Our mission is to graduate students who are immediately prepared for professional practice.
Chemical Engineering

The Program
The chemical engineering curriculum provides students with a background of fundamental knowledge that prepares them for responsible positions in research and development, design, technical service, plant operation, technical sales, and management in a wide variety of government, non-profit and industrial organizations. It places major emphasis on mathematics, chemistry and engineering sciences in addition to courses in design and analysis. Traditionally, the department has achieved prominence in research areas fundamental to chemical engineering, including mass transfer, heat transfer, chemical reaction engineering, fluidization, and thermodynamics.

In recent years excellence is being established in several emerging areas, including biochemical engineering, high-temperature ceramic materials, thin film materials processing, environmental control, waste minimization, polymer processing and rheology, and computerized process control.

The excellence of the program is evident in that over the past three years a large majority of the students have either received offers of employment or decided to pursue a graduate education. Graduates of the Chemical Engineering Program work in design, production, R & D, sales, and management positions all over the world. Particularly successful graduates include Linus Pauling (2 time Nobel Laureate), Robert Lundeen (former CEO of Dow Chemical) and Dale R. Laurance (current COE of Occidental Oil and Gas Corporation). Just a few of the employers of OSU CHE Alumni are:

- Amgen
- Amorphyx
- ATI Specialty Metals
- Bechtel
- Bend Research
- Boeing
- Cascade Pacific Pulp
- CH2M Hill
- Dow Chemical
- E&J Gallo Winery
- Emerald Kalama Chemical
- ENTEK Manufacturing
- Frito-Lay
- Genentech
- Georgia-Pacific
- Hewlett Packard
- HP inc.
- Inpria
- Intel
- KapStone Longview
- Merck
- Nalco
- NASA
- Occidental
- ON Semiconductor
- Petroleum Dev. Oman (PDO)
- Puget Sound Naval Shipyard
- Pyrotek
- Qatar Petroleum
- Sabic
- Saudi Aramco
- Selmet
- Schlumberger
- Siltronic
- Solenis LLC
- Tokyo Electric
- Tosoh Quartz
- US Water Services
- WaferTech
- Xerox

For those students whose professional goals include higher level engineering positions, engineering research, or engineering education, the chemical engineering curriculum provides an excellent background for graduate school. Many OSU CHE graduates have continued at Oregon State for graduate study or have gone on to graduate studies at such institutions as Massachusetts Institute of Technology, California Institute of Technology, University of Texas, University of Wisconsin, University of Minnesota, University of Washington, University of Illinois, University of New Mexico, University of Kansas, Carnegie Mellon and Arizona State University for advanced engineering degrees or the Oregon Institute of Health Sciences for MD degrees. Our alums are teaching at highly ranked schools: University of Illinois, Urbana Champaign and West Virginia University.
About the Chemical Engineering Undergraduate Program (CHE):

Chemical engineering is the engineering discipline that focuses on the science and engineering of processes to convert raw materials into valued chemicals and products at a manufacturing scale. These include products found in everyday life such as transportation and heating fuels, plastics, pharmaceuticals, household and paper products (soaps, cosmetics, health care and cleaning products, etc.), as well as more advanced products like solar cells, computer chips, and advanced composites for jet aircraft.

Chemical engineers find employment in traditional chemical industries such as pulp and paper manufacturing and petroleum refining, high-tech industries such as semiconductor device manufacturing, biopharmaceutical production, aerospace, and emerging industries, particularly in sustainable energy.

Alumni of the Chemical Engineering program will be work-ready engineers, problem solvers, responsible professionals, and interdisciplinary collaborators. Specifically, based on the needs of the program’s constituencies, within a few years of graduation chemical engineering alumni will have:

1. Obtained professional employment in a company, institute or agency within the chemical or related industries, entered a graduate program in chemical engineering or a related field or gained admission to a professional program such as medicine, law or business.

2. Created value by applying appropriate modern chemical engineering tools to the analysis, design, and control of chemical, physical, and/or biological processes, including the hazards associated with these processes.

3. Continued to develop their skills and knowledge through professional activities including FE/PE certifications, memberships in professional organizations and continuing education courses in order to fulfill their professional and ethical responsibilities though lifelong learning.

4. Demonstrated good communication skills and worked effectively in cross-functional team environments comprised of a diverse set of members with varying organizational backgrounds, positions, and geographic locations.

