# 2016-17 Suggested Course Plan

## Chemical Engineering

### First Year

<table>
<thead>
<tr>
<th>Semester</th>
<th>Course Code</th>
<th>Course Title</th>
<th>Units</th>
</tr>
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<tbody>
<tr>
<td>Fall</td>
<td>GE A</td>
<td>WRIT 150</td>
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<tr>
<td></td>
<td>MATH 125</td>
<td>MATHEMATICS 125</td>
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<td></td>
<td>CHEM 105aL</td>
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<td></td>
<td>ENGR 102</td>
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<tr>
<td>Spring</td>
<td>CHE 120</td>
<td>CHEMISTRY ELECTIVE: CHEM 322bL, 431</td>
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<tr>
<td></td>
<td>CHE 205</td>
<td>CHEMISTRY ELECTIVE: CHEM 105aL</td>
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<tr>
<td></td>
<td>MATH 126 or MATH 129</td>
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<td>CHEM 105bL</td>
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<tr>
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<td>PHYS 151L</td>
<td>PHYSICS (GE F)</td>
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### Second Year

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<td>MATH 226 or MATH 229</td>
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<td>PHYS 152L</td>
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### Third Year

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<tr>
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<td>CHEM 444aL</td>
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### Fourth Year

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<td>CHEM 445</td>
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<td>WRIT 340</td>
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<td>CHEM 480</td>
<td>CHEMISTRY ELECTIVE: CHEM 480</td>
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### Mathematics (16 Units)
- MATH 125: Calculus I
- MATH 126 or MATH 129: Calculus II
- MATH 226 or MATH 229: Calculus III
- MATH 245: Mathematics of Phys. and Engr.

### Physics (8 Units)
- PHYS 151L: Mechanics and Thermodynamics
- PHYS 152L: Electricity and Magnetism

### Chemistry (24 Units)
- CHEM 105AL: General Chemistry
- CHEM 105BL: General Chemistry
- CHEM 300L: Analytical Chemistry
- CHEM 322AL: Organic Chemistry
- CHEM 430: Physical Chemistry: Thermodynamics & Kinetics

### General Education Elective: CHEM 322BL or 431

### Writing (7 Units)
- WRIT 150: Writing and Critical Reasoning
- WRIT 340: Advanced Writing

### Engineering (54-57 Units)
- CHE 120: Intro. to Chemical Engineering
- CHE 205: Numerical Methods in Chemical Engineering
- CHE 330: Chemical Engr. Thermodynamics
- CHE 350: Intro to Separation Processes
- CHE 405: Probability and Statistics for CHE
- CHE 442: Chemical Reaction Analysis
- CHE 443: Viscous Flow
- CHE 444AL: Chemical Engineering Labor
- CHE 444BL: Chemical Engineering Labor
- CHE 445: Heat Transfer in CHE Processes
- CHE 446: Mass Transfer in CHE Processes
- CHE 460L: Chem. Proc. Dynamics & Control
- CHE 476: Chemical Engineering Materials
- CHE 480: CHEM. Process and Plant Design
- CHE 485: Computer Aided Process Design
- ENGR 102: Engineering Freshman Academy

### Approved Electives

### SPECIAL NOTES
- Courses with this symbol may be satisfied with AP, IB or A-Level exams. See page 17 for more information.
- GE: Engineering students are encouraged to satisfy GE G and GE H with a course that also satisfies a Core Literacy. GE H may be satisfied by exam. Additionally, your GESM course should be taken in categories A, B, C, or D only. See pp. 16-17 for more information and consult your advisor for detailed assistance.
- Optional Electives: Consult with your academic advisor to explore optional elective courses. These courses are not required.

