7085	Metal Structures Theory and Design I	Fall 2014
CVE 7088	Structural Dynamics	Fall 2013

Option 2 - Geotechnical

CVE 7011	Structural Mechanics	Fall
CVE 7061	Consolidation and Settlement (Must have CVE 476)	TBA
CVE 7062	Soil Shear Strength and Slope Stability	TBA

Take **two** of the following courses:

CVE 6081	Foundation Engineering	Fall
CVE 7081	Theory and Design of Concrete Structures I	Fall 2013
CVE 7085	Metal Structures Theory	Fall 2014

In addition students must complete **three** of the following

CVE 6082	Reinforced Concrete Design of Shallow Foundations	Spring
CVE 6063	Principles of Pavement Engineering	Fall
GEOL 7001C	Geomorphic Processes	Fall
GEOL 6004	Glacial Geology	Fall

Option 3 – Construction

CVE 6044	Construction Law	Fall 2013
CVE 6012	Traffic Demand Forecasting and Environmental Analysis	Fall 2013
CVE 6038	Leadership and Decision Making	Spring 2014
CVE 6036	Value Engineering and Constructability	Fall 2013

Option 4 – Pavements

CVE 7010	Risk and Reliability	Spring
CVE 6063	Principles of Pavement Engineering	Fall
CVE 6067	Advanced Pavement Engineering	Spring

Two courses from structures, geotechnical, construction, or transportation areas.

Option 4 - Transportation

CVE 6038	Leadership and Decision Making	Spring 2014
CVE 6022C	Traffic Control and Signal System Design	Spring 2014
CVE 6010C	Advanced Traffic Engineering, or	Fall 2014
CVE 6024	Highway Engineering and Traffic Safety	Spring 2015
CVE 6012	Travel Demand Forecasting and Environmental Analysis	Fall 2013
CVE 6008	Transportation Planning and System Evaluation	Fall 2014

Civil Engineering Breadth Program – Required Classes

CVE 7010 Risk and Reliability Spring

Two courses from structures and/or geotechnical areas

Two courses from construction and/or traffic area

Elective Courses:

With permission of their advisor, students may select some of their elective credit hours in areas outside of Civil Engineering. Independent studies or projects in advanced topics may also be arranged, for a maximum of 6 semester credit hours total. Note that some of the courses listed below have prerequisite courses.

CVE6008	Transportation Planning and System Evaluation
CVE6010C	Advanced Traffic Engineering
CVE6011	Advanced Strength of Materials
CVE6012	Travel Demand Forecasting and Environmental Analysis
CVE6021	Bridge Engineering
CVE6022C	Traffic Control and Signal System Design
CVE6024	Highway Engineering and Traffic Safety
CVE6036	Value Engineering and Constructability
CVE6037	Construction Financing & Strategy Planning
CVE6038	Leadership/Decision Making
CVE6041	Project Management Functions
CVE6042	Sustainable Construction and LEED
CVE6043	Structural Systems for Constructors
CVE6044	Construction Law
CVE6045	Heavy Highway Estimating

CVE6046	MEP systems for Constructors
CVE6058	Design of Wood and Masonry Structures
CVE6063	Principles of Pavement Engineering
CVE6067	Advanced Pavement Engineering
CVE6081	Foundation Engineering
CVE6082	Reinforced Concrete Design of Shallow Foundations
CVE6085	Advanced Structural Analysis
CVE7010	Risk and Reliability
CVE7011	Structural Mechanics
CVE7012	Finite Element Analysis
CVE7013	Advanced Topics in Finite Element Analysis
CVE7014	Marketing Construction Firm
CVE7016	Human Resources in Construction
CVE7017	Operation Management in Construction
CVE7020C	Advanced Computer Applications in Construction Engineering and Management
CVE7021	International Construction
CVE7024	New Trends in Construction Management
CVE7061	Consolidation and Settlement
CVE7062	Soil Shear Strength and Slope Stability
CVE7074	Traffic Flow Theory and Network Modeling
CVE7076	Intelligent Transportation Systems: Integrated Planning and Technologies
CVE7081	Theory and Design of Concrete Structures I
CVE7082	Design of Concrete Structures II (CVE7081 prerequisite)
CVE7085	Metal Structures Theory and Design I
CVE7086	Metal Structures Theory and Design II (CVE 7085 prerequisite)
CVE7088	Structural Dynamics
CVE7089	Earthquake Engineering