The chemical engineering undergraduate curriculum is designed to meet these objectives through relevant course content, hands-on laboratory and design experiences at the first year through senior levels, and structured, collaborative learning experiences. The school has a core curriculum where students from all three programs housed within the school (CHE, BIOE, ENVE) take common courses in the areas of first-year engineering, material and energy balances, thermodynamics, transport phenomena, and senior year laboratory.

Chemical engineering students have opportunities to obtain internships offered through the School of CBEE, and through the Multiple Engineering Cooperative Program (MECOP) program. Many scholarships are also available on a competitive basis for chemical engineering undergraduate students.

The chemical engineering program allows students to choose technical elective courses in a focus or emphasis area. Three suggested emphasis areas are Biochemical Processes, Environmental Processes, and Microelectronics and Material Science.

CoaChEs. The acronym “CoaChEs” stands for “Communication, organization, and analysis skills for Chemical Engineering students.” The philosophy is that learning best occurs when students receive immediate feedback on their performance through classroom interaction and small group teaching. The senior laboratory sequence involves 3 hours/week of project management coaching with a high faculty/student ratio.

Preparing students for professional practice implies the formal teaching of many soft skills in addition to technical skills. Our endowed Linus Pauling Chair was created for the purpose of bringing seasoned engineering professionals into the classroom as full time teachers. Beginning in the freshman year, students are formally taught and coached in soft skills as they perform their technical laboratories and team projects. By the end of senior year, students are expected to be fully competent in project planning and management, formal meeting procedures, proposal writing and presentation, technical and non-technical presentations, and report writing. Writing exercises include memos, proposals, safety documentation, technical paper writing, and formal lab books. Students are coached through their work, having them repeat it until the mistakes are corrected. Additionally, all students receive formal team building and conflict resolution based on the Thomas-Kilman Conflict Mode Instrument and Self Awareness based on the Myers-Briggs Type Indicator (MBTI).
Curriculum

The requirements for the BS degree in Chemical Engineering reflect the knowledge and skills necessary for the new engineer to take his or her place in society. General requirements are established by the College of Engineering (COE) and Oregon State University. The School of Chemical, Biological, and Environmental Engineering determines the specific requirements for graduation and audits those courses to ensure that the standards of the Accreditation Board for Engineering and Technology (ABET) are met by every student who receives a degree.

ABET is the national organization that accredits—or certifies—engineering and technology degree programs. ABET’s Engineering Accreditation Commission (EAC) applies standards set by practicing engineers and engineering educators to specify the general form and content of engineering programs. The School of Chemical, Biological and Environmental Engineering, with the advice of industry and government, determines the courses needed to help the student develop the knowledge and skills required of the modern chemical engineer. In several situations the School’s regulations are more restrictive than the university’s regulation.

The University (OSU) establishes a set of core requirements - called the Baccalaureate Core - which all undergraduate degree programs at OSU must incorporate. These requirements help the student develop the values, knowledge, and skills that all university graduates should possess. The current requirements are published each quarter in the Schedule of Classes for that quarter.

The following pages list the Chemical Engineering curriculum by the categories that are used for ABET accreditation. In both the Oregon State University Bulletin and the OSU College of Engineering Advising Guide (http://www.engr.oregonstate.edu/advising/), you will find the same curricula. Copies of the Curriculum Check Sheet for the chemical engineering curriculum and the Curriculum Block Diagrams are included in this guide. The official checklist is maintained in the main office. Please note that just because a course is required or recommended in the curriculum does not mean that it will be offered every term. Also, most courses have prerequisites, courses that must be completed satisfactorily before the course can be taken. Always consult the Oregon State University Bulletin or the OSU Schedule of Classes, or check with the appropriate department for availability and prerequisites before registering for a course. Required Technical Courses – these may NOT be taken S/U.

Grade Requirements:
Students must achieve a ‘C’ or better in all required courses (exceptions are HHS, PAC, perspectives, synthesis classes), or the course will be considered ‘missing’ for a prerequisite or graduation requirement. Pre-core GPA calculation for professional program admission: Both OSU and transfer grades are included, and in the case of repeated classes, the grade from the second take, no matter where the class was taken, will be used in the pre-core GPA calculation.
Summary by ABET Topic

This page lists, by course category, the requirements for the Chemical Engineering curriculum.