**APPROVED ELECTIVES:** 8-9 units of approved electives including CE 205 (1), EE 438L (3), and 1SE 460 (3) or BUAD 301 (3) or other courses with department approval.
## CHEMICAL (BIOCHEMICAL)

### FIRST YEAR

#### FALL SEMESTER
- **GE A**
  - WRIT 150
  - MATH 125 (GE F)
  - CHEM 105aL (GE E)
  - ENGR 102

#### SPRING SEMESTER
- **CHE 120**
  - MATH 126 or MATH 129
- **CHE 205**

### SECOND YEAR

#### FALL SEMESTER
- **CHE 330**
  - CHEM 300L
  - MATH 226 or MATH 229
  - PHYS 152L
  - CHEM 322aL

#### SPRING SEMESTER
- **GE B**
  - WRIT 340
  - MATH 245
  - CHEM 322aL

### THIRD YEAR

#### FALL SEMESTER
- **GE C**
  - BISC 320L (GE D)
  - CHEM 430
  - CHE 442

#### SPRING SEMESTER
- **GE B**
  - BISC 330L
  - BISC 300L
  - CHE 443

### FOURTH YEAR

#### FALL SEMESTER
- **BIOELECTIVE**
  - CHE 444bL
  - CHE 405 or ISE 460
  - CHE 485
  - CHE 445

#### SPRING SEMESTER
- **GE C**
  - CHE 446
  - CHE 460L
  - CHE 480

### MATHEMATICS (18 UNITS)
- MATH 125: Calculus I
- MATH 126 or MATH 129: Calculus II
- MATH 226 or MATH 229: Calculus III
- MATH 245: Mathematics of Phys. and Engr.

### PHYSICS (8 UNITS)
- PHYS 151L: Mechanics and Thermodynamics
- PHYS 152L: Electricity and Magnetism

### CHEMISTRY (20 UNITS)
- CHEM 105AL: General Chemistry
- CHEM 105BL: General Chemistry
- CHEM 300L: Analytical Chemistry
- CHEM 322AL: Organic Chemistry
- CHEM 430: Physical Chemistry: Thermodynamics & Kinetics

### BIOLOGY (12 UNITS)
- BISC 300L: Intro. to Microbiology
- BISC 320L: Molecular Biology
- BISC 330L: Biochemistry

### GENERAL EDUCATION (32 UNITS)
- GE A: The Arts (1 Course)
- GE B: Humanistic Inquiry (2 Courses)
- GE C: Social Analysis (2 Courses)
- GE D: Life Sciences (1 Course)
- GE E: Physical Sciences (1 Course)

### SPECIAL NOTES
- Courses with this symbol may be satisfied with AP, IB or A-Level exams. See page 17 for more information.
- GE: Engineering students are encouraged to satisfy GE G and GE H with a course that also satisfies a Core Literacy. GE H may be satisfied by exam. Additionally, your GESM course should be taken in categories A, B, C, or D only. See pp. 16-17 for more information and consult your academic advisor to explore optional elective courses. These courses are not required.

### BIOELECTIVE: Approved Bioengineering course or BISC 403
- BISC 403: Must have 48 engineering units in order to register for this class
A SUGGESTED COURSE PLAN FOR:
CHEMICAL (ENVIRONMENTAL)

<table>
<thead>
<tr>
<th>FIRST YEAR</th>
<th>FALL SEMESTER</th>
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<tbody>
<tr>
<td>GE A</td>
<td>WRIT 150</td>
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<tr>
<td>SPRING SEMESTER</td>
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<tr>
<td>CHE 120 (MATH 125, CHEM 105aL)</td>
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<th>SECOND YEAR</th>
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<tr>
<td>CHEM 322aL</td>
<td>CHEM 105bL</td>
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<th>THIRD YEAR</th>
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<tbody>
<tr>
<td>GE C</td>
<td>CHEM 430</td>
</tr>
<tr>
<td>SPRING SEMESTER</td>
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<tr>
<td>ENE 428L or 429</td>
<td>CE 463L</td>
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<th>FOURTH YEAR</th>
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<tr>
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<tr>
<td>CHEM 446</td>
<td>CHE MATH 245</td>
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</table>

**MATHEMATICS (16 UNITS)**
- MATH 125: Calculus I
- MATH 126 or MATH 129: Calculus II
- MATH 226 or MATH 229: Calculus III
- MATH 245: Mathematics of Phys. and Engr.

