

ENGINEERING at UMD

- Bachelor of Science in Chemical Engineering (B.S.Ch.E)
- Bachelor of Science in Civil Engineering (B.S.C.E.) *beginning Fall 2008*
- Bachelor of Science in Electrical and Computer Engineering (B.S.E.C.E.)
- Bachelor of Science in Industrial Engineering (B.S.I.E.)
- Bachelor of Science in Mechanical Engineering (B.S.M.E.)

CHEMICAL ENGINEERING

This four-year baccalaureate degree program emphasizes the development of the student's ability to analyze and design chemical processing systems and to communicate effectively. Graduates are qualified for assignments that include plant operations, process development, process control, project engineering, or sales, and frequently pursue engineering management later in their careers. They are also well qualified to continue with professional or graduate education. ABET accredited.*

CIVIL ENGINEERING *(Program begins Fall 2008)*

The Civil Engineering program integrates topics from chemistry, physics, mathematics, statistics, geology and core engineering science to prepare graduates to work professionally in both public and private organizations that design, develop and construct structures; design, build and maintain highway systems; and design, operate, and control water resource systems. The UMD program will emphasize four of the core tracks in civil engineering: (1) transportation systems, (2) water resource engineering, (3) structural engineering, and (4) geotechnical engineering. New program accepting freshman in Fall 2008.

ELECTRICAL AND COMPUTER ENGINEERING

The Electrical and Computer Engineering program at UMD combines traditional electrical engineering topics with current topics that focus on computer design and analysis. Electrical and computer engineering is concerned with the theory, design, and application of electrical phenomena and digital computers, including electronic circuits, signal analysis, system design, and computer architecture. ABET accredited.*

INDUSTRIAL ENGINEERING

The Industrial Engineering program at UMD develops students' abilities to analyze the technical, economic, and human factors involved in production. Industrial engineers are involved with the design, improvement, and production of integrated systems of people, materials, equipment, and energy. The program offers two tracks. **Automated Systems** emphasizes the overall perspective, concentrating on intelligent manufacturing systems; electives allow students to study systems of interest to them. The **International Engineering** track offers a unique opportunity for students to study in Luleå, Sweden. ABET accredited.*

MECHANICAL ENGINEERING

The Mechanical Engineering program integrates the sciences and advanced mathematics with engineering fundamentals so graduates can design, develop, and implement both thermal and mechanical systems. Mechanical engineers design products, energy systems, and new materials, which are cost effective and useful. ABET accredited.*

UMD STUDENT CHAPTERS OF ENGINEERING SOCIETIES:

- AIChE: American Institute of Chemical Engineers
- ASME: American Society of Mechanical Engineers
- IEEE: Institute of Electrical and Electronics Engineers
- IIE: Institute of Industrial Engineers
- ISA: Instrumentation, Systems & Automation Society of America
- Tau Beta Pi: Engineering Honor Society

*UMD engineering programs are accredited by the Accreditation Board of Engineering and Technology (ABET).

BACHELOR OF SCIENCE IN CHEMICAL ENGINEERING

The Chemical Engineering program educational objectives are to produce:

1. Graduates who are able to apply theoretical and practical knowledge of engineering in the workplace.
2. Graduates who possess the ability to communicate effectively with technical and non-technical users of technology.
3. Graduates who are prepared to engage in advanced or additional education in their chosen field of endeavor or interest.
4. Graduates who recognize that the broader aspects of engineering practices include economic, environmental, social, political and professional constraints

Program Course Requirements:

Year 1

ChE 1011 Intro to Chemical Engineering or ChE 2001 Intro to Environmental Engr	3 cr
Chem 1151 or 1161 General Chemistry I	5 cr
Chem 1152 or 1162 General Chemistry II	5 cr
Math 1296 Calculus I	5 cr
Math 1297 Calculus II	5 cr
Phys 2011 General Physics I	4 cr
CS 11xx Intro to Programming	3 cr
Comp 1120 College Writing	3 cr

Year 2

ChE 2011 Design of Experiments	3 cr
ChE 2111 Material and Energy Balances	3 cr
ChE 2121 Chem Engr Thermodynamics	3 cr
Chem 2222 Quantitative Analysis	3 cr
Chem 2223 Quantitative Analysis Lab	1 cr
Chem 2521 Organic Chemistry I	4 cr
Engr 2015 Statics	3 cr
Math 3280 Diff Equations w/Linear Algebra	4 cr
Phys 2012 General Physics II	4 cr

Year 3

ChE 3031 Computational Methods in ChE	3 cr
ChE or ME 3111 Fluid Mechanics	3 cr
ChE 3112 Heat and Mass Transfer	3 cr
ChE 3211 Chemical Engineering Lab I	3 cr
ChE 3231 Properties of Engineering Materials	3 cr
ChE 3241 Prin of Particle Technology	3 cr
ChE 4xxx elective	3 cr
Advanced chemistry electives	8 cr
Comp 31xx or 51xx Advanced Writing	3 cr