Mathematics & Basic Science
(ABET requirement; 48 credits)

**Mathematics (20 credits)**

# MTH 251 (4) Differential Calculus
# MTH 252 (4) Integral Calculus
# MTH 306 (4) Matrix & Power Series Methods
# MTH 254 (4) Vector Calculus
# MTH 256 (4) Applies Differential Equation

**Biological Science Course (4 credits)**

**Basic Science (27 credits)**

# CH 231/261 (5) Chemistry for CH/CHE Majors I
CH 232/262 (5) Chemistry for CH/CHE Majors II
CH 233/263 (5) Chemistry for CH/CHE Majors III
# PH 211 (4) General Physics with Calculus I
# PH 212 (4) General Physics with Calculus II
# PH 213 (4) General Physics with Calculus III

**Advanced Chemistry**
(ABET requirement; working knowledge)

**Required Upper Division Chemistry (17 credits)**

CH 331 (4) Organic Chemistry I
CH 332 (4) Organic Chemistry II
CH 440 (3) Physical Chemistry I
CH 441 (3) Physical Chemistry II
CH 442 (3) Physical Chemistry III

**Advanced Chemistry Elective—one class with a lab(7)**

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
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<tbody>
<tr>
<td>CHE 334</td>
<td>2</td>
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**Engineering Topics**
(ABET requirement; 72 credits)

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
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<tbody>
<tr>
<td>CBEE 212</td>
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<tr>
<td>CBEE 213</td>
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<td>CHE 311</td>
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<tr>
<td>CHE 312</td>
<td>3</td>
</tr>
<tr>
<td>CHE 322</td>
<td>3</td>
</tr>
<tr>
<td>CHE 333</td>
<td>3</td>
</tr>
<tr>
<td>CHE 335</td>
<td>2</td>
</tr>
<tr>
<td>CHE 361</td>
<td>4</td>
</tr>
<tr>
<td>CHE 411</td>
<td>3</td>
</tr>
<tr>
<td>CHE 415</td>
<td>3</td>
</tr>
<tr>
<td>CBEE 416</td>
<td>3</td>
</tr>
<tr>
<td>CHE 431</td>
<td>3</td>
</tr>
<tr>
<td>CHE 432</td>
<td>3</td>
</tr>
<tr>
<td>CHE 443</td>
<td>4</td>
</tr>
<tr>
<td>CHE 461</td>
<td>3</td>
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**Engineering Topics Electives (9 credits)**

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHE 414</td>
<td>3</td>
</tr>
<tr>
<td>CHE 415</td>
<td>3</td>
</tr>
<tr>
<td>CHE 416</td>
<td>3</td>
</tr>
<tr>
<td>CHE 431</td>
<td>3</td>
</tr>
<tr>
<td>CHE 432</td>
<td>3</td>
</tr>
<tr>
<td>CHE 443</td>
<td>4</td>
</tr>
<tr>
<td>CHE 461</td>
<td>3</td>
</tr>
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</table>

**General Education**

**Communication Skills (9 credits)**

<table>
<thead>
<tr>
<th>Course</th>
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<tbody>
<tr>
<td>WR 121</td>
<td>3</td>
</tr>
<tr>
<td>WR 327</td>
<td>3</td>
</tr>
<tr>
<td>COMM 114</td>
<td>3</td>
</tr>
</tbody>
</table>

**Humanities and Social Sciences (24)**

<table>
<thead>
<tr>
<th>Perspectives (12)</th>
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</thead>
<tbody>
<tr>
<td>DPD (3)</td>
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</table>

<table>
<thead>
<tr>
<th>Synthesis (6)</th>
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</thead>
<tbody>
<tr>
<td>ETHICS (3)</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Safety, Engineering Ethics, Professionalism (3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHE 320</td>
</tr>
</tbody>
</table>

**Fitness (3 credits)**

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>HHS 231</td>
<td>2</td>
</tr>
<tr>
<td>HHS 24x</td>
<td>1</td>
</tr>
</tbody>
</table>

**Free Electives (4 credits)**

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHE 334</td>
<td>2</td>
</tr>
</tbody>
</table>

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* Means that the course is a pre-engineering core course and is required for entry into the professional program.

