DUAL DEGREE PROGRAM COLUMBIA UNIVERSITY
2014-15 CURRICULUM GUIDE
FOR WESLEYAN UNIVERSITY STUDENTS
(September 4, 2014)

The following tables list the courses that Columbia University requires for acceptance into the Dual Degree or Combined Plan program. On the left half of the tables, Columbia’s courses with number and (short) title are listed and on the right half their Wesleyan equivalents. When no equivalent Wesleyan course exists, the entry NA is shown.

Part I enumerates the foundation courses that have to be taken by all students. Part II lists the additional courses and requirements for each engineering major.

Note 1: It is possible that certain Wesleyan courses are not offered every year.

Note 2: In any given semester, Introduction to Programming (COMP 112) may be taught in a language different then C or JAVA.

Note 3: If a course is not available at Wesleyan, it is the student’s responsibility to find alternative solutions such as arranging graded tutorials at Wesleyan or taking summer courses.

Note 4: In general, all courses required for the Dual Degree program need to be taken letter graded (and not pass/fail).

Note 5: Only if all conditions stipulated by Columbia University on their Combined Plan website are satisfied is acceptance into the program guaranteed. In any other case, it is at the discretion of Columbia to accept students.
### I. FOUNDATION COURSES REQUIRED OF ALL MAJORS:

<table>
<thead>
<tr>
<th>Mathematics</th>
<th>Columbia</th>
<th>Wesleyan</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH V1101</td>
<td>Calculus I</td>
<td>MATH 121</td>
</tr>
<tr>
<td>MATH V1102</td>
<td>Calculus II</td>
<td>MATH 122</td>
</tr>
<tr>
<td>MATH V1201</td>
<td>Calculus III</td>
<td>MATH 221</td>
</tr>
<tr>
<td></td>
<td></td>
<td>or MATH 223</td>
</tr>
<tr>
<td>MATH V1202</td>
<td>Calculus IV</td>
<td>MATH 222</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Multivariable Calculus</td>
</tr>
<tr>
<td>Physics</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PHYS C1401</td>
<td>Introduction to Mechanics and Thermodynamics</td>
<td>PHYS 113</td>
</tr>
<tr>
<td></td>
<td></td>
<td>General Physics I</td>
</tr>
<tr>
<td>PHYS C1402</td>
<td>Introduction to Electricity, Magnetism, and Optics</td>
<td>PHYS 116</td>
</tr>
<tr>
<td></td>
<td></td>
<td>General Physics II</td>
</tr>
<tr>
<td>Chemistry</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CHEM C1403</td>
<td>General Chemistry</td>
<td>CHEM 141</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Introductory Chemistry I</td>
</tr>
<tr>
<td>Lab Requirement</td>
<td></td>
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</tr>
<tr>
<td></td>
<td>Either one-semester physics lab or one-semester chemistry lab is generally required. Please see individual programs below for more details</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Computer Science</td>
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</tr>
<tr>
<td></td>
<td>Some majors require a specific programming language (see requirements for majors below).</td>
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<tr>
<td></td>
<td></td>
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</tr>
<tr>
<td>COMS W1003</td>
<td>Introduction to Computer Science and Programming in C</td>
<td>COMP 112</td>
</tr>
<tr>
<td>or COMS W1004</td>
<td>ditto in Java</td>
<td></td>
</tr>
<tr>
<td>or COMS W1005</td>
<td>ditto in Matlab</td>
<td></td>
</tr>
<tr>
<td>or COMS W1007</td>
<td>Object-Oriented Programming and Design in Java</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Introduction to Programming</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Note that in any given semester, COMP 112 may be taught in a language different than JAVA or C.</td>
</tr>
<tr>
<td>Humanities and Social Sciences</td>
<td>In addition to the following two courses, nine (9) full credit courses in the Humanities and Arts and/or Social and Behavioral Sciences are required.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ECON W1105</td>
<td>Principles of Economics</td>
<td>ECON 101</td>
</tr>
<tr>
<td>or ECON 110</td>
<td></td>
<td>or ECON 110</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Introduction to Economics</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Introduction to Economic Theory</td>
</tr>
<tr>
<td>ENGL C1010</td>
<td>University Writing</td>
<td>ENGL 130</td>
</tr>
<tr>
<td>or ENGL 292</td>
<td></td>
<td>or ENGL 132</td>
</tr>
<tr>
<td>or other writing intensive courses</td>
<td>The English Essay Writing Medicine and the Doctor-Writer Techniques of Nonfiction</td>
<td></td>
</tr>
</tbody>
</table>
### REQUIRED FOR MAJORS IN:

**APPLIED MATHEMATICS AND PHYSICS**

<table>
<thead>
<tr>
<th>Columbia</th>
<th>Wesleyan</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Mathematics</strong></td>
<td><strong>Physics</strong></td>
</tr>
<tr>
<td>MATH E1210</td>
<td>Ordinary Differential Equations</td>
</tr>
<tr>
<td><strong>PHYS C1403</strong></td>
<td>Classical and Quantum Waves</td>
</tr>
<tr>
<td>PHYS C1493 &amp; 4</td>
<td>Introduction to Experimental Physics</td>
</tr>
</tbody>
</table>

**Chemistry / Biology**

*(Choose one course listed below. Chemistry/Biology labs not required.)*

<table>
<thead>
<tr>
<th>CHEM C1403</th>
<th>General Chemistry I</th>
<th>CHEM 141</th>
<th>Introductory Chemistry I</th>
</tr>
</thead>
<tbody>
<tr>
<td>EEEB W2001</td>
<td>Environmental Biology I: Molecules to Cells</td>
<td>BIOL 181</td>
<td>Principles of Biology I: Cell Biology and Molecular Basis of Heredity</td>
</tr>
<tr>
<td>BIOL C2005</td>
<td>Introduction to Molecular and Cellular Biology</td>
<td>BIOL 181</td>
<td>Principles of Biology I: Cell Biology and Molecular Basis of Heredity</td>
</tr>
<tr>
<td>Mathematics</td>
<td>Columbia</td>
<td>Wesleyan</td>
<td></td>
</tr>
<tr>
<td>----------------------------------------------</td>
<td>--------------------------------------------------------------------------</td>
<td>-----------------------</td>
<td></td>
</tr>
<tr>
<td>APMA E2101</td>
<td>Introduction to Applied Mathematics – Ordinary Differential Equations &amp; Linear Algebra \ <em>(Students who take an ODE course must also take a Linear Algebra course.)</em></td>
<td>MATH 229</td>
<td>Differential Equations</td>
</tr>
<tr>
<td>STAT W1211</td>
<td>Introduction to Statistics (with Calculus) \ <em>(be taken the summer before entering or while at Columbia)</em></td>
<td>NA</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Physics</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>PHYS C1403</td>
<td>Classical and Quantum Waves</td>
<td>PHYS 213</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Chemistry</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM C1404</td>
<td>General Chemistry II</td>
<td>CHEM 142</td>
</tr>
<tr>
<td>CHEM C1500</td>
<td>General Chemistry Lab</td>
<td>CHEM 152</td>
</tr>
<tr>
<td>CHEM C3443</td>
<td>Organic Chemistry I</td>
<td>CHEM 251</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Electrical Engineering &amp; Engineering Mechanics</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>ELEN E1201</td>
<td>Introduction to Electrical Engineering</td>
<td>NA</td>
</tr>
<tr>
<td>ENME E3105</td>
<td>Mechanics</td>
<td>NA</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Computer Science</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Introduction to Computer Science and Programming in MATLAB (COMS W1005) preferred</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mathematics (choose one course listed below)</td>
<td>Columbia</td>
<td>Wesleyan</td>
</tr>
<tr>
<td>---------------------------------------------</td>
<td>----------</td>
<td>----------</td>
</tr>
<tr>
<td>MATH E1210 Ordinary Differential Equations</td>
<td>MATH 229 Differential Equations</td>
<td></td>
</tr>
<tr>
<td>APMA E2101 Introduction to Applied Mathematics – Ordinary Differential Equations &amp; Linear Algebra (Students who take an ODE course must also take a Linear Algebra course.)</td>
<td>MATH 229 Differential Equations</td>
<td></td>
</tr>
<tr>
<td>Physics</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PHYS C1493 &amp; 4 Physics Lab</td>
<td>PHYS 123 &amp; 4 General Physics Laboratory</td>
<td></td>
</tr>
<tr>
<td>Chemistry</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CHEM C1404 General Chemistry II</td>
<td>CHEM 142 Introductory Chemistry II</td>
<td></td>
</tr>
<tr>
<td>CHEM C1500 General Chemistry Lab</td>
<td>CHEM 152 Introductory Chemistry Laboratory</td>
<td></td>
</tr>
<tr>
<td>CHEM C3443 Organic Chemistry I</td>
<td>CHEM 251 Principles of Organic Chemistry I</td>
<td></td>
</tr>
<tr>
<td>CHEM C3543 Organic Chemistry Lab</td>
<td>CHEM 257 General Chemistry Laboratory</td>
<td></td>
</tr>
<tr>
<td>Mathematics</td>
<td></td>
<td></td>
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<tr>
<td>-------------</td>
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</tr>
<tr>
<td>APMA E2101</td>
<td>Introduction to Applied Mathematics – Ordinary Differential Equations &amp; Linear Algebra (<em>Students who take an ODE course must also take a Linear Algebra course.</em>)</td>
<td>MATH 229</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Physics / Chemistry Lab <em>(choose one course listed below)</em></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>PHYS C1493</td>
<td>Physics Lab I</td>
<td>PHYS 123</td>
<td>General Physics Laboratory I</td>
</tr>
<tr>
<td>or PHYS C1494</td>
<td>Physics Lab II</td>
<td>or PHYS 124</td>
<td>General Physics Laboratory II</td>
</tr>
<tr>
<td>or CHEM C1500</td>
<td>General Chemistry Lab</td>
<td>or CHEM 152</td>
<td>Introductory Chemistry Laboratory</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Engineering Mechanics <em>(may be taken the summer before entering or while at Columbia)</em></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>ENME E3105</td>
<td>Mechanics</td>
<td>NA</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Computer Science</th>
<th></th>
</tr>
</thead>
</table>