**PHYSICS (8 UNITS)**
- PHYS 151L: Mechanics and Thermodynamics
- PHYS 152L: Electricity and Magnetism

**CHEMISTRY (20 UNITS)**
- CHEM 105aL: General Chemistry
- CHEM 105bL: General Chemistry
- CHEM 300L: Analytical Chemistry
- CHEM 322aL: Organic Chemistry
- CHEM 430L: Physical Chemistry: Thermodynamics & Kinetics

**GENERAL EDUCATION (32 UNITS)**
- GE A: The Arts (1 Course)
- GE B: Humanistic Inquiry (2 Courses)
- GE C: Social Analysis (2 Courses)
- GE D: Life Sciences (1 Course)
- GE E: Physical Sciences (1 Course)
- GE F: Quantitative Reasoning (1 Course)
- GE G, H: Global Perspectives (2 Courses)*
- GESM: General Education Seminar (1 Course)*

**WRITING (7 UNITS)**
- WRIT 150: Writing and Critical Reasoning
- WRIT 340: Advanced Writing

**ENGINEERING (63 UNITS)**
- CE 453: Water Quality Control
- CE 463L: Water Chemistry and Analysis
- CHE 120: Intro. to Chemical Engineering
- CHE 205: Numerical Methods in Chemical Engineering
- CHE 330: Chemical Engr. Thermodynamics
- CHE 350: Intro. to Separation Processes
- CHE 442: Chemical Reactor Analysis
- CHE 443: Viscous Flow
- CHE 444AL: Chem. Engineering Laboratory
- CHE 444BL: Chem. Engineering Laboratory
- CHE 445: Heat Transfer in ChE Processes
- CHE 446: Mass Transfer in ChE Processes
- CHE 460L: Chemical Process Dynamics
- CHE 476: Chemical Engineering Materials
- CHE 480: Chem. Process and Plant Design
- CHE 485: Computer Aided Process Design
- CHE 486: Design of Environ. Benign Plants
- CHEM 105L: General Chemistry
- CHEM 322aL: Analytical Chemistry
- MATH 126 or 129: Calculus II
- MATH 226: Mathematics of Phys. and Engr.

**OPTIONAL ELECTIVES:** Consult with your academic advisor to explore optional elective courses. These courses are not required.

ISE 460: Engineering Economy
or BUAD 301: Technical Entrepreneurship
PTE 463L: Trans. Processes in Porous Media

* SPECIAL NOTES
Courses with this symbol may be satisfied with AP, IB or A-Level exams. See page 17 for more information.

GE: Engineering students are encouraged to satisfy GE G and GE H with a course that also satisfies a Core Literacy. GE H may be satisfied by exam. Additionally, your GESM course should be taken in categories A, B, C, or D only. See pp. 16-17 for more information and consult your advisor for detailed assistance.

Optional Electives: Consult with your academic advisor to explore optional elective courses. These courses are not required.
# A Suggested Course Plan for: Chemical (Nanotechnology)

## First Year

**Fall Semester**
- **GE A**: WRIT 150
- **MATH 125 (GE F)**
- **CHEM 105aL (GE E)**
- **ENGR 102**

**Spring Semester**
- **CHE 120**: Math 125, CHEM 105aL
- **CHE 205**: MATH 125
- **MATH 126 or MATH 129**
- **CHEM 105bL**: MATH 105bL

## Second Year

**Fall Semester**
- **CHEM 330**: GE C
- **CHEM 300L**: PHYS 151L
- **MATH 226 or MATH 229**
- **PHYS 152L**: MATH 125

**Spring Semester**
- **CHEM 322aL**: CHEM 105bL
- **MATH 245**: CHEM 105bL
- **CHE 350**: CHEM 105bL
- **WRIT 340**: WRIT 150