* Means that the course is a writing intensive course, which is part of the OSU BACC requirements for graduation.

* ChE 101 does not count towards the 72 credits required for Engineering Topics.
Required technical courses are those specifically required courses taught in the School of Chemical, Biological and Environmental Engineering or in a closely related field. Restricted Electives: Engineering Topics, and Advanced Chemistry — these may NOT be taken S/U.

The purpose of restricted electives is to develop specific interests of the students within the major and in related areas. These courses are meant to allow a student to explore an interest in more depth than is required by their major. You must take at least 5 elective classes including:

- 3 Engineering Topics classes with a minimum of 9 credits.
- 2 Advanced Chemistry classes with a minimum of 6 credits. One class must have a lab component.

Before registering for any restricted elective course, even a recommended course, consult with your advisor.

Explanation of CHE Curriculum

**Mathematics.** Along with the natural and social sciences, mathematics provides an important base for chemical engineering. Required mathematics department courses cover calculus through differential equations. ST 314, CHE 213, CHE 414 and 415 contain material on probability and statistics, two important tools used by chemical engineers in the analysis of process data. NO mathematics course may be taken S/U.

**Basic Science.** CHE students are expected to have had a strong chemistry background in high school and are required to take CH 231/361, 232/262 and 233/263, which are 5-credit courses offered by the Chemistry department specifically for chemistry and chemical engineering majors during their first year of study. ABET requirements state that chemical engineering students must take chemistry courses equivalent to those taken by chemistry majors, thus other first year sequences may not be appropriate for CHE students. If you are transferring into the Chemical Engineering Program and have already taken some of these other first year chemistry courses, you must consult with your advisor to determine appropriate additional chemistry work.

All engineering majors are required to take PH 211, PH 212 and PH 213 calculus-based physics courses. These courses are part of the pre-engineering core and must be completed before entering the professional engineering program.

In addition to the required chemistry and physics courses, CHE students must take at least four credits of biological science (with lab) to satisfy the OSU Baccalaureate Core. The latest list is available in the OSU Schedule of classes for each quarter. Acceptable courses, as listed in the 2004-05 Oregon State University Bulletin (General Catalog) are:

- **ANS 121 (4)** Introduction to Animal Sciences
- **BI 101, 102, 103 (4)** General Biology
- **BI 211, 212, 213 (4)** Principles of Biology
- **BOT 101 (4)** Botany: A Human Concern
- **SOIL 205 (4)** Soils: Sustainable Ecosystems
- **SUS 102 (4)** Introduction to Environmental Science and Sustainability
- **FOR 240 (4)** Forest Biology
- **MB 230 (4)** Introductory Microbiology (required by several options)

NO science course, required or elective, may be taken S/U.
**Advanced Chemistry.** CHE students must take advanced chemistry elective courses beyond the required advanced chemistry courses. These courses must have a 1 year college science prerequisite, a substantial science content (advanced concepts or chemical methods) and cannot be courses which are classified as engineering topics. Because the organic and physical chemistry sequences required of CHE students at OSU do not include laboratory experience, it is required that one of these elective courses include a lab component. A substantial portion of the CHE Curriculum inherently covers chemistry.

**Acceptable Advanced Chemistry Electives**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHE 417(S)</td>
<td>Lab (4) Instrumentation in Chemical, Biological and Environmental Engineering</td>
</tr>
<tr>
<td>CH 324</td>
<td>Lab (4) Quantitative Analysis</td>
</tr>
<tr>
<td>CH 337(FS)</td>
<td>Lab (3) Organic Chemistry Lab</td>
</tr>
<tr>
<td>CH 411(F)</td>
<td>(3) Inorganic Chemistry</td>
</tr>
<tr>
<td>CH 412(W)</td>
<td>(3) Inorganic Chemistry</td>
</tr>
<tr>
<td>CH 413(S)</td>
<td>(3) Solid State Chemistry</td>
</tr>
<tr>
<td>CH 418(W)</td>
<td>(3) Nuclear Chemistry</td>
</tr>
<tr>
<td>CH 435(F)</td>
<td>(3) Structure Determination by Spectroscopic Methods</td>
</tr>
<tr>
<td>CH 445(W)</td>
<td>(3) Physical Chemistry of Materials</td>
</tr>
<tr>
<td>CH 450(F)</td>
<td>(3) Introductory Quantum Chemistry</td>
</tr>
<tr>
<td>CH 453</td>
<td>(3) Chemical Thermodynamics</td>
</tr>
<tr>
<td>OEAS 540(W)</td>
<td>(3) The Biogeochemical Earth (formerly Chemical Oceanography)</td>
</tr>
<tr>
<td>ATS 413(F)</td>
<td>(3) Atmospheric Chemistry</td>
</tr>
<tr>
<td>WSE 321(F)</td>
<td>(3) Chemistry of Renewable Materials</td>
</tr>
</tbody>
</table>

