Fundamentals of Engineering Program

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Nature of the Program

The Benjamin M. Statler College of Engineering and Mineral Resources’ Fundamentals of Engineering Program (FEP) is designed to support engineering students as they build foundational engineering skills and discern their career interests within engineering and computing fields. The mission of this student-oriented program is to advise, prepare, and retain qualified students for degree programs in the Statler College. The FEP provides the academic and co-curricular support students need for their success in their: transition to college life; development of academic discipline and skills necessary for entering and succeeding in an academically challenging major; foundational courses (mathematics, chemistry, physics, and basic engineering); and selection of an engineering or computing discipline major. The FEP focuses on: (1) careful advising and accurate placement of students into courses that are at an appropriate level to facilitate academic success; (2) communication between students, faculty, advisors, and others; (3) academic support services to support students in the fundamental mathematics, science, and engineering courses; and (4) provision of a co-curricular environment that facilitates successful transition to the college environment, provides career exploration opportunities, and supports students’ academic endeavors; and (5) quality and engaging fundamental engineering instruction.

The FEP provides a vibrant and supportive community for beginning engineering students centered in the Eugene V. Cilento Learning Center (ELC). Students have a “one-stop” place to get the answers they need as they navigate through the transition from high school to college. In the ELC, students receive free tutoring, find information about upcoming guest speakers and other College events, get advising questions answered, and spend a significant amount of time studying, doing homework, and working on team projects for their engineering courses. Academic support is provided to all FEP students in the following subjects: mathematics, chemistry, physics, and engineering. All students taking any 100-level ENGR course must spend two hours each week studying or working on homework or class assignments in an approved and supervised environment that provides (and reports) tutoring support services.

To facilitate engagement with the engineering community an development as engineering and computing professionals, FEP students are required to participate in and reflect upon “Out of Class Experiences” (OCEs). Typical OCE opportunities include: EngineerFEST, an engineering student organization fair held each year to encourage students to learn about and become involved in one or more of the College’s many student chapters of the professional engineering societies; , in which each department hosts FEP students in an informational seminar describing their majors, relevant research opportunities, and the career paths of graduates; and other seminars, presentations, panels, workshops and experiences in which students learn academic success skills and strategies, are introduced to important professional expectations and life skills, and explore a variety of engineering and computing-related careers.

All policies, procedures, upcoming events and activities, and academic resources are listed on the FEP website. All of these efforts, curricular and co-curricular, work together to create a coherent program designed to facilitate student success in engineering and computing fields.

Program Objectives

The educational objective of the Fundamentals of Engineering Program (FEP) in the Statler College is to prepare students to be academically successful in the engineering or computing major of their choice. Students who complete the FEP are successful in their:

- Transition to college life;
- Development of the academic discipline and skills necessary for entering and succeeding in an academically challenging major;
- Foundation courses (mathematics, chemistry, physics, and basic engineering); and
- Selection of an engineering or computing discipline major.

Educational Outcomes

Recognizing that the Fundamentals of Engineering Program is the first step toward completing an engineering or computing discipline degree, students completing the FEP will have been introduced to the engineering and computing program educational outcomes listed below. Each of these outcomes will be further developed in the program to which the student moves and in which the student completes a degree program. Students who successfully complete the requirements of the WVU Fundamentals of Engineering Program have begun to develop an ability to:

1. identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics
2. apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors
3. communicate effectively with a range of audiences
4. recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts
5. function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives
6. develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions
7. acquire and apply new knowledge as needed, using appropriate learning strategies

Additionally, students successfully completing the WVU Statler College Fundamentals of Engineering Program will have an ability to select and enter an engineering or computing discipline major within the Statler College.

ADMINISTRATION

ASSISTANT DEAN
• Robin A. M. Hensel - Ed.D. (West Virginia University)
  STEM education K-16, Student success and retention, Diversity and inclusion in STEM fields, Curriculum development

PROGRAM COORDINATOR
• Kristin M. Brewster - M.A. Secondary Mathematics Education (West Virginia University)
  STEM education, Student success and retention, Curriculum development

FACULTY

ASSISTANT DEAN
• Robin A. M. Hensel - Ed.D. (West Virginia University)
  STEM education K-16, Student success and retention, Diversity and inclusion in STEM fields, Curriculum Development