## Third Year

**Fall Semester**
- **GE C**: CHEM 430
- **CHEM 442**: CHEM 442
- **CHEM 487**: CHEM 487
- **OPTIONAL ELECTIVE**

**Spring Semester**
- **CHEM 453**: CHEM 453
- **CHEM 444aL**: CHEM 444aL
- **CHEM 443**: CHEM 443
- **MASC 350L**: CHEM 350L

## Fourth Year

**Fall Semester**
- **GE D**: CHEM 444bL
- **CHEM 445**: CHEM 445
- **CHE 485**: MATH 245
- **CHE 491**: CHEM 491
- **OPTIONAL ELECTIVE**

**Spring Semester**
- **GE C**: CHEM 446
- **CHEM 460L**: CHEM 460L
- **CHEM 480**: CHEM 480
- **OPTIONAL ELECTIVE**
- **MASC 350L**: Design, Synthesis and Processing of Engineering Materials

## Mathematics (16 Units)
- **MATH 125**: Calculus I
- **MATH 126 or MATH 129**: Calculus II
- **MATH 226 or MATH 229**: Calculus III
- **MATH 243**: Mathematics of Phys. and Engr.

## Physics (8 Units)
- **PHYS 151L**: Mechanics and Thermodynamics
- **PHYS 152L**: Electricity and Magnetism

## Chemistry (24 Units)
- **CHEM 105aL**: General Chemistry
- **CHEM 105bL**: General Chemistry
- **CHEM 300L**: Analytical Chemistry
- **CHEM 322aL**: Organic Chemistry
- **CHEM 430**: Physical Chemistry: Thermodynamics & Kinetics
- **CHEM 453**: Advanced Inorganic Chemistry

## General Education (32 Units)
- **GE A**: The Arts (1 Course)
- **GE B**: Humanistic inquiry (2 Courses)
- **GE C**: Social Analysis (2 Courses)
- **GE D**: Life Sciences (1 Course)
- **GE E**: Physical Sciences (1 Course)
- **GE F**: Quantitative Reasoning (1 Course)
- **GE G, H**: Global Perspectives (2 Courses)*
- **GESM**: General Education Seminar (1 Course)*

## Writing (7 Units)
- **WRIT 150**: Writing and Critical Reasoning
- **WRIT 340**: Advanced Writing

## Engineering (54 Units)
- **CHE 120**: Intro. to Chemical Engineering
- **CHE 205**: Numerical Methods in Chemical Engineering
- **CHE 330**: Chemical Engr. Thermodynamics
- **CHE 350**: Intro. to Separation Processes
- **CHE 391**: Intro. to Nanotechnology Research
- **CHE 405**: Applications of Prob. & Stats. for CHE
- **CHE 406**: Engineering Economy or BUAD 301: Technical Entrepreneurship
- **CHE 442**: Chemical Reactor Analysis
- **CHE 443**: Viscous Flows
- **CHE 444aBL**: Chemical Engineering Lab
- **CHE 445**: Heat Transfer in CHE Processes
- **CHE 446**: Mass Transfer in CHE Processes
- **CHE 460L**: Chemical Process Dynamics & Control
- **CHE 480**: Chem. Process and Plant Design
- **CHE 485**: Comp.-Aided Chemical Process Design
- **CHE 487**: Nanotech and Nanoscale Engineering
- **CHE 498**: Nanotech Research for Undergrads
- **ENGR 102**: Engineering Freshman Academy

## Special Notes
Courses with this symbol may be satisfied with AP, IB or A-Level exams. See page 17 for more information.

GE: Engineering students are encouraged to satisfy GE G and GE H with a course that also satisfies a Core Literacy. GE H may be satisfied by exam. Additionally, your GESM course should be taken in categories A, B, C, or D only. See pp. 18-17 for more information and consult your academic advisor to explore optional elective courses. These courses are not required.

