Pre-Engineering Track - Columbia University

**Total Credits: 51**

Students interested in a career in engineering may major in pre-engineering at Yeshiva College or choose a related major, such as chemistry, physics, mathematics, or computer science. The pre-engineering requirements listed below are preparatory for advanced work in an engineering school. Students will have satisfied the requirements necessary for graduation with a pre-engineering major from Yeshiva College only upon successful completion of an engineering degree from an accredited engineering school. If you only fulfill the requirement's listed below, and do not complete the courses of your chosen engineering program, you will not get a bachelor's degree from Yeshiva University.

### REQUIRED COURSES, 51 CREDITS:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHE 1045R</td>
<td>General Chemistry 1</td>
<td>3</td>
</tr>
<tr>
<td>CHE 1046R</td>
<td>General Chemistry 2</td>
<td>3</td>
</tr>
<tr>
<td>CHE 1047L</td>
<td>General Chemistry Lab</td>
<td>2</td>
</tr>
<tr>
<td>MAT 1412</td>
<td>Calculus 1</td>
<td>4</td>
</tr>
<tr>
<td>MAT 1413</td>
<td>Calculus 2</td>
<td>4</td>
</tr>
<tr>
<td>MAT 1510</td>
<td>Multivariable Calculus</td>
<td>4</td>
</tr>
<tr>
<td>MAT 2105</td>
<td>Linear Algebra</td>
<td>3</td>
</tr>
<tr>
<td>MAT 2601</td>
<td>Differential Equations</td>
<td>3</td>
</tr>
<tr>
<td>PHY 1051R</td>
<td>General Physics 1 Lecture, Fall</td>
<td>4</td>
</tr>
<tr>
<td>PHY 1052R</td>
<td>General Physics 2 Lecture, Spring</td>
<td>4</td>
</tr>
<tr>
<td>PHY 1061L</td>
<td>General Physics 2 Lab, Spring</td>
<td>1</td>
</tr>
<tr>
<td>PHY 2051R</td>
<td>General Physics 3 Lecture, Fall</td>
<td>4</td>
</tr>
<tr>
<td>PHY 2061L</td>
<td>General Physics 3 Lab, Fall</td>
<td>1</td>
</tr>
<tr>
<td>PHY 2052R</td>
<td>General Physics 4 Lecture, Spring</td>
<td>4</td>
</tr>
<tr>
<td>COM 1300</td>
<td>Intro to Computer Science</td>
<td>4</td>
</tr>
<tr>
<td>ECO 1010</td>
<td>Principles of Economics</td>
<td>3</td>
</tr>
</tbody>
</table>

### RECOMMENDED COURSES

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHY 1120</td>
<td>Modern Physics</td>
<td>3</td>
</tr>
<tr>
<td>PHY 1621</td>
<td>Introduction to Quantum Mechanics</td>
<td>3</td>
</tr>
</tbody>
</table>

**Notes:**

- If you do not or cannot take calc – based physics (PHY 1321) than you must take Electromagnetism and classical mechanics (PHY 1221)
- Pre engineering students must also look at the Columbia requirements for their specific area of engineering.
Engineering Major Specific Courses, Depending Upon Chosen Field

1. Applied Math/ Applied Physics
   MAT 1412, MAT 1413, MAT 1510, MAT 2601
   PHY 2051, PHY 2052, PHY 1061L/2061L
   Choose one: CHE 1045 OR BIO 3038C OR both BIO 3207C and BIO 3521C

2. Biomedical Engineering
   MAT 1412, MAT 1413, MAT 1510, MAT 2105, MAT 2601
   PHY 2051, PHY 2052, PHY 1061L/2061L
   CHE 1045, CHE 1046R/CHE 1047L
   BIO 1011R/L, BIO 1012R/L
   COM/MAT 1504
   **Electrical Engineering (ELEN E1201 may be taken summer before entering or while at Columbia)

3. Chemical Engineering
   MAT 1412, MAT 1413, MAT 1510, MAT 2105, MAT 2601, COM/MAT 1504
   PHY 1061L/2061L
   CHE 1046R/1047L, CHE 1213R, CHE 1215L

4. Civil Engineering
   MAT 1412, MAT 1413, MAT 1510, MAT 2105, MAT 2601
   PHY 1221, PHY 1222
   COM 1300
   **Geology Course (consult with Pre-Engineering Advisor as to how/when to take this)

5. Computer Engineering
   MAT 1412, MAT 1413, MAT 1510, MAT 2105, MAT 2601, MAT/COM 1504
   COM 1300, COM 1320
   **Electrical Engineering (ELEN E1201 may be taken summer before entering or while at Columbia)

6. Computer Science
   MAT 1412, COM 100, COM 1320, COM/MAT 1504

7. Earth and Environmental Engineering
   MAT 1412, MAT 1413, MAT 1510, MAT 2105, MAT 2601, MAT 2461, MAT 2462
   CHE 1045, CHE 1046R/CHE 1047L
   Choose one: CHE 1213R and CHE 1215L, OR PHY 2051 and PHY 2052R
   BIO 3207C, BIO 3521C
   **Earth and Environmental Sciences (EESC UN2100 or EESC UN2200, and EAEE E2100), may be taken while at Columbia

8. Electrical Engineering
   MAT 1412, MAT 1413, MAT 1510, MAT 2105, MAT 2601
   PHY 2051, PHY 2052, PHY 1061L/2061L
   COM 1300
   **Electrical Engineering (ELEN E1201 may be taken summer before entering or while at Columbia)

   MAT 1412, MAT 1413, MAT 1510, MAT 2105, MAT 2601
   PHY 1221, PHY 1222

Updated: 9.9.2019
10. Industrial Engineering, Engineering Management Systems, or Operations Research
   MAT 1412, MAT 1413, MAT 1510, MAT 2105, MAT 2461, MAT 2462
   COM 1300, COM 1320, COM 1504/MAT 1504
   ACC 1001, ACC 1002

11. Materials Science and Engineering
   MAT 1412, MAT 1413, MAT 1510, MAT 2601
   PHY 2051, PHY 2052, PHY 1061L/ 2061L
   CHE 1045, CHE 1046R/ CHE 1047L

12. Mechanical Engineering
   MAT 1412, MAT 1413, MAT 1510, MAT 2105, MAT 2601
   Choose one: PHY 2051 and PHY 2052 OR BIO 3038C OR both BIO 3521C BIO and 3207C
   PHY 1221, PHY 1222
   ** Electrical Engineering (ELEN E1201 may be taken summer before entering or while at
   Columbia)

** There is no current YC course that meets this requirement. Students should meet with the
Pre-Engineering Advisor to obtain direction from Columbia as to how and when these
courses should be taken