MAJOR IN PHYSICS, PHYSICS CONCENTRATION

The Physics concentration provides a broad background in physics that serves as a base for later specialization, either in graduate school or on the job. It is designed for those seeking greater insight into physics and an introduction to more advanced topics and methods. Students who obtain a degree in Physics with the Physics concentration are prepared for a career in industry or government, or for advanced study at the graduate level.

Requirements
Effective Fall 2018
Each course used to meet requirements of the concentration need a minimum grade of C-, including courses to satisfy AUCC Categories 1, 2, and 3A.

### Freshman

<table>
<thead>
<tr>
<th>Course</th>
<th>Description</th>
<th>AUCC</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CO 150</td>
<td>College Composition (GT-CO2)</td>
<td>1A</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Select one group from the following:</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Group A:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CS 155</td>
<td>Introduction to Unix</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CS 156</td>
<td>Introduction to C Programming I</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CS 157</td>
<td>Introduction to C Programming II</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Group B:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CS 163 or 164</td>
<td>CS1—No Prior Programming Experience</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>CS1—Prior Programming Experience</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MATH 160</td>
<td>Calculus for Physical Scientists I (GT-MA1)</td>
<td>1B</td>
<td>4</td>
</tr>
<tr>
<td>MATH 161</td>
<td>Calculus for Physical Scientists II (GT-MA1)</td>
<td>1B</td>
<td>4</td>
</tr>
<tr>
<td>PH 141</td>
<td>Physics for Scientists and Engineers I (GT-SC1)</td>
<td>3A</td>
<td>5</td>
</tr>
<tr>
<td>PH 142</td>
<td>Physics for Scientists and Engineers II (GT-SC1)</td>
<td>3A</td>
<td>5</td>
</tr>
<tr>
<td>Arts and Humanities</td>
<td></td>
<td>3B</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>Total Credits</td>
<td></td>
<td>30-31</td>
</tr>
</tbody>
</table>

### Sophomore

<table>
<thead>
<tr>
<th>Course</th>
<th>Description</th>
<th>AUCC</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 111</td>
<td>General Chemistry I (GT-SC2)</td>
<td>3A</td>
<td>4</td>
</tr>
<tr>
<td>CHEM 112</td>
<td>General Chemistry Lab I (GT-SC1)</td>
<td>3A</td>
<td>1</td>
</tr>
<tr>
<td>MATH 261</td>
<td>Calculus for Physical Scientists III</td>
<td></td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>Select one from the following:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MATH 340</td>
<td>Introduction to Ordinary Differential Equations</td>
<td></td>
<td>4</td>
</tr>
<tr>
<td>MATH 345</td>
<td>Differential Equations</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PH 245</td>
<td>Introduction to Electronics</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>PH 293</td>
<td>Selected Topics in Physics</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>PH 314</td>
<td>Introduction to Modern Physics</td>
<td></td>
<td>4</td>
</tr>
<tr>
<td>PH 315</td>
<td>Modern Physics Laboratory</td>
<td></td>
<td>2</td>
</tr>
<tr>
<td>Historical Perspectives</td>
<td></td>
<td>3D</td>
<td>3</td>
</tr>
<tr>
<td>Social and Behavioral Sciences</td>
<td></td>
<td>3C</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Total Credits</td>
<td></td>
<td>29</td>
</tr>
</tbody>
</table>

### Junior

<table>
<thead>
<tr>
<th>Course</th>
<th>Description</th>
<th>AUCC</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Select one from the following:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CHEM 301</td>
<td>Advanced Scientific Writing–Chemistry (GT-CO3)</td>
<td></td>
<td>2</td>
</tr>
<tr>
<td>CO 300</td>
<td>Writing Arguments (GT-CO3)</td>
<td></td>
<td>2</td>
</tr>
<tr>
<td>CO 301B</td>
<td>Writing in the Disciplines: Sciences (GT-CO3)</td>
<td></td>
<td>2</td>
</tr>
<tr>
<td>LB 300</td>
<td>Specialized Professional Writing</td>
<td></td>
<td>2</td>
</tr>
<tr>
<td>PH 341</td>
<td>Mechanics</td>
<td></td>
<td>4</td>
</tr>
<tr>
<td>PH 351</td>
<td>Electricity and Magnetism</td>
<td></td>
<td>4</td>
</tr>
<tr>
<td>PH 353</td>
<td>Optics and Waves</td>
<td></td>
<td>4</td>
</tr>
<tr>
<td>PH 361</td>
<td>Physical Thermodynamics</td>
<td></td>
<td>3</td>
</tr>
</tbody>
</table>
Select one group from the following:

**Group A:**
- PH 327 Analytical Techniques for Physics

**Electives**

**Group B:**
- Mathematics and Statistics List (select a minimum of 6 credits)
  - Electives

**Global and Cultural Awareness**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>3E</td>
<td></td>
<td>3</td>
</tr>
</tbody>
</table>

**Total Credits**

<table>
<thead>
<tr>
<th>Senior</th>
</tr>
</thead>
<tbody>
<tr>
<td>PH 425</td>
</tr>
<tr>
<td>PH 451</td>
</tr>
<tr>
<td>PH 452</td>
</tr>
<tr>
<td>PH 462</td>
</tr>
<tr>
<td>PH 492</td>
</tr>
</tbody>
</table>

**Technical Course List (select at least two courses from the list below)**

<table>
<thead>
<tr>
<th>Electives</th>
<th>6</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>12-13</td>
</tr>
</tbody>
</table>

**Total Credits**

<table>
<thead>
<tr>
<th>Program Total Credits:</th>
</tr>
</thead>
<tbody>
<tr>
<td>120</td>
</tr>
</tbody>
</table>

### Mathematics and Statistics List (select a minimum of 6 credits not taken elsewhere in the program)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 317</td>
<td>Advanced Calculus of One Variable</td>
<td>3</td>
</tr>
<tr>
<td>MATH 332</td>
<td>Partial Differential Equations</td>
<td>3</td>
</tr>
<tr>
<td>MATH 366</td>
<td>Introduction to Abstract Algebra</td>
<td>3</td>
</tr>
<tr>
<td>MATH 369</td>
<td>Linear Algebra I</td>
<td>3</td>
</tr>
<tr>
<td>MATH 419</td>
<td>Introduction to Complex Variables</td>
<td>3</td>
</tr>
<tr>
<td>MATH 430</td>
<td>Fourier and Wavelet Analysis with Apps</td>
<td>3</td>
</tr>
<tr>
<td>MATH 466</td>
<td>Abstract Algebra I</td>
<td>3</td>
</tr>
<tr>
<td>MATH 467</td>
<td>Abstract Algebra II</td>
<td>3</td>
</tr>
<tr>
<td>MATH 469</td>
<td>Linear Algebra II</td>
<td>3</td>
</tr>
<tr>
<td>MATH 472</td>
<td>Introduction to Topology</td>
<td>3</td>
</tr>
<tr>
<td>MATH 474</td>
<td>Introduction to Differential Geometry</td>
<td>3</td>
</tr>
<tr>
<td>PH 571</td>
<td>Mathematical Methods for Physics I</td>
<td>3</td>
</tr>
<tr>
<td>PH 572</td>
<td>Mathematical Methods for Physics II</td>
<td>3</td>
</tr>
<tr>
<td>STAT 315</td>
<td>Statistics for Engineers and Scientists</td>
<td>3</td>
</tr>
<tr>
<td>STAT 340</td>
<td>Multiple Regression Analysis</td>
<td>3</td>
</tr>
<tr>
<td>STAT 420</td>
<td>Probability and Mathematical Statistics I</td>
<td>3</td>
</tr>
<tr>
<td>STAT 421</td>
<td>Introduction to Stochastic Processes</td>
<td>3</td>
</tr>
<tr>
<td>STAT 430</td>
<td>Probability and Mathematical Statistics II</td>
<td>3</td>
</tr>
<tr>
<td>STAT 460</td>
<td>Applied Multivariate Analysis</td>
<td>3</td>
</tr>
</tbody>
</table>