**Optional Electives**: Consult with your academic advisor to explore optional elective courses. These courses are not required.

**Nanotech. Elective**: EE/MASC 438L, CHE 489, or CHE/PTE 463L.

**CHE 491**: Technical electives may be taken in place of these courses. Contact the department for approved courses.
# A Suggested Course Plan for: Chemical (Petroleum)

## General Education (32 Units)

- **GE A** The Arts (1 Course)
- **GE B** Humanistic Inquiry (2 Courses)
- **GE C** Social Analysis (2 Courses)
- **GE D** Life Sciences (1 Course)
- **GE E** Physical Sciences (1 Course)
- **GE F** Quantitative Reasoning (1 Course)
- **GE G, H** Global Perspectives (2 Courses)*
- **GESM** General Education Seminar (1 Course)*

## Mathematics (16 Units)

- **MATH 125**: Calculus I
- **MATH 126** or **MATH 129**: Calculus II
- **MATH 226** or **MATH 229**: Calculus III
- **MATH 245**: Mathematics of Phys. and Engr.

## Physics (8 Units)

- **PHYS 151L**: Mechanics and Thermodynamics
- **PHYS 152L**: Electricity and Magnetism

## Chemistry (24 Units)

- **CHEM 105aL**: General Chemistry
- **CHEM 105bL**: General Chemistry
- **CHEM 300L**: Analytical Chemistry
- **CHEM 322aL**: Organic Chemistry
- **CHEM 430**: Physical Chemistry: Thermodynamics & Kinetics
- **CHEMISTRY ELECTIVE**: CHEM 322aL or 431

## First Year

### Fall Semester

- **GE A**
- **WRIT 150**
- **MATH 125** (GE F)
- **CHEM 105aL** (GE E)
- **ENGR 102**

### Spring Semester

- **CHEM 120** (MATH 125, CHEM 105aL)
- **CHEM 205** (MATH 125)
- **MATH 126 or MATH 129**
- **CHEM 105bL**
- **PHYS 151L** (GE E)

## Second Year

### Fall Semester

- **CHEM 330**
- **CHEM 322aL**
- **MATH 226 or MATH 229**
- **PHYS 152L**
- **WRIT 340**

### Spring Semester

- **GE B**
- **CHEM 300L** (CHEM 105bL)
- **MATH 245**
- **CHEM 350** (CHEM 105bL)
- **CHEM 476** (CHEM 322aL)

## Third Year

### Fall Semester

- **CHEM 430** (CHEM 300L, MATH 226, PHYS 151L)
- **CHEM 405**
- **CHEM 442**
- **PTE 461**
- **PTE 463L** (CHE 350, MATH 245)

### Spring Semester

- **GE B**
- **CHEM 444aL** (442, 443)
- **PTE 464L**
- **CHEM 443** (CHE 350, MATH 245)
- **GE C**

## Fourth Year

### Fall Semester

- **GE D**
- **CHEM 444bL** (CHE 350, MATH 245)
- **CHEM 445** (CHEM 445, MATH 245)
- **CHEM 485** (CHEM 445, MATH 245)
- **PTE 465L**
- **ISE 460** or **BUAD 301**

### Spring Semester

- **GE C**
- **CHEM 446** (CHEM 446, MATH 245)
- **CHEM 460L** (CHEM 446, MATH 245)
- **CHEM 480**
- **CHEMISTRY ELECTIVE**
- **OPTIONAL ELECTIVE**