*Introduction to Computer Science and Programming in MATLAB (COMS W1005) preferred*
## COMPUTER ENGINEERING

### Mathematics

<table>
<thead>
<tr>
<th>Columbia</th>
<th>Wesleyan</th>
</tr>
</thead>
</table>
| APMA E2101 | Introduction to Applied Mathematics – Ordinary Differential Equations & Linear Algebra  
(Student who take an ODE course must also take a Linear Algebra course.) | MATH 229 | Differential Equations |

### Physics / Chemistry Lab (choose one course listed below)

<table>
<thead>
<tr>
<th>Columbia</th>
<th>Wesleyan</th>
</tr>
</thead>
</table>
| PHYS C1493 or PHYS C1494 or CHEM C1500 | Physics Lab I  
Physics Lab II  
General Chemistry Lab | PHYS 123 or PHYS 124 or CHEM 152 | General Physics Laboratory I  
General Physics Laboratory II  
Introductory Chemistry Laboratory |

### Computer Science

<table>
<thead>
<tr>
<th>Columbia</th>
<th>Wesleyan</th>
</tr>
</thead>
<tbody>
<tr>
<td>COMS W3203</td>
<td>Discrete Mathematics</td>
</tr>
</tbody>
</table>

*Computer Programming in JAVA is required.*

### Electrical Engineering (may be taken the summer before entering or while at Columbia)

<table>
<thead>
<tr>
<th>Columbia</th>
<th>Wesleyan</th>
</tr>
</thead>
<tbody>
<tr>
<td>ELEN E1201</td>
<td>Introduction to Electrical Engineering</td>
</tr>
</tbody>
</table>
## COMPUTER SCIENCE

<table>
<thead>
<tr>
<th>Columbia</th>
<th>Wesleyan</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Physics / Chemistry Lab</strong> <em>(choose one course listed below)</em></td>
<td></td>
</tr>
<tr>
<td>PHYS C1493 or PHYS C1494 or CHEM C1500</td>
<td>PHYS C1493 or PHYS C1494 or CHEM C1500</td>
</tr>
<tr>
<td>Physics Lab I</td>
<td>Physics Lab II</td>
</tr>
<tr>
<td><strong>Computer Science</strong></td>
<td></td>
</tr>
<tr>
<td>COMS W3137</td>
<td>Data Structures and Algorithms</td>
</tr>
<tr>
<td>COMS W3203</td>
<td>Discrete Mathematics</td>
</tr>
<tr>
<td>COMS W3210</td>
<td>Scientific Computation</td>
</tr>
</tbody>
</table>

**Note:** The Wesleyan course COMP 212 is the second course in a two-course sequence (COMP 211-212). Because of the non-programming topics that are addressed in COMP 211, permission to take COMP 212 without having taken COMP 211 will be decided on a case-by-case basis by the instructor. COMP 112 is not typically acceptable as a prerequisite for this course.
# EARTH AND ENVIRONMENTAL ENGINEERING