Year 4

ChE 4111 Separations	3 cr
ChE 4211 Chemical Engineering Lab II	3 cr
ChE 4301 Chemical Reaction Engineering	3 cr
ChE 4402 Process Dynamics and Control	3 cr
ChE 4501 Chemical Engineering Design I	4 cr
ChE 4502 Chemical Engineering Design II	4 cr
3xxx science or engineering elective	3 cr

BACHELOR OF SCIENCE IN CIVIL ENGINEERING

Civil Engineering graduates will learn safe and efficient design skills, respect for the environment and the importance of improving the environment. They will be qualified for employment in a wide variety of organizations, both public and private, including design, material testing and manufacture, construction, transportation, natural resources development, and energy.

Program Course Requirements:

Year 1

CE 1025 Intro to Civil Engineering	1 cr
Chem 1151 or 1161 General Chemistry I	5 cr
Chem 1152 or 1162 General Chemistry II	5 cr
Math 1296 Calculus I	5 cr
Math 1297 Calculus II	5 cr
Phys 2011 General Physics I	4 cr
CS 11xx Intro to Programming	3-5 cr
Comp 1120 College Writing	3 cr

Year 2

CE 2026 Surveying & Geometrics	3 cr
Engr 2015 Statics	3 cr
Engr 2016 Mechanics of Materials	3 cr
Engr 2026 Dynamics	3 cr
Engr 3411 Engineering Statistics	3 cr
Math 3298 Calculus III	4 cr
Math 3280 Diff Equations w/Linear Algebra	4 cr
Phys 2012 General Physics II	4 cr
Econ 1022 or 1023 Macro or Micro Economics	3 cr

Program Course Requirements:

Year 3

CE 3015 CADD/ Comp Tools for Civil Engr	3 cr
CE 3115 Structural Engineering	4 cr
Geol 1110 Geology & Earth Systems	4 cr
ChE or ME 3111 Fluid Mechanics	3 cr
IE 3125 Engineering Economic Analysis	3 cr
CE 3025 Environmental Engineering	3 cr
CE 3026 Project Management	3 cr
CE 3225 Hydrology	4 cr
CE 3316 Transportation Engineering	4 cr
CE 3426 Soil Mechanics	4 cr

Year 4

CE 4155 Senior Design I	2 cr
CE 4255 Senior Design II	2 cr
ME 3211 Thermodynamics	3 cr
CE technical electives selected from focus groups:	12 cr
• Structures	
• Water Resources	
• Transportation Engineering	
• Geotechnical Engineering	

BACHELOR OF SCIENCE IN ELECTRICAL AND COMPUTER ENGINEERING

The educational objectives of the Electrical and Computer Engineering program are to

1. Provide a high quality educational opportunity in electrical and computer engineering for students in the region.
2. Help each student to prepare for a successful career in industry, academia, or government by learning the substance and methods of the electrical and computer engineering discipline including technical, critical thinking, and communication skills
3. Provide the opportunity for a student to participate fully in the liberal education mission of the University.
4. Foster significant scholarly research for faculty and students.
5. Serve the well-being of the community, state, and region through the multi-faceted efforts of our faculty and graduates.
6. Develop a foundation for our students for life-long learning.

Program Course Requirements:

Year 1

ECE 1001 Introduction to ECE	2 cr
ECE 1315 Digital System Design	4 cr
CS 1511 Computer Science I	5 cr
CS 1521 Computer Science II	5 cr
Math 1296 Calculus I	5 cr
Math 1297 Calculus II	5 cr
Phys 2011 General Physics I	4 cr
Comp 1120 College Writing	3 cr

Year 2

ECE 2006 Electrical Circuit Analysis	4 cr
ECE 2111 Linear Systems & Signal Analysis	4 cr
ECE 2212 Electronics I	4 cr
ECE 2325 Microcomputer System Design	4 cr
Chem 1151 General Chemistry I	5 cr
Math 3280 Diff Equations w/Linear Algebra	4 cr
Math 3298 Calculus III	4 cr
Phys 2012 General Physics II	4 cr

Year 3

ECE 3151 Control Systems	3 cr
ECE 3235 Electronics II	4 cr
ECE 3341 Digital Computer Circuits	4 cr
ECE 3611 Solid-State Semiconductors	3 cr
CS 2511 Software Development	4 cr
CS 5631 Operating Systems	4 cr
Econ 1022 or 1023 Macro or Micro Economics	3 cr
Stat 3611 Probability and Statistics	3 cr