## Required Courses (59 Units)

- **CHEM 105aL**
- **CHEM 105bL**
- **WRIT 150**: Writing and Critical Reasoning
- **WRIT 340**: Advanced Writing
- **ENGINEERING (60 Units)**
  - **CHE 120**: Intro. to Chemical Engineering
  - **CHE 205**: Numerical Methods in Chemical Engineering
  - **CHE 330**: Chemical Engr. Thermodynamics
  - **CHE 350**: Intro. to Separation Processes
  - **CHE 405**: Probability and Statistics for CHE
  - **CHE 442**: Chemical Reactor Analysis
  - **CHE 443**: Viscous Flow
  - **CHE 444aL**: Chemical Engineering Lab
  - **CHE 444bL**: Chemical Engineering Lab
  - **CHE 445**: Heat Transfer in CHE Processes
  - **CHE 446**: Mass Transfer in CHE Processes
  - **CHE 460L**: Chemical Process Dynamics
  - **CHE 476**: Chemical Engineering Materials
  - **CHE 480**: Chem. Process and Plant Design
  - **CHE 485**: Computer Aided Process Design
  - **ENGR 102**: Engineering Freshman Academy
  - **ISE 460**: Engineering Economy
  - **PTE 461**: Formation Evaluation
  - **PTE 463L**: Trans. Processes in Porous Media
  - **PTE 464L**: Petroleum Reservoir Engineering
  - **PTE 465L**: Drill. Tech. & Subsurface Meth.

## Writing (7 Units)

- **WRIT 150**: Writing and Critical Reasoning
- **WRIT 340**: Advanced Writing

## General Education Elective (1 Course)

- **CHEMISTRY ELECTIVE**: CHEM 322aL or 431

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* SPECIAL NOTES

Courses with this symbol may be satisfied with AP, IB or A-Level exams. See page 17 for more information.

**GE**: Engineering students are encouraged to satisfy GE G and GE H with a course that also satisfies a Core Literacy. GE H may be satisfied by exam. Additionally, your GESM course should be taken in categories A, B, C, or D only. See pp. 16-17 for more information and consult your academic advisor for detailed assistance.

**OPTIONAL ELECTIVES**: Consult with your academic advisor to explore optional elective courses. These courses are not required.
## CHEMICAL (POLYMERS/MATERIALS)

### FIRST YEAR
#### FALL SEMESTER
- **GE A**
- **WRIT 150**
- **MATH 125** (GE F)
- **CHEM 105aL** (GE E)
- **ENGR 102**

#### SPRING SEMESTER
- **CHE 120** (MATH 125, CHEM 105aL)
- **CHE 205**
- **MATH 126 or MATH 129**
- **CHEM 105bL**
- **PHYS 151L** (GE E)

### SECOND YEAR
#### FALL SEMESTER
- **CHEM 330**
- **CHEM 300L**
- **MATH 226 or MATH 229**
- **PHYS 152L**
- **OPTIONAL ELECTIVE**

#### SPRING SEMESTER
- **GE B**
- **CHEM 322aL**
- **MATH 245**
- **WRIT 340**
- **CHEM 350** (CHEM 105bL)

### THIRD YEAR
#### FALL SEMESTER
- **CHEM 430**
- **CHE 442**
- **CHE 472**
- **OPTIONAL ELECTIVE**

#### SPRING SEMESTER
- **GE C**
- **CHEMISTRY ELECTIVE**
- **CHEM 444aL**
- **CHEM 443**
- **CHEM 476**

### FOURTH YEAR
#### FALL SEMESTER
- **GE D**
- **CHE 444bL**
- **CHE 445**
- **CHE 485**
- **POLYMER/MATERIALS SCI. ELECTIVE**
- **CHE 405**

#### SPRING SEMESTER
- **GE C**
- **CHE 446**
- **CHE 460L**
- **CHE 480**
- **POLYMER/MATERIALS SCI. ELECTIVE**
- **MASC 350L**

### MATHEMATICS (16 UNITS)
- **MATH 125**: Calculus I
- **MATH 126 or MATH 129**: Calculus II
- **MATH 226 or MATH 229**: Calculus III
- **MATH 245**: Mathematics of Phys. and Engr.