MEng Graduate Program Curriculum Chemical Engineering

The Chemical Engineering Masters of Engineering degree is meant to be extremely flexible so as to meet the needs of prospective students. The coursework requirements are:

MEng Core Courses – 3 courses

Track Required Courses – 4 courses

CHE 6040	Advanced Thermodynamics	Fall
CHE 6043	Adv Transport Phenomenon I	Fall
CHE 6044	Transport Phenomenon II	Spring
CHE 7077	Chemical Reactor Design	Spring

Capstone Project – 1 course

Elective Courses – 2 courses

CHE 6045C	Transp. Phenom Modelling & Anal	Fall
CHE6057	Fuel Cells	Spring
CHE6059	Inorganic Membranes	Fall
CHE6076	Colloid Science	Spring
CHE 6089	Zeol. Synthesis, Charac, & Appl	Fall

With permission of their advisor, students may select some of their elective credit hours in areas outside of Chemical Engineering. Independent studies or projects in advanced topics may also be arranged.

MEng Graduate Program Curriculum Computer Engineering

The Computer Engineering Masters of Engineering degree is meant to be extremely flexible so as to meet the needs of prospective students. The coursework requirements are:

MEng Core Courses – 3 courses

Track Required Courses – 3 courses

Computer Engineering - complete at least 3 of the following 5 courses:

EECE6010	Database Management Theory	Spring
EECE6029	OPERATING SYSTEMS	Fall
EECE6080C	INTRO VLSI DESIGN	Fall
EECE6083	Compiler Theory and Practice	Spring
EECE7095	INTRO COMPUTER ARCH	Fall

VLSI Design Track – complete

EECE6080C	INTRO VLSI DESIGN	Fall
EECE6082C	VLSI Design for Test and Power	Spring
EECE6086C	VLSI Design Automation	Spring

And 2 of the following

EECE6010	Database Management Theory	Spring
EECE6029	OPERATING SYSTEMS	Fall
EECE6083	Compiler Theory and Practice	Spring
EECE7095	INTRO COMPUTER ARCH	Fall

Capstone Project – 1 course

Elective Courses – courses from EECE or CS

With permission of their advisor, students may select some of their elective credit hours in areas outside of Computer Engineering. Independent studies or projects in advanced topics may also be arranged.

MEng Graduate Program Curriculum Computer Science

The Computer Science Masters of Engineering degree is meant to be extremely flexible so as to meet the needs of prospective students. The coursework requirements are:

MEng Core Courses – 3 courses

Track Required Courses – 4 courses

Students must complete at least 4 computer science courses

Fall

CS6033	Artificial Intelligence
CS6037	MACHINE LEARNING
CS6051	DATABASE THEORY
CS6054	INFO RETRIEVAL
CS6060	COMPUTER GRAPHICS I
CS 6063	Distributed Systems
CS6067	USER INTERFACE I
CS6068	Parallel Computing
CS6070	Automata
CS 6097	Wireless & Mobile Networks
CS7035	CRYPTOGRAPHY 1
CS7097	Intro Fucntional Genomics
CS8021	PATTERN RECOGNITION

Spring

CS 6026	Formal Methods
CS 6052	Intelligent Data Analysis
CS 7081	Adv. Algorithms I
CS 7099	Intro to Bioinformatics
CS 7083	Exper. Combinator.

Summer

CS 6060	Computer Graphics
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With permission of their advisor, students may select some of their elective credit hours in areas outside of Electrical Engineering. Independent studies or projects in advanced topics may also be arranged.