TEACHING ASSOCIATE PROFESSORS
• Todd R. Hamrick - Ph.D. (West Virginia University)
  STEM education, Robotics, Industrial applications, Curriculum development
• Lizzie Y. Santiago - Ph.D. (The Pennsylvania State University)
  Bioengineering, Engineering education, Curriculum development, STEM education, Retention

TEACHING ASSISTANT PROFESSORS
• Atheer Almasri - Ph.D. (Virginia Commonwealth University)
  Mechanical Engineering, STEM Education
• Gerald M. Angle, II - Ph.D. (West Virginia University)
  Aerospace engineering, STEM education K-16, Curriculum development
• Carter Hulcher - Ph.D. (West Virginia University)
  Civil Engineering, Geomechanics, Student retention
• Xinyu (Catherine) Zhang - Ph.D. (University of Illinois at Urbana-Champaign)
  STEM education, Chemical and biomedical engineering, Sustainability of biomanufacturing

TEACHING INSTRUCTORS
• Michael K. Brewster - M.A. (West Virginia University)
  Mathematics, Statistics, STEM education K-16

ADJUNCT LECTURER
• Diane Raque - M.S. Materials Engineering (Virginia Polytechnic Institute and State University)

Admissions

Due to Covid-19 – Admission requirements may differ from what is listed on this page. Please review the most up-to-date program admission requirements for the Benjamin M. Statler College of Engineering and Mineral Resources (https://www.statler.wvu.edu/undergraduate/admissions-criteria/).

ADMISSION TO THE FUNDAMENTALS OF ENGINEERING PROGRAM (INTERNAL TRANSFER STUDENT, FTFT)

To be admitted into the Engineering Track 2 or 3 major, a student must have:

• A WVU and overall GPA of at least 2.5
• Completed the prerequisites for or be ready to take MATH 153 or MATH 155
ADMISSION TO THE FUNDAMENTALS OF ENGINEERING PROGRAM (EXTERNAL TRANSFER STUDENT)

To be admitted into the Engineering Track 2 major, a transfer student must have:

- A cumulative GPA of 2.75 or higher
- Completed the prerequisites for or be ready to take MATH 153 or MATH 155

ADMISSION TO A DISCIPLINE MAJOR

To be admitted into an engineering major, a student must have:

- Successfully completed MATH 154 or MATH 155, CHEM 115 and CHEM 115L, ENGL 101, ENGR 101, ENGR 102, and ENGR 191, all with a grade of C- or better
- A WVU and overall GPA of at least 2.25

To be admitted into a computer science or cybersecurity major, a student must have:

- Successfully completed MATH 154 or MATH 155, ENGL 101, any approved 4-credit lab science course (BIOL 115 & BIOL 116, CHEM 115 & CHEM 115L, CHEM 117 & CHEM 117L, PHYS 111, or GEOL 101 and GEOL 102), CS 110, ENGR 101, and ENGR 191, all with a grade of C- or better
- A WVU and overall GPA of at least 2.25

The criteria listed above are minimum requirements.

ADMISSION TO PROGRAMS UNDER ENROLLMENT MANAGEMENT

In rare cases, programs may need to be placed under enrollment management. Admission to programs under enrollment management will follow the priority structure listed below. If the number of eligible first priority students exceeds the number of admission slots, students will be admitted into the program based on review and consideration of their cumulative GPAs.

1. First priority will be given to students starting within the WVU system.
2. Second priority will be given to internal transfer students from other majors.
3. Third priority will be given to students previously enrolled in Statler College.
4. Fourth priority will be given to students wishing to transfer from outside WVU and all second degree students.

EARLY ADMISSION TO DISCIPLINE MAJOR

First-year Engineering Track 1 students having outstanding academic performance during their first semester may elect to move into their selected major at the end of the first semester. These students have the option of taking ENGR 102 or an approved department-specific ENGR 102 substitute course during the second semester. Early admission is based on a combination of prior credit and first semester academic performance. For early admission to a discipline major, students must:

- Have seven credit hours or more of degree-pursuant AP or prior college credit including at least four credits of CHEM 115 and CHEM 115L, CHEM 116 and CHEM 116L, PHYS 111, or PHYS 112;
- Pass all first semester math (MATH 155 and above) and all science courses (BIOL 115 and BIOL 116; CHEM 115 and CHEM115L; CHEM 116 and CHEM 116L; CHEM 117 and CHEM 117L; GEOL 101 and GEOL 102; PHYS 111; or PHYS 112) plus ENGR 191 and ENGR 101 with a C- or better; and
- Achieve a cumulative GPA # 3.0.