<table>
<thead>
<tr>
<th>Columbia</th>
<th>Wesleyan</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Mathematics</strong></td>
<td></td>
</tr>
<tr>
<td>APMA E2101</td>
<td>Introduction to Applied Mathematics – Ordinary Differential Equations &amp; Linear Algebra <em>(Students who take an ODE course must also take a Linear Algebra course.)</em></td>
</tr>
<tr>
<td><strong>Chemistry</strong></td>
<td></td>
</tr>
<tr>
<td>CHEM C1404</td>
<td>General Chemistry II</td>
</tr>
<tr>
<td>CHEM C1500</td>
<td>General Chemistry Lab</td>
</tr>
<tr>
<td><strong>Other Science Electives Chemistry (choose one course listed below)</strong></td>
<td></td>
</tr>
<tr>
<td>CHEM C3443</td>
<td>Organic Chemistry I</td>
</tr>
<tr>
<td>PHYS C1403</td>
<td>Classical and Quantum Waves</td>
</tr>
<tr>
<td>BIOL C2005</td>
<td>Introduction to Molecular and Cellular Biology</td>
</tr>
<tr>
<td><strong>Earth and Environmental Sciences (choose one course listed below; may be taken while at Columbia)</strong></td>
<td></td>
</tr>
<tr>
<td>EESC W4001</td>
<td>Advanced General Geology</td>
</tr>
<tr>
<td>EESC V2100</td>
<td>The Climate System</td>
</tr>
<tr>
<td>EESC V2200</td>
<td>The Solid Earth System</td>
</tr>
<tr>
<td><strong>Earth and Environmental Engineering (may be taken while at Columbia)</strong></td>
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</tr>
<tr>
<td>EAEE E2002</td>
<td>Alternative Energy Resources</td>
</tr>
</tbody>
</table>
### ELECTRICAL ENGINEERING

<table>
<thead>
<tr>
<th>Columbia</th>
<th>Wesleyan</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Mathematics</strong></td>
<td></td>
</tr>
<tr>
<td>APMA E2101 Introduction to Applied Mathematics – Ordinary Differential</td>
<td>MATH 229 Differential Equations</td>
</tr>
<tr>
<td>Equations &amp; Linear Algebra (Students who take an ODE course must also</td>
<td></td>
</tr>
<tr>
<td>take a Linear Algebra course.)</td>
<td></td>
</tr>
<tr>
<td><strong>Physics</strong></td>
<td></td>
</tr>
<tr>
<td>PHYS C1403 Classical and Quantum Waves</td>
<td>PHYS 213 Waves &amp; Oscillations</td>
</tr>
<tr>
<td>PHYS C1493 &amp; 4 Introduction to Experimental Physics</td>
<td>PHYS 123 &amp; 124 General Physics Laboratory</td>
</tr>
<tr>
<td><strong>Computer Science</strong></td>
<td></td>
</tr>
<tr>
<td><em>Computer Programming in JAVA (W1107) is recommended</em></td>
<td></td>
</tr>
<tr>
<td>**Electrical Engineering (may be taken the summer before entering or</td>
<td></td>
</tr>
<tr>
<td>while at Columbia)*</td>
<td></td>
</tr>
<tr>
<td>ELEN E1201 Introduction to Electrical Engineering</td>
<td>NA</td>
</tr>
</tbody>
</table>
# IEOR: ENGINEERING MANAGEMENT SYSTEMS

## Mathematics (choose one course listed below)

<table>
<thead>
<tr>
<th>Course</th>
<th>Columbia</th>
<th>Wesleyan</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH V2010</td>
<td>Linear Algebra</td>
<td>MATH 223</td>
</tr>
<tr>
<td>APAM E3101</td>
<td>Linear Algebra</td>
<td>MATH 221</td>
</tr>
</tbody>
</table>

## Physics / Chemistry Lab (choose one course listed below)

<table>
<thead>
<tr>
<th>Course</th>
<th>Columbia</th>
<th>Wesleyan</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHYS C1493</td>
<td>Physics Lab I</td>
<td>PHYS 123</td>
</tr>
<tr>
<td>or PHYS C1494</td>
<td>Physics Lab II</td>
<td>or PHYS 124</td>
</tr>
<tr>
<td>or CHEM C1500</td>
<td>General Chemistry Lab</td>
<td>or CHEM 152</td>
</tr>
<tr>
<td></td>
<td>General Physics Laboratory I</td>
<td></td>
</tr>
<tr>
<td></td>
<td>General Physics Laboratory II</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Introductory Chemistry Laboratory</td>
<td></td>
</tr>
</tbody>
</table>