### Technical Course List (select a minimum of 6 credits from a minimum of 2 courses not taken elsewhere in the program)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 114</td>
<td>General Chemistry Lab II</td>
<td>1</td>
</tr>
<tr>
<td>CHEM 245</td>
<td>Fundamentals of Organic Chemistry</td>
<td>4</td>
</tr>
<tr>
<td>CHEM 341</td>
<td>Modern Organic Chemistry I</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 343</td>
<td>Modern Organic Chemistry II</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 345</td>
<td>Organic Chemistry I</td>
<td>4</td>
</tr>
<tr>
<td>CHEM 346</td>
<td>Organic Chemistry II</td>
<td>4</td>
</tr>
<tr>
<td>CHEM 347</td>
<td>Inorganic Chemistry</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 474</td>
<td>Physical Chemistry I</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 475</td>
<td>Physical Chemistry II</td>
<td>4</td>
</tr>
<tr>
<td>CIVE 300</td>
<td>Fluid Mechanics</td>
<td>3</td>
</tr>
<tr>
<td>CIVE 301</td>
<td>Fluid Mechanics Laboratory</td>
<td>1</td>
</tr>
<tr>
<td>CS 253</td>
<td>Software Development with C++</td>
<td>4</td>
</tr>
<tr>
<td>CS 410</td>
<td>Introduction to Computer Graphics</td>
<td>4</td>
</tr>
<tr>
<td>CS 440</td>
<td>Introduction to Artificial Intelligence</td>
<td>4</td>
</tr>
<tr>
<td>CS 475</td>
<td>Parallel Programming</td>
<td>4</td>
</tr>
<tr>
<td>ECE 312</td>
<td>Linear System Analysis II</td>
<td>3</td>
</tr>
<tr>
<td>ECE 331</td>
<td>Electronics Principles I</td>
<td>4</td>
</tr>
<tr>
<td>ECE 332</td>
<td>Electronics Principles II</td>
<td>4</td>
</tr>
<tr>
<td>ECE 404</td>
<td>Experiments in Optical Electronics</td>
<td>2</td>
</tr>
<tr>
<td>ECE 441</td>
<td>Optical Electronics</td>
<td>3</td>
</tr>
<tr>
<td>ECE 444</td>
<td>Antennas and Radiation</td>
<td>3</td>
</tr>
<tr>
<td>ECE 471A</td>
<td>Semiconductor Physics</td>
<td>1</td>
</tr>
<tr>
<td>ECE 471B</td>
<td>Semiconductor Junctions</td>
<td>1</td>
</tr>
<tr>
<td>ECE 507</td>
<td>Plasma Physics and Applications</td>
<td>3</td>
</tr>
<tr>
<td>ECE 546</td>
<td>Laser Fundamentals and Devices</td>
<td>3</td>
</tr>
<tr>
<td>ERHS 450</td>
<td>Introduction to Radiation Biology</td>
<td>3</td>
</tr>
<tr>
<td>ERHS 530</td>
<td>Radiological Physics and Dosimetry I</td>
<td>3</td>
</tr>
<tr>
<td>ERHS 531</td>
<td>Nuclear Instruments and Measurements</td>
<td>2</td>
</tr>
<tr>
<td>GEOL 578</td>
<td>Global Seismology</td>
<td>4</td>
</tr>
<tr>
<td>MATH 317</td>
<td>Advanced Calculus of One Variable</td>
<td>3</td>
</tr>
<tr>
<td>MATH 332</td>
<td>Partial Differential Equations</td>
<td>3</td>
</tr>
</tbody>
</table>

| CHEM 114 | General Chemistry Lab II                  | 1       |
| CHEM 245 | Fundamentals of Organic Chemistry         | 4       |
| CHEM 341 | Modern Organic Chemistry I                | 3       |
| CHEM 343 | Modern Organic Chemistry II               | 3       |
| CHEM 345 | Organic Chemistry I                       | 4       |
| CHEM 346 | Organic Chemistry II                      | 4       |
| CHEM 347 | Inorganic Chemistry                       | 3       |
| CHEM 474 | Physical Chemistry I                      | 3       |
| CHEM 475 | Physical Chemistry II                     | 4       |
| CIVE 300 | Fluid Mechanics                            | 3       |
| CIVE 301 | Fluid Mechanics Laboratory                | 1       |
| CS 253 | Software Development with C++             | 4       |
| CS 410 | Introduction to Computer Graphics         | 4       |
| CS 440 | Introduction to Artificial Intelligence   | 4       |
| CS 475 | Parallel Programming                      | 4       |
| ECE 312 | Linear System Analysis II                 | 3       |
| ECE 331 | Electronics Principles I                  | 4       |
| ECE 332 | Electronics Principles II                 | 4       |
| ECE 404 | Experiments in Optical Electronics        | 2       |
| ECE 441 | Optical Electronics                       | 3       |
| ECE 444 | Antennas and Radiation                    | 3       |
| ECE 471A | Semiconductor Physics                     | 1       |
| ECE 471B | Semiconductor Junctions                  | 1       |
| ECE 507 | Plasma Physics and Applications           | 3       |
| ECE 546 | Laser Fundamentals and Devices            | 3       |
| ERHS 450 | Introduction to Radiation Biology        | 3       |
| ERHS 530 | Radiological Physics and Dosimetry I     | 3       |
| ERHS 531 | Nuclear Instruments and Measurements     | 2       |
| GEOL 578 | Global Seismology                        | 4       |
| MATH 317 | Advanced Calculus of One Variable        | 3       |
| MATH 332 | Partial Differential Equations           | 3       |
MATH 366 Introduction to Abstract Algebra 3
MATH 369 Linear Algebra I 3
MATH 405 Introduction to Number Theory 3
MATH 419 Introduction to Complex Variables 3
MATH 430 Fourier and Wavelet Analysis with Apps 3
MATH 450 Introduction to Numerical Analysis I 3
MATH 451 Introduction to Numerical Analysis II 3
MATH 466 Abstract Algebra I 3
MATH 467 Abstract Algebra II 3
MATH 469 Linear Algebra II 3
MATH 472 Introduction to Topology 3
MATH 474 Introduction to Differential Geometry 3
MECH 331 Introduction to Engineering Materials 4
MECH 344 Heat and Mass Transfer 3
MECH 460 Aeronautics 3
MECH 468 Space Propulsion and Power Engineering 3
PH 498 Research 1-6
STAT 420 Probability and Mathematical Statistics I 3
STAT 421 Introduction to Stochastic Processes 3
STAT 421 Probability and Mathematical Statistics II 3
STAT 460 Applied Multivariate Analysis 3