The following are NOT acceptable as Adv. CH electives: CH 334, 335, 336, 374, 390, 490, 595 or 596 – see FAQ section. Advanced science other than chemistry (physics for example) can be used to satisfy the advanced chemistry electives. Consult your advisor to see if a class that you are interested in is appropriate.

A petition to the Head Advisor of Chemical Engineering is required to use a class outside of the list above.

**NO** advanced chemistry course, required or elective, may be taken S/U.
Engineering Topics:  *Engineering Science & Design.* These courses cover concepts and techniques that are essential to engineering analysis and design. More importantly they cover the *philosophy and process* of engineering problem solving. The engineering topics courses specifically required in the chemical engineering curriculum cover engineering mechanics, electrical fundamentals, material and energy balances, thermodynamics, momentum, energy and mass transfer, reactors, and process dynamics and control. Your advanced level engineering topics elective courses may be prescribed by your option. You are required to take 9 credits of advanced engineering topics beyond the standard curriculum.

**Selected list of Engineering Topics (ET) Electives**

- CHE 499 (WS) (3) Selected Topics
- CHE 444 (W) (4) Thin Film Materials Processing
- CHE 445 (FS) (4) Polymer Engineering and Science
- CHE 514 (W) (4) Fluid Flow
- CHE 520 (S) (4) Mass Transfer
- CHE 525 (F) (4) Chemical Engineering Analysis
- CHE 537 (W) (4) Thermodynamics
- CHE 540 (W) (4) Chemical Reactors
- CHE 450 (WS) (3) Conventional & Alternative Energy Systems
- CHE 451 (S) (3) Solar Technologies
- BIOE 351 (alt. S) (4) Biomaterials
- BIOE 457 (F) (4) Bioreactors I
- BIOE 459 (alt. S) (3) Cell Engineering
- BIOE 462 (W) (4) BioSeparations
- ENVE 322 (W) (4) Environmental Engineering Fundamentals
- ENVE 421 (F) (4) Water and Wastewater Characterization
- ENVE 422 (W) (4) Environmental Engineering Design
- ENVE 425 (S) (3) Air Pollution Control
- ENVE 431 (W) (4) Fate and Transport of Chemicals in Environmental Systems
- ENVE 456 (S) (4) Sustainable Water Resources and Development
- CE 412 (FS) (3) Hydrology
- ECE 415 (S) (3) Material Science of Nanotechnology
- ECE 416 (F) (3) Electronic Materials and Devices
- ECE 417 (W) (3) Basic Semiconductor Devices
- ECE 418 (S) (3) Semiconductor Processing
- ENGR 221 (F) (3) Applications of Nanotechnology
- MATS 321 (FWS) (4) Materials Science
- MATS 322 (FWS) (3) Mechanical Properties of Materials
- IE 355 (FS) (4) Statistical Quality Control
- IE 356 (WS) (4) Experimental Design For Industrial Processes

The following classes CANNOT be taken as an ET elective: ENGR 248, ENGR 350, CE 356

Other engineering classes can also be used towards the engineering topics electives. Consult your advisor to see if a class that you are interested in is appropriate. A petition to the Head Advisor of the Chemical Engineering Department is required to use a class outside of the list above.

No engineering topics course may be taken S/U.

Our Mission is to graduate students immediately prepared for professional practice.
Communication Skills. The best technical work is worthless if it cannot be communicated to others for evaluation and implementation. Many engineers find that they spend more time communicating – meeting and working with colleagues, writing memos and reports, and giving presentations – than they do in technical problem solving. For that reason, the chemical engineering curricula requires courses in basic writing, technical report writing, and public speaking. CHE 414 satisfies the OSU BACC requirement for a writing intensive course (WIC) in the CHE curriculum. NO communication skills course may be taken S/U.