Or advancement can be based on the following exceptional performance:

- Pass all first semester math (MATH 155 and above) and science courses (BIOL 115 and BIOL 116; CHEM 115 and CHEM 115L; CHEM 116 and CHEM 116L; GEOL 101 and GEOL 102; PHYS 111; or PHYS 112) plus ENGR 191 and ENGR 101 with a C- or better, and
- Achieve a cumulative GPA # 3.5.

ADMISSIONS REQUIREMENTS 2022-2023

The Admissions Requirements above will be the same for the 2022-2023 Academic Year.
Curriculum
In this Section
• Engineering Track 1 Program Curriculum (p. 4)
• Engineering Track 2 Program Curriculum (p. 5)
• Engineering Track 3 Program Curriculum (p. 7)

Engineering Track 1 Program Curriculum
The Engineering Track 1 program curriculum is designed for students who have similar math and science backgrounds so they can work effectively in teams, solve problems, and undertake challenging projects in the first Engineering Problem Solving course, ENGR 101. While SAT/ACT Math scores are used to determine initial math and chemistry course placement, some students may opt or be required to use the ALEKS assessment and preparation system to determine initial course placement. Engineering Track 1 students are expected to have the math background necessary to place into MATH 155 and CHEM 115 and CHEM 115L. Credit hours for chemistry courses below CHEM 115 and CHEM 115L, mathematics courses below MATH 154/155, and physics courses below PHYS 111 do not count toward meeting degree credit hour requirements for chemistry, mathematics or physics; students placing below MATH 155 and CHEM 115/115L will be placed in either Engineering Track 2 or Engineering Track 3.

General Education Foundations
Please use this link to view a list of courses that meet each GEF requirement. (http://registrar.wvu.edu/gef/)

NOTE: Some major requirements will fulfill specific GEF requirements. Please see the curriculum requirements listed below for details on which GEFs you will need to select.

General Education Foundations
F1 - Composition & Rhetoric
ENGL 101 & ENGL 102
or ENGL 103
Introduction to Composition and Rhetoric
and Composition, Rhetoric, and Research
Accelerated Academic Writing
F2A/F2B - Science & Technology
4-6
F3 - Math & Quantitative Reasoning
3-4
F4 - Society & Connections
3
F5 - Human Inquiry & the Past
3
F6 - The Arts & Creativity
3
F7 - Global Studies & Diversity
3
F8 - Focus (may be satisfied by completion of a minor, double major, or dual degree)
9
Total Hours
31-37

Please note that not all of the GEF courses are offered at all campuses. Students should consult with their advisor or academic department regarding the GEF course offerings available at their campus.

Engineering Track 1 Curriculum Requirements
CHEM 115 & 115L
Fundamentals of Chemistry
and Fundamentals of Chemistry 1 - Laboratory
CHEM 116 & 116L
Fundamentals of Chemistry
and Fundamentals of Chemistry 2 - Laboratory
or BIOL 115 & BIOL 116
Principles of Biology
and Principles of Biology Laboratory
Select one of the following:
ENGL 101 & ENGL 103
Introduction to Composition and Rhetoric
or Accelerated Academic Writing
ENGR 101 & 102
Engineering Problem Solving 1 & 2
ENGR 191
First-Year Seminar
MATH 155 & 156
Calculus 1 (minimum grade C)
and Calculus 2
PHYS 111
General Physics
### SUGGESTED PLAN OF STUDY

#### First Year

<table>
<thead>
<tr>
<th>Fall</th>
<th>Hours</th>
<th>Spring</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 155</td>
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<td>ENGR 191</td>
<td>1</td>
<td>PHYS 111</td>
<td>4</td>
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<tr>
<td>Select one of the following:</td>
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<td>Select one of the following:</td>
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<tr>
<td>CHEM 115 &amp; 115L</td>
<td></td>
<td>CHEM 116 &amp; 116L</td>
<td></td>
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<tr>
<td>BIOL 115 &amp; BIOL 116*</td>
<td></td>
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<td></td>
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<tr>
<td>Select one of the following:</td>
<td></td>
<td>Select one of the following:</td>
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</tr>
<tr>
<td>ENGL 103</td>
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<td>GEF Elective***</td>
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<td>ENGL 103</td>
<td></td>
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<tr>
<td>GEF Elective***</td>
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<td>Select one of the following:</td>
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<tr>
<td>GEF Elective***</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>BIOL 115 &amp; BIOL 116</td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

Total credit hours: 34-36

* Students intending to pursue a biometric systems engineering degree should take BIOL 115 and BIOL 116 in place of CHEM 115 and CHEM 115L first semester and CS 110 in place of a second semester GEF elective.