MEng Graduate Program Curriculum Electrical Engineering

The Master of Engineering Program for Electrical Engineering consists of three tracks: Systems, Electronic Devices, and VLSI tracks. For the track the following requirements apply:

MEng Core Courses – 3 courses

Track Required Courses – 3 courses

Devices and materials track - complete at least 3 of the following 5 courses:

EECE6007	BIOMED MICROSYS	Fall
EECE6008	FUNDAMENTALS MEMS	Fall
EECE6018	MICROFAB SMCND DEV	Fall
EECE6028	Into to Nanoelectronics	
EECE6048	Optics for Engineers	

Systems track - complete at least 3 of the following 5 courses:

EECE6019	PROB & RAND PROC	Fall
EECE6024	INTRO DIG SIG PROC	Fall
EECE6026	Intro to Communication Systems	Spring
EECE6036	Intelligent Systems	Spring
EECE7033	LINEAR SYS THEORY	Fall

VLSI Design Track – complete

EECE6080C	INTRO VLSI DESIGN	Fall
EECE6082C	VLSI Design for Test and Power	Spring
EECE6086C	VLSI Design Automation	Spring

And 2 of the following

EECE6007	BIOMED MICROSYS	Fall
EECE6008	FUNDAMENTALS MEMS	Fall
EECE6018	MICROFAB SMCND DEV	Fall
EECE6019	PROB & RAND PROC	Fall
EECE6024	INTRO DIG SIG PROC	Fall
EECE6026	Intro to Communication Systems	Spring
EECE6036	Intelligent Systems	Spring
EECE7033	LINEAR SYS THEORY	Fall

Capstone Project – 1 course

With permission of their advisor, students may select some of their elective credit hours in areas outside of Computer Engineering. Independent studies or projects in advanced topics may also be arranged.

MEng Graduate Program Curriculum Environmental Engineering or Environmental Science

In order to graduate with a Master of Engineering degree with specialization in Environmental Engineering, the student has to successfully complete 30 cr hr of courses including at least 2 **Fundamental** courses and 1 **Design** courses.

MEng Core Courses –3 courses

Track Required Courses (10 – 15 cr hr)

Minimum of Two Fundamental courses and Minimum of One Design course

Fundamental Courses - at least 2 courses to be selected from the following

Fall Semester

ENVE 6000/6001 Applied Biology for Engineered Systems (3/2 cr hr)
ENVE 6047 Chemical Principles of Environmental Systems (4 cr hr)
ENVE 6053 Physical Principles of Environmental Systems (4 cr hr)
BE 7022 Introduction to Biostatistics (4 cr hr)
ENVE 6071C [moved from Spring Semester] Aerosol Science and Engineering (4 cr hr)

Spring Semester

ENVE 6027 [moved from Fall Semester – pending approval] Mathematical Principles (4 cr hr)
ENVE 6046 Biological/Microbiological Principles of Environmental Systems (4 cr hr)
ENVE 6094 Probability and Estimation Methods for Engineering Systems (3 cr hr)

Design Courses - at least 1 course to be selected from the following

Fall Semester

ENVE 6064 Air Resources Management (3 cr hr)

Spring Semester

ENVE 6026 [not offered AY 13-14] Water Distribution System Analysis (3 cr hr)
ENVE 6043 Engineering Hydrology (3 cr hr)
ENVE 6054 Physical/Chemical Processes for Water Quality Control (4 cr hr)
ENVE 6055 Biological Processes for Water Quality Control (4 cr hr)

Capstone Project (1 – 4 cr hr)

Elective Courses (2 – 9 cr hr)

Fall Semester

ENVE 6014 Solid Waste Management (3 cr hr)
ENVE 6022C [not offered AY 13-14] Atmospheric Chemistry and Monitoring (3 cr hr)
GEOG 6071C Introduction to Geographic Information Systems (3 cr hr)

Spring Semester

ENVE 6044 Environmentally Conscious Engineering (3 cr hr)
ENVE 6052 Advanced Topics in Environmental Chemistry (3 cr hr)
ENVE 6058 Environmental Instrumentation (3 cr hr)

With permission of their advisor, students may select some of their elective credit hours in areas outside of Environmental Engineering; typical courses come from Arts & Science and DAAP. Independent studies or projects in advanced topics may also be arranged.