Humanities and Social Sciences. It is the University’s role to prepare students to take an active, constructive part in society. To fulfill that role, it must provide engineering students with the technical knowledge and skill that they will need to function as engineers. But engineers must have more than just technical skills. Like any citizen, engineers have a great responsibility to society. To meet that responsibility, they must have a basic understanding of individual and social behavior and values and cultures of the society. For that reason, each engineering curricula requires courses in humanities and social sciences.

ABET requires that at least 24 credits of humanities and social science courses be taken. For purposes of graduation with a BS in Chemical Engineering, the satisfaction of the OSU Baccalaureate Core (BACC) plus the department’s ethics course, CHE 320, is considered to be sufficient to satisfy the ABET requirements. See the Oregon State University Bulletin and the OSU Schedule of Classes for more information on BACC requirements.

Perspectives Courses: A total of 4 Perspectives courses, totaling at least 12 credits, must be taken. This includes a minimum of 1 course in each of the following categories: Western Culture, Cultural Diversity, Literature and the Arts, and Social Processes and Institutions. In fulfilling the Perspectives requirements, a maximum of two courses may be selected from the same department.

Difference, Power, and Discrimination Course (DPD): One DPD course, totaling at least 3 credits, must be taken.

Synthesis Courses: Two Synthesis courses must be taken: one course in Contemporary Global Issues and one course in Science, Technology, and Society. NO COURSE listed as an OSU “synthesis” course can be used as an Advanced Chemistry or Engineering Topic elective. The two synthesis courses must be from different departments.

Humanities and Social Sciences courses MAY be taken S/U. An absolute maximum of 36 credits of S/U may be taken if a student has four years of full-time study at OSU. For transfer students the maximum is 3 times the number of quarters of full-time residency at OSU.

Fitness. The OSU Baccalaureate Core requires that all OSU students take HHS 231 and HHS 24x or a PAC class, Life-time Fitness Lab. HHS 231 and 24x MAY be taken S/U.

Free Electives. Each CHE student may need to take up to four credits of free electives to fill out his or her program (192 total credits). A free elective may be any OSU course. Excess credits from other course categories may be counted as Free Electives. However, Free Electives should not be considered as “throw away” courses. Your time at the University is unique in your life, in that at no other time will you have such easy access to learning. Free electives MAY be taken S/U.
Curriculum Block Diagram for BS Program

The “block diagram” flowchart showing an example of the four-year schedule for completing the Bachelor’s degree in chemical engineering can be seen on the next page. Each column represents one academic quarter. The first two years in the program are the pre-engineering program. The gray shaded courses comprise the “core” courses used to calculate a GPA used for admission to the professional program. The courses shaded in pink represent technical electives while those shaded in aqua represent classes needed to satisfy the general education requirements. The sequence of courses in the third and fourth years represents the professional program. This flowchart represents an idealized schedule, and most students’ actual schedules will differ in sequence and number of quarters required to satisfy all requirements. In particular, students interested in the MECOP program, (and/or other work opportunities) must carefully plan their schedules with the MECOP advisor to ensure timely graduation.

Emphasis

♦ Students in the chemical engineering program at Oregon State are encouraged to take technical elective courses that concentrate around one area of study. On page 12, there is an outline of the general topics that can be covered, but a student is encouraged to customize your classes to make an emphasis that is relevant to you.
## Chemical Engineering Curriculum (192 credits) - Revised 7/27/2017

<table>
<thead>
<tr>
<th>First Year</th>
<th>Second Year</th>
<th>Third Year</th>
<th>Fourth Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.0</td>
<td>2.0</td>
<td>3.0</td>
<td>4.0</td>
</tr>
</tbody>
</table>