## Computer Science (choose one set of courses listed below)

<table>
<thead>
<tr>
<th>Course</th>
<th>Columbia</th>
<th>Wesleyan</th>
</tr>
</thead>
<tbody>
<tr>
<td>COMS W1003</td>
<td>Introduction To Computer Science and Programming In C</td>
<td>COMP 112 Introduction to Programming</td>
</tr>
<tr>
<td>COMS W3133</td>
<td>Data Structures In C</td>
<td>COMP 212</td>
</tr>
</tbody>
</table>

or:

<table>
<thead>
<tr>
<th>Course</th>
<th>Columbia</th>
<th>Wesleyan</th>
</tr>
</thead>
<tbody>
<tr>
<td>COMS W1007</td>
<td>Introduction To Computer Science and Programming In JAVA</td>
<td>COMP 112 Introduction to Programming</td>
</tr>
<tr>
<td>COMS W3134</td>
<td>Data Structures In JAVA</td>
<td>COMP 212</td>
</tr>
</tbody>
</table>

*The Department strongly recommends JAVA over C.*

## Economics

<table>
<thead>
<tr>
<th>Course</th>
<th>Columbia</th>
<th>Wesleyan</th>
</tr>
</thead>
<tbody>
<tr>
<td>ECON E2261</td>
<td>Introduction to Accounting and Finance</td>
<td>ECON 127 Introduction to Financial Accounting</td>
</tr>
</tbody>
</table>

## Probability and Statistics

*Please note that the course must have calculus as a pre-requisite. The Department strongly suggests taking two separate courses: one in Probability and one in Statistics.*

<table>
<thead>
<tr>
<th>Course</th>
<th>Columbia</th>
<th>Wesleyan</th>
</tr>
</thead>
<tbody>
<tr>
<td>W3600</td>
<td>Introduction to Probability and Statistics</td>
<td>ECON 300 Quantitative Methods in Economics</td>
</tr>
</tbody>
</table>
IEOR: FINANCIAL ENGINEERING

**Note:** Students can apply to Financial Engineering only after one semester of study at Columbia. Students interested in this concentration of Operations Research must adhere to the following pre-requisite requirements:

<table>
<thead>
<tr>
<th>Columbia</th>
<th>Wesleyan</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Mathematics</strong></td>
<td></td>
</tr>
<tr>
<td>MATH V2010 or APAM E3101 Linear Algebra</td>
<td>MATH 223 or MATH 221 Linear Algebra or Vectors and Matrices</td>
</tr>
<tr>
<td>MATH E1210 Ordinary Differential Equations</td>
<td>MATH 229 Differential Equations</td>
</tr>
<tr>
<td><strong>Physics / Chemistry Lab (choose one course listed below)</strong></td>
<td></td>
</tr>
<tr>
<td>PHYS C1493 or PHYS C1494 or CHEM C1500 Physics Lab I or II</td>
<td>PHYS 123 or PHYS 124 or CHEM 152 General Physics Laboratory I or II Introductory Chemistry Laboratory</td>
</tr>
<tr>
<td><strong>Computer Science (choose one set of courses listed below)</strong></td>
<td></td>
</tr>
<tr>
<td>COMS W1003 Introduction To Computer Science and Programming In C</td>
<td>COMP 112 Introduction to Programming</td>
</tr>
<tr>
<td>COMS W3133 Data Structures In C</td>
<td>COMP 212 Data Structures (see note on page 8)</td>
</tr>
<tr>
<td>or:</td>
<td></td>
</tr>
<tr>
<td>COMS W1007 Introduction To Computer Science and Programming In JAVA</td>
<td>COMP 112 Introduction to Programming</td>
</tr>
<tr>
<td>COMS W3134 Data Structures In JAVA</td>
<td>COMP 212 Data Structures</td>
</tr>
</tbody>
</table>

The Department strongly recommends JAVA over C.

**Economics**

<table>
<thead>
<tr>
<th>Columbia</th>
<th>Wesleyan</th>
</tr>
</thead>
<tbody>
<tr>
<td>ECON E2261 Introduction to Accounting and Finance</td>
<td>ECON 127 Introduction to Financial Accounting</td>
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</table>

**Probability and Statistics**

Please note that the course must have calculus as a pre-requisite.