1 For students who change majors from Electrical Engineering or are double-majoring in Electrical Engineering, please see advisor for possible substitutions.
2 CHEM 301 and CO 301 B are recommended. Other courses in All-University Core Curriculum (AUCC) Category 2 may be accepted as substitutes if they are taken prior to declaring the Physics major or are taken to meet requirements of another major.
3 Select enough elective credits to bring the program total to a minimum of 120 credits, of which at least 42 must be upper-division (300-, 400-level).
4 Only 3 credits from this course are applied towards the Technical Electives requirement.

Major Completion Map
Distinctive Requirements for Degree Program:

Required PH courses above the 100-Level (with the exception of PH 293 and, if there is sufficient demand, PH 314) are offered only Fall or Spring, not both. A grade of C- or better is required in all courses used to meet requirements of the major, except for unrestricted electives and courses taken to satisfy All-University Core Curriculum (AUCC) categories 3B, 3C, 3D, and 3E. Note that PH 327 may be replaced by six credits from the Mathematics and Statistics Electives List.

Freshman
Semester 1

<table>
<thead>
<tr>
<th>Critical</th>
<th>Recommended</th>
<th>AUCC</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CO 150</td>
<td>College Composition (GT-CO2)</td>
<td>X</td>
<td>1A</td>
</tr>
<tr>
<td>MATH 160</td>
<td>Calculus for Physical Scientists I (GT-MA1)</td>
<td>X</td>
<td>1B</td>
</tr>
<tr>
<td>PH 141</td>
<td>Physics for Scientists and Engineers I (GT-SC1)</td>
<td>X</td>
<td>3A</td>
</tr>
</tbody>
</table>

Arts and Humanities

Total Credits 15

Semester 2

<table>
<thead>
<tr>
<th>Critical</th>
<th>Recommended</th>
<th>AUCC</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 160</td>
<td>Calculus for Physical Scientists II (GT-MA1)</td>
<td>X</td>
<td>1B</td>
</tr>
<tr>
<td>PH 142</td>
<td>Physics for Scientists and Engineers II (GT-SC1)</td>
<td>X</td>
<td>3A</td>
</tr>
</tbody>
</table>

Arts and Humanities

CO 150, MATH 160, and PH 141 must be completed by the end of Semester 2.