### Credits
- First Year: 47 credits
- Second Year: 49 credits
- Third Year: 49 credits
- Fourth Year: 47 credits

### Courses

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<th>Term</th>
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<th>Credits</th>
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<tbody>
<tr>
<td>Fall</td>
<td>Chemistry (CH 231)</td>
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<td>Winter</td>
<td>Chemistry (CH 232)</td>
<td>4</td>
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<tr>
<td>Spring</td>
<td>Chemistry (CH 233)</td>
<td>4</td>
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<tr>
<td>Fall</td>
<td>Organic Chemistry (CH 331)</td>
<td>4</td>
</tr>
<tr>
<td>Winter</td>
<td>Organic Chemistry (CH 332)</td>
<td>4</td>
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<tr>
<td>Spring</td>
<td>Technical Rpts (WR 327)</td>
<td>3</td>
</tr>
<tr>
<td>Fall</td>
<td>Physical Chemistry (CH 440)</td>
<td>3</td>
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<td>Winter</td>
<td>Physical Chemistry (CH 441)</td>
<td>3</td>
</tr>
<tr>
<td>Spring</td>
<td>Physical Chemistry (CH 442)</td>
<td>3</td>
</tr>
<tr>
<td>Fall</td>
<td>Chemical Engineering Lab (CBEE 414)</td>
<td>3</td>
</tr>
<tr>
<td>Winter</td>
<td>Chemical Engineering Lab (CBEE 415)</td>
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<td>Spring</td>
<td>Process Dynamics (CHE 361)</td>
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<tr>
<td>Fall</td>
<td>Process Control (CHE 461)</td>
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<tr>
<td>Winter</td>
<td>Reaction Engineering (CHE 443)</td>
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<tr>
<td>Spring</td>
<td>Design (CHE 431)</td>
<td>3</td>
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<td>Transport II (Heat) (CHE 332)</td>
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<tr>
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### Notes:
- CHE 320 satisfies the department Ethics Requirement.
- Must satisfy the OSU-BACreds Biological Science (with lab) requirement - see list of acceptable courses in current Schedule of Classes.
- Admissions (36 to 42 credits minimum complete).
- "Gray shaded" courses are required for admission to professional program and contribute to "core" GPA used for evaluation for admission.
- Only Persp, Syn, HHS 231, HHS 24*, or PAC, and Free can be taken with S/U grading (at OSU).
- (a) of S/U credits are limited to 3X # of terms at OSU, up to 36 max).
- (b) Technical Electives must satisfy the OSU-BACC "Biological Science (with lab) requirement - see list of acceptable courses in current Schedule of Classes.
- (c) CHE 320 satisfies the department Ethics Requirement.
- (d) Must satisfy the OSU-BACreds Biological Science (with lab) requirement - see list of acceptable courses in current Schedule of Classes.
- (e) Must satisfy the OSU-BACreds Biological Science (with lab) requirement - see list of acceptable courses in current Schedule of Classes.
- (f) Must satisfy the OSU-BACreds Biological Science (with lab) requirement - see list of acceptable courses in current Schedule of Classes.
Academic Concentrations in Chemical Engineering at Oregon State University

Students pursuing a chemical engineering degree at Oregon State University in the School of Chemical, Biological, and Environmental Engineering are encouraged to take technical elective courses that concentrate academic preparation in a focus or emphasis area. You must take at least five elective classes, including two Advanced Chemistry courses (minimum 7 credits, one course must have a lab component) and three or four Engineering Topics courses (minimum 11 credits). Three emphasis areas are suggested below, but students are encouraged to develop their own as well. Students are responsible for managing their course selections, which includes completing prerequisites and being aware of when course are offered. Course capacities may be limited.

### Biochemical Processes

<table>
<thead>
<tr>
<th>Course</th>
<th>Title (abbrev)</th>
<th>Term(s)</th>
<th>Cr</th>
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<tbody>
<tr>
<td>CHE 417</td>
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<td>4</td>
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<tr>
<td>CH 324</td>
<td>Quantitative Analysis (lab)</td>
<td>FWS</td>
<td>4</td>
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<tr>
<td>BB 450,451*</td>
<td>General Biochemistry</td>
<td>FW,WS</td>
<td>4,3</td>
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</table>

**Engineering Topics (select 3)**

| BIOE 457     | Bioreactors             | F       | 3  |
| BIOE 459     | Cell Engineering        | F       | 3  |
| BIOE 462     | Bioseparations          | W       | 3  |
| BIOE 351     | Biomaterials            | S       | 3  |
| BIOE 440,445| Bioconjugation, Surface Analysis | S,3  |
| CBEE 416     | Process Engineering Project | S    | 3  |