** Students intending to pursue a chemical engineering degree or petroleum and natural gas engineering degree must take CHEM 116 and CHEM 116L. Students intending to pursue a civil engineering degree or an industrial engineering degree must take only one 4 credit course sequence of: CHEM 116 & 116L, PHYS 112, or BIOL 115 and BIOL 116. Students wishing to pursue single or dual degrees in aerospace, computer, electrical, mechanical, mining, or biometric systems engineering, or computer science or cybersecurity do not need CHEM 116 and CHEM 116L.

*** Students intending to pursue a petroleum and natural gas engineering degree should take GEOL 101 in place of one GEF elective. Students intending to pursue a mining engineering degree should take GEOL 101 and GEOL 102 in place of one GEF elective. Students pursuing dual mining engineering and geology degrees need to take GEOL 101, 102, 103 and 104 in place of two GEF electives.

### Engineering Track 2 Program Curriculum

The Engineering track 2 program curriculum is tailored for those students who are not ready to take MATH 155 and ENGR 101. While ACT/SAT-Math scores are used to determine initial math and chemistry course placement, some students may opt or be required to use the ALEKS assessment and preparation system to determine initial course placement. Engineering Track 2 students are expected to have the math background necessary to place into MATH 153 and CHEM 115 and CHEM 115L. These students will need to complete ENGR 102 either in the summer following their first year or during the fall of the second year before they will be accepted into an engineering discipline major. Credit hours for chemistry courses below CHEM 115 and CHEM 115L, mathematics courses below MATH 154/155, and physics courses below PHYS 111 do not count toward meeting degree credit hour requirements for chemistry, mathematics or physics.

#### Engineering Track 2 Curriculum Requirements

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 115 &amp; 115L</td>
<td>Fundamentals of Chemistry and Fundamentals of Chemistry 1 - Laboratory</td>
<td>4</td>
</tr>
<tr>
<td>CHEM 116 &amp; 116L</td>
<td>Fundamentals of Chemistry and Fundamentals of Chemistry 2 - Laboratory</td>
<td>4</td>
</tr>
<tr>
<td>or BIOL 115 &amp; BIOL 116</td>
<td>Principles of Biology and Principles of Biology Laboratory</td>
<td></td>
</tr>
<tr>
<td>ENGL 101 or ENGL 103</td>
<td>Introduction to Composition and Rhetoric or Accelerated Academic Writing</td>
<td>3</td>
</tr>
<tr>
<td>ENGR 100</td>
<td>Introduction to Engineering Applications</td>
<td>3</td>
</tr>
<tr>
<td>ENGR 101</td>
<td>Engineering Problem Solving 1</td>
<td>2</td>
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</table>
ENGR 102  Engineering Problem-Solving 2  3
ENGR 191  First-Year Seminar  1

Select from the following based on Placement:

<table>
<thead>
<tr>
<th>Course</th>
<th>Description</th>
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<tr>
<td>MATH 153</td>
<td>Calculus 1a with Precalculus (minimum grade C)</td>
</tr>
<tr>
<td>MATH 154</td>
<td>Calculus 1b with Precalculus (minimum grade C)</td>
</tr>
<tr>
<td>MATH 155</td>
<td>Calculus 1 (minimum grade C)</td>
</tr>
<tr>
<td>MATH 156</td>
<td>Calculus 2</td>
</tr>
<tr>
<td>PHYS 111</td>
<td>General Physics</td>
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Total Hours 32