MEng Graduate Program Curriculum Materials Science or Metallurgical Engineering

The Master of Engineering consists of two tracks: Materials Science or Metallurgical Engineering. For either track the following general requirements apply:

MEng Core Courses – 3 courses

Track Required Courses – 4 courses from the following

MTEN6010L	PHYS PROP SOLIDS	Fall
MTEN6025C	POLYMER PROCESSING	
MTEN6034	Polymer Properties	Fall
MTEN6035	Polymer Spectroscopy	Fall
MTEN6042	COMPOSITE MATERIALS	Fall
MTEN6044	CER PROC	Fall
MTEN6047	ELEC OPT PROP CER	
MTEN6090	MOLECULAR MODELING	Spring
MTEN6096	Smart Materials	Fall
MTEN6097	Mech Prop Mater	Fall
MTEN7048	DIFFRACTION THEORY	Spring
MTEN7079	DEFECT IN SOLID	
MTEN7094	POLYMER SCIENCE	Fall
MTSC7010C	Advanced Material. Techniques	Fall
MTSC7035	ADV. THERMO	Fall

Capstone Project – 1 course

With permission of their advisor, students may select some of their elective credit hours in areas outside of Materials Science / Metallurgical Engineering. Independent studies or projects in advanced topics may also be arranged.

MEng Graduate Program Curriculum Mechanical Engineering

The Mechanical Engineering Master of Engineering curriculum allows the flexibility for students to choose from a combination of courses to complete the Track & Elective credit hours requirement. For students who wish to specialize in a particular area, suggested courses oriented toward the available areas of specialization are given below. However, students do not need to specialize.

MEng Core Courses – 3 courses`

Capstone Project – 1 course

Track / Elective Courses – 6 courses

Primary areas of specialization within Mechanical Engineering are:

- Structural Dynamics and Vibro-Acoustics
- System Dynamics and Controls
- Design and Manufacturing
- Solid Mechanics
- Thermal-Fluids Engineering

FALL

MECH6010	Advanced Strength of Materials
MECH6013	Smart Structures
MECH6031	Intro to Robotics
MECH6046	Bio-Fluid Mechanics
MECH6050	Occupational Safety Engineering
MECH6060	Applied Fast Fourier Transforms
MECH6066	Acoustics
MECH6074	Quality Control
MECH6075	Production Planning & Control
MECH6077	Micro & Nano Manufacturing
MECH7041	Grid Generation Techniques
MECH7051	Continuum Mechanics
MECH7062	System Dynamic analysis
MECH7096	Viscous Fluid Flow
EGFD7041	Viscous Flow and Heat Transfer

SPRING (subject to change)

MECH6004	Monte Carlo Methods
MECH6011	Computational Design
MECH6032	Robot Control and Design
MECH6035	Intelligent Systems Theory
MECH6036	Robot Vision
MECH6043	CFD/FEM in Heat Transfer & Fluid Flow
MECH6062	Experimental Vibrations
MECH6067	Vibro-Acoustics
MECH6072	Manufacturing Facilities Design
MECH6073	Intro to E-Manufacturing
MECH6074	Quality Control
MECH6076	Supply Chain Modeling and Optimization
MECH6094	Fundamentals & Applications of Solar Energy
MECH6095	Thermal Energy Storage

MECH6096	Internal Combustion Engines
MECH6098	HVAC Design II
MECH7042	CFD for Incompressible Flow
MECH7044	Micro-fluidics
MECH7051	Continuum Mechanics
MECH7052	Finite Element Method
MECH7064	Advanced System Dynamics
MECH7066	Vibrations and Acoustics of Continuous Systems
MECH7070	Advanced Manufacturing Processes
MECH7072	Precision engineering and Computational metrology
MECH7091	Convection Heat Transfer
MECH7092	Radiation Heat Transfer
MECH8037	Multibody Dynamics
MECH8092	Advanced Convection Heat Transfer

With permission of their advisor, students may select some of their elective credit hours in areas outside of Mechanical Engineering or EGF. Independent studies or projects in advanced topics may also be arranged.