### Microelectronics and Material Science

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<th>Cr</th>
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</thead>
<tbody>
<tr>
<td>CHE 417</td>
<td>Instrumentation (lab)</td>
<td>S</td>
<td>4</td>
</tr>
<tr>
<td>CH 324</td>
<td>Quantitative Analysis (lab)</td>
<td>FWS</td>
<td>4</td>
</tr>
<tr>
<td>CH 411</td>
<td>Inorganic Chemistry</td>
<td>FW</td>
<td>3</td>
</tr>
<tr>
<td>CH 421</td>
<td>Analytical Chemistry</td>
<td>F</td>
<td>3</td>
</tr>
<tr>
<td>CH 422</td>
<td>Analytical Chemistry</td>
<td>W</td>
<td>3</td>
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</table>

**Environmental Processes**

**Advanced Chemistry (select CHE 417 or CH 324 & one non-lab)**

| CHE 417      | Instrumentation (lab)   | S       | 4  |
| CH 324       | Quantitative Analysis (lab) | FWS     | 4  |
| CH 422       | Analytical Chemistry    | W       | 4  |
| BB 350       | Elementary Biochemistry | S       | 4  |
| TOX 430      | Chem Behav in the Environ | F    | 3  |

**Engineering Topics (select 3)**

| CE 412       | Hydrology               | FS      | 3  |
| CBEE 416     | Process Engineering Project | S   | 3  |
| ENVE 322*    | Fundamentals of Env Eng | W       | 4  |
| ENVE 421     | Water/Wastewater Char   | F       | 4  |
| ENVE 422     | Environmental Eng Design | W     | 4  |
| ENVE 425     | Air Pollution Control   | S       | 3  |
| ENVE 431     | Fate & Transport in the Env | W   | 4  |
| ENVE 456     | Sustainable Water Res   | S       | 3  |

*Prerequisite for majority of emphasis classes
# Curriculum Check List
## Chemical Engineering (192 cr)

### Student's Name: ____________________________

### Form completed by: ____________________________

### Date: ____________________________

#### Declared Option: ____________________________

#### Required ChE Courses (60 credits)

<table>
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<th>Course</th>
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<tr>
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<td>ChE 334</td>
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#### Mathematics (20 credits)

<table>
<thead>
<tr>
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<tbody>
<tr>
<td>MTH 251</td>
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<tr>
<td>MTH 252</td>
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</tr>
<tr>
<td>MTH 306</td>
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<td>MTH 254</td>
<td>4</td>
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<td>MTH 256</td>
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#### Basic Science (27 credits)

<table>
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<tbody>
<tr>
<td>CH 231/261</td>
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<tr>
<td>CH 232/262</td>
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<td>CH 233/263</td>
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<td>PH 212</td>
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#### Biological Science Elective (4 credits)

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#### Advanced Chemistry (17 credits)

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#### Restricted Electives (18 credits)

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#### Required ENGR Courses (6 credits)

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#### Advanced Chemistry (17 credits)

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<td>CH 441</td>
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#### Free Electives (4 credits)

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### Mathematics (20 credits)

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### Basic Science (27 credits)

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<tbody>
<tr>
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#### Biological Science Elective (4 credits)

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### Communication Skills (9 credits)

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### Fitness (3 credits)

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### Humanities and Social Sciences (24 credits)

#### Perspectives

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#### Synthesis

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<td>Sci., Tech. &amp; Soc.</td>
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*The entire organic chemistry sequence CH 334, 335, 336 can be used in place of the entire sequence CH 331, 332.

**11 credits must be upper division engineering topics; 7 credits must be Advanced Chemistry—one chemistry class with a lab.

---

*Our Mission is to graduate students immediately prepared for professional practice.*
MECOP
Each Summer, the MECOP program places over 250 students from most of the college’s engineering pro-
grams in internships at approximately 70 companies in the Northwest. Chemical Engineering has participated
in the program since 1992 and has sent interns to: Armstrong, Axiom Electronics, Boeing, Freightliner,
Hewlett Packard, Intel, Kodak, LSI Logic, Merix, Norpac, Oremet, Planar Systems, Praegitzer, Siltronic, Tek-
tronix, and Wah Chang.

Students who are accepted into the internship program complete their professional school requirements over
three years instead of two. See below for the recommended schedule for the ChE core courses. The remain-
der of the schedule each term should be filled with technical electives, option requirements and university
requirements.

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<th>FALL</th>
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<td>INTERNSHIP</td>
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May 24, 2016

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