Total Credits 15

Sophomore
Semester 3

<table>
<thead>
<tr>
<th>Critical</th>
<th>Recommended</th>
<th>AUCC</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 111</td>
<td>General Chemistry I (GT-SC2)</td>
<td>3A</td>
<td>4</td>
</tr>
<tr>
<td>CHEM 112</td>
<td>General Chemistry Lab I (GT-SC1)</td>
<td>3A</td>
<td>1</td>
</tr>
<tr>
<td>Semester 4</td>
<td>Critical</td>
<td>Recommended</td>
<td>AUCC</td>
</tr>
<tr>
<td>-----------</td>
<td>----------</td>
<td>-------------</td>
<td>------</td>
</tr>
<tr>
<td>MATH 340</td>
<td></td>
<td>Introduction to Ordinary Differential Equations</td>
<td>X</td>
</tr>
<tr>
<td>MATH 345</td>
<td></td>
<td>Differential Equations</td>
<td></td>
</tr>
<tr>
<td>PH 314</td>
<td></td>
<td>Introduction to Modern Physics</td>
<td>X</td>
</tr>
<tr>
<td>PH 315</td>
<td></td>
<td>Modern Physics Laboratory</td>
<td>X</td>
</tr>
<tr>
<td>Social and Behavioral Sciences</td>
<td></td>
<td>3C</td>
<td>3</td>
</tr>
<tr>
<td>MATH 261 must be completed by the end of Semester 4.</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Credits</td>
<td>16</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Junior**

<table>
<thead>
<tr>
<th>Semester 5</th>
<th>Critical</th>
<th>Recommended</th>
<th>AUCC</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PH 341</td>
<td></td>
<td>Mechanics</td>
<td>X</td>
<td>4</td>
</tr>
<tr>
<td>PH 353</td>
<td></td>
<td>Optics and Waves</td>
<td>X</td>
<td>4</td>
</tr>
<tr>
<td>Select one group from the following:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Group A:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PH 327</td>
<td></td>
<td>Analytical Techniques for Physics</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Elective</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Group B:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mathematics and Statistics List (Select a minimum of 6 credits from List on Concentration Requirements Tab)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MATH 340 and PH 245 must be completed by the end of Semester 5.</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Credits</td>
<td>14</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Semester 6**

<table>
<thead>
<tr>
<th>Critical</th>
<th>Recommended</th>
<th>AUCC</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PH 351</td>
<td>Electricity and Magnetism</td>
<td>X</td>
<td>4</td>
</tr>
<tr>
<td>PH 361</td>
<td>Physical Thermodynamics</td>
<td>X</td>
<td>3</td>
</tr>
<tr>
<td>Select one course from the following:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CHEM 301</td>
<td>Advanced Scientific Writing–Chemistry (GT-CO3)</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>CO 300</td>
<td>Writing Arguments (GT-CO3)</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>CO 301B</td>
<td>Writing in the Disciplines: Sciences (GT-CO3)</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>LB 300</td>
<td>Specialized Professional Writing</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Global and Cultural Awareness</td>
<td>3E</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Elective</td>
<td></td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>PH 293, PH 314, and PH 315 must be completed by the end of Semester 6.</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Credits</td>
<td>16</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Senior**

<table>
<thead>
<tr>
<th>Critical</th>
<th>Recommended</th>
<th>AUCC</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PH 451</td>
<td>Introductory Quantum Mechanics I</td>
<td>X</td>
<td>4A,4B</td>
</tr>
<tr>
<td>PH 462</td>
<td>Statistical Physics</td>
<td>X</td>
<td>3</td>
</tr>
<tr>
<td>Technical Course List (See Technical Course List on Concentration Requirements Tab)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Electives</td>
<td></td>
<td>7</td>
<td></td>
</tr>
<tr>
<td>PH 341 and PH 353 must be completed by the end of Semester 7.</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Credits</td>
<td>16</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Semester 8**

<table>
<thead>
<tr>
<th>Critical</th>
<th>Recommended</th>
<th>AUCC</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PH 425</td>
<td>Advanced Physics Laboratory</td>
<td>X</td>
<td>4C</td>
</tr>
<tr>
<td>PH 452</td>
<td>Introductory Quantum Mechanics II</td>
<td>X</td>
<td>3</td>
</tr>
<tr>
<td>Course Code</td>
<td>Course Title</td>
<td>Credits</td>
<td></td>
</tr>
<tr>
<td>-------------</td>
<td>------------------------------------------------------------------------------</td>
<td>---------</td>
<td></td>
</tr>
<tr>
<td>PH 492</td>
<td>Seminar</td>
<td>4C</td>
<td></td>
</tr>
<tr>
<td>X</td>
<td></td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>X</td>
<td>Technical Course List (See Technical Course List on Concentration Requirements Tab)</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>X</td>
<td>Electives</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>X</td>
<td>The benchmark courses for the 8th semester are the remaining courses in the entire program of study.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Credits</td>
<td></td>
<td>15</td>
<td></td>
</tr>
<tr>
<td>Program Total Credits:</td>
<td></td>
<td>120</td>
<td></td>
</tr>
</tbody>
</table>