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<tr>
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<tbody>
<tr>
<td>W3658 Probability</td>
<td>ECON 300 Quantitative Methods in Economics</td>
</tr>
<tr>
<td>W3659 Statistical Inference</td>
<td>NA</td>
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</table>
### IEOR: INDUSTRIAL ENGINEERING

<table>
<thead>
<tr>
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<tbody>
<tr>
<td><strong>Mathematics</strong> <em>(choose one course listed below)</em></td>
<td></td>
</tr>
<tr>
<td>MATH V2010</td>
<td>Linear Algebra</td>
</tr>
<tr>
<td>APAM E3101</td>
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<tr>
<td><strong>Physics / Chemistry Lab</strong> <em>(choose one course listed below)</em></td>
<td></td>
</tr>
<tr>
<td>PHYS C1493 or PHYS C1494 or CHEM C1500</td>
<td>Physics Lab I or Physics Lab II or General Chemistry Lab</td>
</tr>
<tr>
<td><strong>Computer Science</strong> <em>(choose one set of courses listed below)</em></td>
<td></td>
</tr>
<tr>
<td>COMS W1003</td>
<td>Introduction To Computer Science and Programming In C</td>
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<tr>
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<td>Data Structures In C</td>
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<tr>
<td><strong>or:</strong></td>
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</tr>
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<td>COMS W1007</td>
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| **Economics** | |
| ECON E2261 | Introduction to Accounting and Finance | ECON 127 | Introduction to Financial Accounting |

| **Probability and Statistics** | |
| W3600 | Introduction to Probability and Statistics | ECON 300 | Quantitative Methods in Economics |

*Please note that the course must have calculus as a pre-requisite. The Department strongly suggests taking two separate courses: one in Probability and one in Statistics.*
## IEOR: OPERATIONS RESEARCH

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*Please note that the course must have calculus as a pre-requisite. The Department strongly suggests taking two separate courses: one in Probability and one in Statistics.*

| W3600 | Introduction to Probability and Statistics | ECON 300 | Quantitative Methods in Economics |
## ENGINEERING MECHANICS

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<tbody>
<tr>
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<tr>
<td>MATH E1210</td>
<td>Ordinary Differential Equations</td>
</tr>
<tr>
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<tr>
<td>PHYS C1493 or PHYS C1494 or CHEM C1500</td>
<td>Physics Lab I or Physics Lab II or General Chemistry Lab</td>
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<tr>
<td><strong>Engineering Mechanics (may be taken the summer before entering or while at Columbia)</strong></td>
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<tr>
<td>ENME E3105</td>
<td>Mechanics</td>
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</tbody>
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### MATERIALS SCIENCE AND ENGINEERING

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</tr>
<tr>
<td>PHYS C1403</td>
<td>Classical and Quantum Waves</td>
</tr>
<tr>
<td>PHYS C1493 &amp; 4</td>
<td>Physics Lab</td>
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<tr>
<td><strong>Chemistry</strong></td>
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<tr>
<td>CHEM C1404</td>
<td>General Chemistry II</td>
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<td>CHEM C1500</td>
<td>General Chemistry Lab</td>
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## MECHANICAL ENGINEERING

### Columbia

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<tbody>
<tr>
<td>APMA E2101</td>
<td>Introduction to Applied Mathematics – Ordinary Differential Equations &amp; Linear Algebra <em>(Students who take an ODE course must also take a Linear Algebra course.)</em></td>
</tr>
</tbody>
</table>

### Physics / Biology
*(Choose one course listed below. Chemistry/Biology labs not required.)*

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<thead>
<tr>
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<tbody>
<tr>
<td>PHYS C1403</td>
<td>Classical and Quantum Waves</td>
</tr>
<tr>
<td>EEEB W2001</td>
<td>Environmental Biology I: Molecules to Cells</td>
</tr>
<tr>
<td>BIOL C2005</td>
<td>Introduction to Molecular and Cellular Biology</td>
</tr>
</tbody>
</table>

### Physics / Chemistry Lab *(choose one course listed below)*

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<td>Physics Lab I or Physics Lab II or General Chemistry Lab</td>
</tr>
<tr>
<td>PHYS 123 or PHYS 124 or CHEM 152</td>
<td>General Physics Laboratory I or General Physics Laboratory II or Introductory Chemistry Laboratory</td>
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### Electrical Engineering / Engineering Mechanics
*(may be taken the summer before entering or while at Columbia)*

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<th>Course</th>
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<tr>
<td>ELEN E1201 or equivalent</td>
<td>Introduction to Electrical Engineering</td>
</tr>
<tr>
<td>ENME E3105</td>
<td>Mechanics</td>
</tr>
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