**SUGGESTED PLAN OF STUDY**

**First Year**

<table>
<thead>
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<th>Fall</th>
<th>Hours</th>
<th>Spring</th>
<th>Hours</th>
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<tr>
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<td>3 MATH 154</td>
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<td>ENGR 191</td>
<td>1 ENGR 101</td>
<td>2</td>
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<td>Select one of the following:</td>
<td>4 Select one of the following:</td>
<td>3-4</td>
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<tr>
<td>CHEM 115 &amp; 115L</td>
<td>CHEM 115 &amp; 115L</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BIOL 115 &amp; BIOL 116</td>
<td>CHEM 116 &amp; 116L</td>
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<td>3 GEF Elective ***</td>
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<tr>
<td>ENGL 101</td>
<td>ENGL 101</td>
<td>3</td>
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</tr>
<tr>
<td>ENGL 103</td>
<td>ENGL 103</td>
<td></td>
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<td>GEF Elective ***</td>
<td>GEF Elective ***</td>
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<td>Select one of the following:</td>
<td>3-4 GEF Elective ***</td>
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<td></td>
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<td>ENGR 100***</td>
<td>GEF Elective ***</td>
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<td></td>
</tr>
<tr>
<td>BIOL 115 &amp; BIOL 116</td>
<td>GEF Elective ***</td>
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<td></td>
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<td>GEF Electives ***</td>
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<td>14-15</td>
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**Second Year**

<table>
<thead>
<tr>
<th>Fall</th>
<th>Hours</th>
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<tbody>
<tr>
<td>MATH 156</td>
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<td>ENGR 102</td>
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<tr>
<td>PHYS 111</td>
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<td>Select one of the following:</td>
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<tr>
<td>CHEM 116 &amp; 116L</td>
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<tr>
<td>BIOL 115 &amp; BIOL 116</td>
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<tr>
<td>GEF Elective ***</td>
<td>GEF Electives ***</td>
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</tbody>
</table>

Total credit hours: 45-48

* Students intending to pursue a biometric systems engineering degree should take BIOL 115 and BIOL 116 in the first semester and should also take CS 110 in place of a GEF Elective.

** Students intending to pursue a chemical engineering degree or petroleum and natural gas engineering degree must take CHEM 116 and CHEM 116L. Students intending to pursue a civil engineering degree or an industrial engineering degree must take only one 4 credit course sequence of: CHEM 116 and CHEM 116L, PHYS 112, or BIOL 115 and BIOL 116. Students wishing to pursue single or dual degrees in aerospace, computer, electrical, mechanical, mining, or biometric systems engineering, or computer science or cybersecurity do not need CHEM 116 and CHEM 116L.
Students intending to pursue a petroleum and natural gas engineering degree should take GEOL 101 in place of one GEF elective. Students intending to pursue a mining engineering degree should take GEOL 101 and GEOL 102 in place of one GEF elective. Students pursuing dual mining engineering and geology degrees need to take GEOL 101, 102, 103 and 104 in place of two GEF electives.

Students taking MATH 153 should take ENGR 100 in the same semester.

**Engineering Track 3 Program Curriculum**

The Engineering Track 3 program curriculum is tailored for those students who demonstrate the need to take more than one math course before MATH 154 or MATH 155 Calculus 1. While ACT/SAT-Math scores are used to determine initial math and chemistry course placement, some students may opt or be required to use the ALEKS assessment and preparation system to determine initial course placement. Typically, Engineering Track 3 students have the background necessary to place into CHEM 110 and MATH 126. Engineering Track 3 students should expect to take more than one year to complete the six courses that are pre-requisite to entering an engineering discipline major. Credit hours for chemistry courses below CHEM 115, mathematics courses below MATH 154/155, and physics courses below PHYS 111 do not count toward meeting degree credit hour requirements for chemistry, mathematics or physics.

**Engineering Track 3 Curriculum Requirements**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
<th>Hours</th>
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</thead>
<tbody>
<tr>
<td>CHEM 110</td>
<td>Introduction to Chemistry</td>
<td>2</td>
</tr>
<tr>
<td>CHEM 115</td>
<td>Fundamentals of Chemistry</td>
<td>4</td>
</tr>
<tr>
<td>&amp; 115L</td>
<td>and Fundamentals of Chemistry 1 - Laboratory</td>
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</tr>
<tr>
<td>CHEM 116</td>
<td>Fundamentals of Chemistry</td>
<td>4</td>
</tr>
<tr>
<td>&amp; 116L</td>
<td>and Fundamentals of Chemistry 2 - Laboratory</td>
<td></td>
</tr>
<tr>
<td>or BIOL 115</td>
<td>Principles of Biology</td>
<td></td>
</tr>
<tr>
<td>&amp; BIOL 116</td>
<td>and Principles of Biology Laboratory</td>
<td></td>
</tr>
<tr>
<td>ENGL 101</td>
<td>Introduction to Composition and Rhetoric</td>
<td>3</td>
</tr>
<tr>
<td>or ENGL 103</td>
<td>Accelerated Academic Writing</td>
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</tr>
<tr>
<td>ENGR 100</td>
<td>Introduction to Engineering Applications</td>
<td>3</td>
</tr>
<tr>
<td>ENGR 101</td>
<td>Engineering Problem Solving 1</td>
<td>2</td>
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<td>ENGR 102</td>
<td>Engineering Problem-Solving 2</td>
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<td>ENGR 191</td>
<td>First-Year Seminar</td>
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<tr>
<td>MATH 126</td>
<td>College Algebra</td>
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<tr>
<td>MATH 128</td>
<td>Plane Trigonometry (minimum grade C)</td>
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<tr>
<td>MATH 153</td>
<td>Calculus 1a with Precalculus (minimum grade C)</td>
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<tr>
<td>MATH 154</td>
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<td>PHYS 111</td>
<td>General Physics</td>
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<tr>
<td>Total Hours</td>
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<td>34</td>
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**SUGGESTED PLAN OF STUDY**