Year 4

ECE 3445 Electromagnetic Fields	3 cr
ECE 4305 Computer Architecture	
or ECE 5315 Multiprocessor-based System Design	4 cr
ECE Technical Electives	6 cr
ECE 4899 & 4999 Senior Design Project I & II	
or ECE 4951 ECE Design Workshop	4 cr
Engr 2015 Statics	3 cr
Comp 3130 Advanced Writing for Engineers	3 cr

BACHELOR OF SCIENCE IN INDUSTRIAL ENGINEERING

The educational objectives of the Bachelor of Science in Industrial Engineering program are to produce graduates who can:

1. Solve industrial engineering problems by applying contemporary engineering tools to propose and implement effective solutions.
2. Design, develop, implement, and improve integrated systems that include people, materials, information, equipment, and energy.
3. Contribute as informed, ethical, and responsible members of the engineering profession and society as a whole.
4. Continue lifelong professional development throughout their career.
5. Collaborate and communicate effectively with others as a member or leader of an engineering or multidisciplinary team in an international setting.

Major Course Requirements:

Year 1

IE 1225 Engineering Design/Manufacturing	4 cr
Chem 1151 General Chemistry I	5 cr
CS programming course	3-5 cr
Math 1296 Calculus I	5 cr
Math 1297 Calculus II	5 cr
Phys 2011 General Physics I	4 cr
Comp 1120 College Writing	3 cr

Year 2

ECE 2006 Electrical Circuit Analysis	4 cr
Engr 2015 Statics	3 cr
Engr 2016 Mechanics of Materials	3 cr
Engr 2026 Dynamics	3 cr
Econ 1022 or 1023 Macro or Micro Economics.	3 cr
Engr 2110 Intro to Material Science for Engineers	3 cr
Math 3280 Diff Equations w/Linear Algebra	4 cr
Phys 2012 General Physics II	4 cr
Stat 3411 Engineering Statistics	4 cr

Year 3

IE 3140 Human Factors & Ergonomic Design	3 cr
IE 3115 Operations Research	4 cr
IE 3125 Engineering Economic Analysis	3 cr
IE 3130 Materials Processing Engineering	3 cr
IE 3122 Material Engineering Lab	2 cr
IE 3222 Occupational Systems Lab	2 cr
IE 4010 Six Sigma Quality Control	3 cr
IE 4020 Lean Enterprises Management	3 cr
Comp 3130 Advanced Writing: Engineering	3 cr

Year 4

Project Management and Design	6 cr
Required and elective courses for chosen track	20-24 cr

BACHELOR OF SCIENCE IN MECHANICAL ENGINEERING

Educational Objectives: The BSME program will produce mechanical engineering graduates who are able to:

1. Solve mechanical engineering problems by applying contemporary engineering tools to propose and implement effective solutions.
2. Design, develop, implement, and improve thermal and mechanical systems.
3. Contribute as informed, ethical, and responsible members of the engineering profession and society as a whole.
4. Continue lifelong professional development throughout their career.
5. Collaborate and communicate effectively with others as a member or leader of an engineering or multidisciplinary team in an international setting.

Major Course Requirements:

Year 1

IE 1225 Engineering Design/Manufacturing	4 cr
Chem 1151 General Chemistry I	5 cr
CS programming course	3-5 cr
Math 1296 Calculus I	5 cr
Math 1297 Calculus II	5 cr
Phys 2011 General Physics I	4 cr
Comp 1120 College Writing	3 cr

Year 2

ECE 2006 Electrical Circuit Analysis	4 cr
Econ 1022 or 1023 Macro or Micro Econ.	3 cr
Engr 2015 Statics	3 cr
Engr 2016 Mechanics of Materials	3 cr
Engr 2026 Dynamics	3 cr
Math 3280 Diff Equations/ Linear Algebra	4 cr
Engr 2110 Intro to Material Science for Engineers	3 cr
Phys 2012 General Physics II	4 cr
Stat 3411 Engineering Statistics	4 cr

Year 3

IE 3125 Engineering Economic Analysis	3 cr
IE 3130 Materials Processing Engineering	3 cr
ME or ChE 3111 Fluid Mechanics	3 cr
ME 3140 System Dynamics & Control	3 cr
ME 3222 Controls & Kinematics lab	2 cr
ME 3230 Kinematics & Mechanics	3 cr
ME 3211 Thermodynamics	3 cr
ME 4145 CAD/CAM	4 cr
Math 3298 Calculus III	4 cr
Comp 3130 Advanced Writing: Engineering	3 cr

Year 4

ME 4112 or ChE 3112 Heat and Mass Transfer	3 cr
ME 4122 Heat/Thermodynamics/Fluids lab	2 cr
EMgt 4110 Eng. Professionalism & Practice	2 cr
ME 4175 Machine Design	3 cr
ME 4255 Multidisciplinary Senior Design	3 cr
Mechanical engineering electives	6 cr
Technical elective	3 cr

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For more information on engineering at UMD please contact:

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