### PHYSICS (8 UNITS)
- **PHYS 151L**: Mechanics and Thermodynamics
- **PHYS 152L**: Electricity and Magnetism

### CHEMISTRY (24 UNITS)
- **CHEM 105AL**: General Chemistry
- **CHEM 105BL**: General Chemistry
- **CHEM 300L**: Analytical Chemistry
- **CHEM 322AL**: Organic Chemistry
- **CHEM 430**: Physical Chemistry: Thermodynamics & Kinetics
- **CHEMISTRY ELECTIVE**: CHEM 322bL or 431

### GENERAL EDUCATION (32 UNITS)
- **GE A** The Arts (1 Course)
- **GE B** Humanistic inquiry (2 Courses)
- **GE C** Social Analysis (2 Courses)
- **GE D** Life Sciences (1 Course)
- **GE E** Physical Sciences (1 Course)
- **GE F** Quantitative Reasoning (1 Course)
- **GE G,H** Global Perspectives (2 Courses)*
- **GESM** General Education Seminar (1 Course)*

### WRITING (7 UNITS)
- **WRIT 150**: Writing and Critical Reasoning
- **WRIT 340**: Advanced Writing

### ENGINEERING (57 UNITS)
- **CHE 120**: Intro. to Chemical Engineering
- **CHE 205**: Numerical Methods in Chemical Engineering
- **CHE 330**: Chemical Engr. Thermodynamics
- **CHE 350**: Intro. to Separation Processes
- **CHE 405**: Probability and Statistics for CHE or ISE 460: Engineering Economy or BUAD 301: Technical Entrepreneurship
- **CHE 442**: Chemical Reactor Analysis
- **CHE 443**: Viscous Flow
- **CHE 444aBL**: Chemical Engineering Lab
- **CHE 445**: Heat Transfer in CHE Processes
- **CHE 446**: Mass Transfer in CHE Processes
- **CHE 460L**: Chemical Process Dynamics
- **CHE 472**: Polymer Science & Engineering
- **CHE 476**: Chemical Engineering Materials or MASC 310: Materials Behavior and Processing
- **CHE 480**: Chem. Process and Plant Design
- **CHE 485**: Computer Aided Process Design
- **ENGR 102**: Engineering Freshman Academy

### MASC 350L: Nanostructured Materials: Design, Synthesis, and Processing

### MATERIALS ELECTIVES

### SPECIAL NOTES
Courses with this symbol may be satisfied with AP, IB or A-Level exams. See page 17 for more information.

GE: Engineering students are encouraged to satisfy GE G and GE H with a course that also satisfies a Core Literacy. GE H may be satisfied by exam. Additionally, your GESM course should be taken in categories A, B, C, or D only. See pp. 16-17 for more information and consult your academic advisor for detailed assistance.

OPTIONAL ELECTIVES: Consult with your academic advisor to explore optional elective courses. These courses are not required.

POLYMER/MAT ELECTIVES: Select 9 units from BME 410, CHE 474L, 475, 477, 487, EE 438L, or MASC 440.
# A Suggested Course Plan for: Chemical (Sustainable Energy)

## First Year

**Fall Semester**
- **GE A**
- **WRIT 150**
- **MATH 125 (GE F)**
- **CHEM 105aL (GE E)**
- **ENGR 102**

**Spring Semester**
- **CHE 120** or **CHE 125** (MATH 125)
- **CHEM 205**
- **MATH 126 or MATH 129** (MATH 126)
- **CHEM 105bL (GE E)**
- **PHYS 151L (GE E)**

## Second Year

**Fall Semester**
- **CHE 330**
- **CHEM 300L**
- **MATH 226 or MATH 229** (MATH 226)
- **PHYS 152L**
- **OPTIONAL ELECTIVE**