**First Year**

<table>
<thead>
<tr>
<th>Fall</th>
<th>Hours</th>
<th>Spring Hours</th>
<th>Summer Hours</th>
<th>Hours</th>
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<tr>
<td>MATH 126</td>
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<td>3 MATH 128</td>
<td>3 MATH 153</td>
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<td>1 CHEM 115</td>
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<td>CHEM 110</td>
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<td>Select one of the following:</td>
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<td>ENGL 101</td>
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<td>ENGL 103</td>
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<tr>
<td>ENGL 103</td>
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<td>GEF Elective***</td>
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<tr>
<td>ENGR 151</td>
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**Fundamentals of Engineering Program**

<table>
<thead>
<tr>
<th>Biomedical Engineering Program</th>
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<tbody>
<tr>
<td>BIOL 115, &amp; BIOL 116</td>
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<tr>
<td>GEF Elective</td>
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### Second Year

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<thead>
<tr>
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<th>Fall</th>
<th>Hours</th>
<th>Spring</th>
<th>Hours</th>
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<tbody>
<tr>
<td>MATH 154</td>
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<td>MATH 156</td>
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<td>ENGR 102</td>
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<tr>
<td>CHEM 115 &amp; 115L</td>
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<tr>
<td>CHEM 116 &amp; 116L</td>
<td></td>
<td>ENGL 102</td>
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<tr>
<td>BIOL 115 &amp; BIOL 116</td>
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<td>ECON 201</td>
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<td>ENGL 102</td>
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<td>Minor course</td>
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<td>GEF Elective***</td>
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<tr>
<td>Minor Course</td>
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</table>

Total credit hours: 66-67

* Students intending to pursue a biometrics systems engineering degree should take BIOL 115 and BIOL 116 in the first semester and should also take CS 110 in place of a GEF elective.

** Students intending to pursue a chemical engineering degree or petroleum and natural gas engineering degree must take CHEM 116 and CHEM 116L. Students intending to pursue a civil engineering degree or an industrial engineering degree must take only one 4-credit course sequence of: CHEM 116 and CHEM 116L, PHYS 112, or BIOL 115 and BIOL 115L. Students wishing to pursue single or dual degrees in aerospace, computer, electrical, mechanical, mining, or biometric systems engineering or in computer science or cybersecurity do not need CHEM 116 and CHEM 116L.

*** Students intending to pursue a petroleum and natural gas engineering degree should take GEOL 101 in place of one GEF elective. Students intending to pursue a mining engineering degree should take GEOL 101 and GEOL 102 in place of one GEF elective. Students pursuing dual mining engineering and geology degrees need to take GEOL 101, 102, 103 and 104 in place of two GEF electives.

### Policies

**IN THIS SECTION**

- Adequate Academic Progress (p. 8)
- Dismissal from the Statler College (p. 9)

### ADEQUATE ACADEMIC PROGRESS

All students need to make adequate academic progress. Adequate academic progress for Track 1, Track 2, and Track 3 engineering students is defined as meeting the prerequisites to take MATH 153 or MATH 155 by the beginning of the third semester within the Fundamentals of Engineering Program and meeting the criteria for admission to an engineering discipline major within four semesters of the date of entrance to the Statler College. Because each student’s case is unique, the academic progress of all students who have not started MATH 153/MATH 155 by the start of their third semester and all students who have not moved to an engineering discipline major by the end of their fourth semester will be reviewed by the Fundamentals of Engineering Program Academic Standards Committee. Upon review, the committee will either:

1. Transfer the student out of the Statler College to the Center for Learning, Advising, and Student Success and specify the conditions which must be met before the student may return to the Statler College; or
2. Retain the student in the Statler College and specify the academic progress which must be met within one semester.

Students will not be permitted to enroll, without college approval, in courses carrying a discipline major code until they have been accepted into an engineering discipline major.
DISMISSAL FROM THE STATLER COLLEGE

A student who has been dismissed from the Fundamentals of Engineering program for not making adequate academic progress or for low academic performance (overall and/or WVU grade point average less than 2.25) must petition to be readmitted to the Statler College; the decision to readmit will be on a case-by-case basis. A student who has been dismissed from the Statler College cannot transfer academic major course work taken at another institution, during the period of dismissal, for credit toward meeting their degree requirements.

A student may also be dismissed from the Statler College for violating the WVU Student Code of Conduct. Dismissal from the Statler College for academic integrity offenses is permanent.

ENGR 100. Introduction to Engineering Applications. 3 Hours.
PR or CONC: MATH 129 or MATH 153. Introduction to basic problem solving of engineering applications using algebra and trigonometry.

ENGR 101. Engineering Problem Solving 1. 2 Hours.
PR or CONC: MATH 154 or MATH 155. Engineering problem solving methodologies and analysis. Use of computers in problem solving, technical report writing, team based project work and presentations.

ENGR 102. Engineering Problem-Solving 2. 3 Hours.
PR: ENGR 101 and (MATH 154 or MATH 155) with a minimum grade of C- in each. Continued development of engineering problem-solving, teamwork, and communication skills with emphases on using the computer as a tool and algorithm development with a high-level language such as MATLAB.

ENGR 103. Introduction to Nanotechnology Design. 3 Hours.
PR: ENGR 101 and (MATH 154 or MATH 155 with a C or better) or Consent. Continued development of engineering problem-solving, teamwork, and communication skills with emphasis on the fundamentals of nanotechnology design, using the computer as a tool, and algorithm development with a high-level language such as MATLAB.

ENGR 112. Professional Development in Engineering. 2 Hours.
Professional development and academic success strategies for first-year students enrolled in the Freshman Engineering summer bridge program - Academy of Engineering Success (AcES).

ENGR 129. Engineering Mathematics. 1 Hour.
PR: Consent. Review of key pre-calculus and early calculus concepts and topics for engineering students.

ENGR 140. Engineering in History. 3 Hours.
Impact of engineering on society throughout history. Developments in warfare, architecture, agriculture, manufacturing, communication, transportation, and their impacts on society.

ENGR 142. Engineering Seminar. 1 Hour.
Faculty, alumni, graduate students, and industry representatives will provide presentations on various engineering research, career, and experience topics. Students will reflect and discuss the presentations on instructor monitored discussion boards.

ENGR 143. Engineering Concepts. 3 Hours.
Course covers engineering approaches to problem solving, design process, understanding technical communication, estimation, international standards and units, manufacturing processes and intellectual property, useful to students pursuing a career related to the engineering profession. Introduces the engineering disciplines and areas of application.

ENGR 150. Academic Success Skills. 1 Hour.
The development of academic skills that are needed to be a successful engineering student.

ENGR 151. Introduction to Engineering Reasoning. 3 Hours.
PR or CONC: MATH 126. An introduction to skills of critical reasoning. Application of reasoning skills to engineering problem solving, research and experimentation in engineering, and to the engineering design process. The course emphasizes the importance of elements of thought, universal intellectual standards, and essential intellectual traits in reasoning.

ENGR 155. Spatial Visualization. 1 Hour.
Introductory course offered to engineering students to strengthen their spatial thinking skills. These 3D visualization skills are beneficial for future engineering classes. Topics Include: isometric drawing, orthographic projections, 3D object rotations, flat pattern developments, and surfaces and solids of revolution.

ENGR 191. First-Year Seminar. 1-3 Hours.
Engages students in active learning strategies that enable effective transition to college life at WVU. Students will explore school, college and university programs, policies and services relevant to academic success. Provides active learning activities that enable effective transition to the academic environment. Students examine school, college and university programs, policies and services.