**Spring Semester**
- **GE B**
- **CHEM 322aL**
- **MATH 245**
- **CHEM 350**
- **WRIT 340**

## Third Year

**Fall Semester**
- **GE C**
- **CHEM 430**
- **CHEM 442**
- **CHE 450**
- **OPTIONAL ELECTIVE**

**Spring Semester**
- **CHEM TECH. ELECTIVE**
- **CHEM 444aL**
- **CHEM 443**
- **CHE 476 or MASC 350L**
- **SUSTAINABLE ENERGY ELECTIVE**

## Fourth Year

**Fall Semester**
- **GE D**
- **CHEM 444bL**
- **CHEM 445**
- **CHEM 485**
- **OPTIONAL ELECTIVE**

**Spring Semester**
- **GE C**
- **CHEM 446**
- **CHEM 460L**
- **CHEM 480**
- **GE B**

### Mathematics (16 Units)
- **MATH 125**: Calculus I
- **MATH 126 or MATH 129**: Calculus II
- **MATH 226 or MATH 229**: Calculus III
- **MATH 245**: Mathematics of Phys. and Engr.

### Physics (8 Units)
- **PHYS 151L**: Mechanics and Thermodynamics
- **PHYS 152L**: Electricity and Magnetism

### Chemistry (24 Units)
- **CHEM 105aL**: General Chemistry
- **CHEM 105bL**: General Chemistry
- **CHEM 300L**: Analytical Chemistry
- **CHEM 322aL**: Organic Chemistry
- **CHEM 430L**: Physical Chemistry: Thermodynamics & Kinetics
- **Chemistry Technical Electives**: Organic Chemistry or **CHEM 431L**: Physical Chemistry: Quantum Mechanics or **CHEM 453L**: Advance Inorganic Chemistry

### General Education (32 Units)
- **GE A**: The Arts (1 Course)
- **GE B**: Humanistic Inquiry (2 Courses)
- **GE C**: Social Analysis (2 Courses)
- **GE D**: Life Sciences (1 Course)
- **GE E**: Physical Sciences (1 Course)

**GE F**: Quantitative Reasoning (1 Course)

**GE G-H**: Global Perspectives (2 Courses)*

**GESM**: General Education Seminar (1 Course)*

### Writing (7 Units)
- **WRIT 150**: Writing and Critical Reasoning
- **WRIT 340**: Advanced Writing

### Engineering (54 Units)
- **CHE 120**: Intro. to Chemical Engineering
- **CHE 205**: Numerical Methods in Chemical Engineering
- **CHE 330**: Chemical Engr. Thermodynamics
- **CHE 350**: Intro. to Separation Processes
- **CHE 405**: Applications of Prob. & Stats. for ChE or ISE 460**: Engineering Economy or **BUAD 301**: Technical Entrepreneurship
- **CHE 442**: Chemical Reactor Analysis
- **CHE 443**: Viscous Flows
- **CHE 444aBL**: Chemical Engineering Lab
- **CHE 445**: Heat Transfer in CHE Processes
- **CHE 446**: Mass Transfer in CHE Processes
- **CHE 450**: Sustainable Energy
- **CHE 460L**: Chemical Process Dynamics & Control
- **CHE 480**: Chem. Process and Plant Design
- **CHE 485**: Comp. Aided Chemical Process Design
- **ENGR 102**: Engineering Freshman Academy

### Special Notes
- Courses with this symbol may be satisfied with AP, IB or A-Level exams. See page 17 for more information.

- GE: Engineering students are encouraged to satisfy GE F and GE H with a course that also satisfies a Core Literacy. GE H may be satisfied by exam. Additionally, your GESM course should be taken in categories A, B, C, or D only. See pp. 16-17 for more information and consult your academic advisor for detailed assistance.

- OPTIONAL ELECTIVES: Consult with your academic advisor to explore optional elective courses. These courses are not required.

- **SUSTAINABLE ENERGY ELECTIVE (3)**
  - Biofuel (CHE 301 or CHEM 488 or CHE 489)
  - Solar (CHE 487 or EE 513)
  - Geothermal (PTE 463L)

- **Must have 49 engineering units to be able to take BUAD 301.**