ENGR 199. Orientation to Engineering. 1 Hour.
Orientation to degree programs and requirements, departmental resources, curriculum options, students' responsibilities, and opportunities. Development of academic success strategies and University experiences to equip students to make life decisions.
ENGR 210. Engineering Decision Making. 2 Hours.
PR: ENGR 143. Examines engineering ethics, critical reasoning, and problem solving. Applies these ideas to questions, challenges, and issues in a variety of areas, including engineering applications. Covers important and controversial decisions made previously in the engineering field, and the related impacts and consequences.

ENGR 230. Exploring Culture and Technology of Germany Study Abroad. 3 Hours.
PR: Consent. Expose students to engineering as a global profession including language, culture, customs, and history of Germany, especially relating to engineering, through travel to Germany to visit factories, museums and universities.

ENGR 280. Sophomore Nanoscience Seminar. 1 Hour.
PR: ENGR 103. Introduces students to the original nanoscale science and engineering literature, including research on social, ethical and economic issues, and develops skills in interdisciplinary team building.

ENGR 293. Special Topics. 1-6 Hours.
PR: Consent. Investigation of topics not covered in regularly scheduled courses.

ENGR 310. Energy Engineering. 3 Hours.
An introduction to the basic principles governing energy use, energy sources, and the impact of energy production on the environment. Examines the amount of energy used by society, fossil fuels and alternative energy sources, and methods of energy production.

ENGR 380. Junior Nanoscience Seminar 1. 1 Hour.
PR: ENGR 280. Familiarizes students with science and engineering that is being carried out in the laboratories at WVU, and helps students understand the importance of other disciplinary approaches to Nanoscale Science and Engineering.

ENGR 381. Junior Nanoscience Seminar 2. 1 Hour.
PR: ENGR 380. This course matches students with appropriate host laboratories in preparation for their senior research project. It fosters appreciation for the importance of the disciplinary fundamentals learned in the development of nanoscale science and engineering.

ENGR 383. Special Topics. 1-6 Hours.
PR: Consent. Investigation of topics not covered in regularly scheduled courses.

ENGR 450. Technology Entrepreneurship and Enterprise Development. 3 Hours.
PR: Senior level or consent. Introduction to concepts, methods, and strategies involved in starting a successful business that is based upon new technology, products, and services. The course assists in identifying opportunities for existing markets, understanding how investors look at technology companies, managing intellectual property, financial and legal issues, commercializing real technologies, and information required for preparing a business plan to guide the enterprise.

ENGR 463. Find an Engineering Job/Internship. 1 Hour.
Assist engineering or computer science students in finding an engineering job or internship. Topics covered are resume and cover letter writing, interviewing skills, looking for a job, and assessing job offers.

ENGR 470. Fluid Mechanics Videos 1. 1 Hour.
Videos and discussion illustrate phenomena such as turbulence, compressibility and surface tension. Supplements MAE 331 and MAE 335 and CE 321 and CE 322 and CE 522. Does not satisfy AE, CE or ME technical elective requirement.

ENGR 471. Fluid Mechanics Videos 2. 1 Hour.
Videos and discussion illustrate phenomena such as turbulence, compressibility and surface tension. Supplements MAE 331 and MAE 335 and CE 321, CE 322 and CE 522. Does not satisfy AE, CE, or ME technical elective requirement.

PR: Consent. Prearranged co-op experience in student's major. Involves placement in public or private enterprise, supervision, and evaluation for credit by faculty and employer.

ENGR 491. Professional Field Experience. 1-18 Hours.
PR: Consent. (May be repeated up to a maximum of 18 hours.) Prearranged experiential learning program, to be planned, supervised, and evaluated for credit by faculty and field supervisors. Involves temporary placement with public or private enterprise for professional competence development.

ENGR 493. Special Topics. 1-6 Hours.
PR: Consent. Investigation of topics not covered in regularly scheduled courses.

ENGR 494. Seminar. 1-3 Hours.
PR: Consent. Presentation and discussion of topics of mutual concern to students and faculty.

ENGR 495. Independent Study. 1-6 Hours.
Faculty supervised study of topics not available through regular course offerings.

ENGR 496. Senior Thesis. 1-3 Hours.
PR: Consent.

ENGR 497. Research. 1-6 Hours.
Independent research projects.
ENGR 498. Honors. 1-3 Hours.
PR: Students in Honors Program and consent by the honors director. Independent reading, study, or research.