

# PHYSICS APPLIED PHYSICS

## REQUIREMENTS

**CORE CURRICULUM** The Core Curriculum is designed to foster critical thinking skills and introduce students to basic domains of thinking that transcend disciplines. The Core applies to all majors. Information on specific classes in the Core can be found at [marshall.edu/gened](http://marshall.edu/gened).

### CORE 1: CRITICAL THINKING

| CODE                                      | COURSE NAME                    | HRS | GRADE |
|---|--------------------------------|-----|-------|
| FYS 100                                   | First Year Sem Crit Thinking   | 3   | _____ |
| MTH 229                                   | Critical Thinking Course       | 5   | _____ |
| _____                                     | Critical Thinking Course       | 3   | _____ |
| <b>Additional University Requirements</b> |                                |     |       |
| _____                                     | Writing Intensive              | 3   | _____ |
| _____                                     | Writing Intensive              | 3   | _____ |
| _____                                     | Multicultural or International | 3   | _____ |
| PHY 491/492                               | Capstone                       | 2   | _____ |

### CORE 2:

| CODE       | COURSE NAME                      | HRS | GRADE |
|------------|----------------------------------|-----|-------|
| ENG 101    | Beginning Composition            | 3   | _____ |
| ENG 201    | Advanced Composition             | 3   | _____ |
| _____      | Core II Communication            | 3   | _____ |
| MTH 229    | Calculus I                       | 5   | _____ |
| _____      | Core II Humanities               | 3   | _____ |
| _____      | Core II Social Science           | 3   | _____ |
| _____      | Core II Fine Arts                | 3   | _____ |
| CHM 211/17 | Core II Natural/Physical Science | 5   | _____ |

### MAJOR-SPECIFIC

All Applied Physics majors are required to take the following courses:

| CODE     | COURSE NAME                    | HRS | GRADE | CODE    | COURSE NAME                     | HRS | GRADE |
|----------|--------------------------------|-----|-------|---------|---------------------------------|-----|-------|
| CHM 211  | Principles of Chemistry I      | 3   | _____ | PHY 304 | Optics                          | 3   | _____ |
| CHM 217  | Principles of Chemistry I Lab  | 2   | _____ | PHY 405 | Optics Lab                      | 2   | _____ |
| CHM 212  | Principles of Chemistry II     | 3   | _____ | PHY 300 | Electricity & Magnetism         | 3   | _____ |
| CHM 218  | Principles of Chemistry II Lab | 2   | _____ | PHY 330 | Mechanics                       | 4   | _____ |
| ENGR 111 | Engineering Computations       | 3   | _____ | PHY 320 | Intro Modern Physics            | 3   | _____ |
| CIT 163  | Programming Practicum          | 3   | _____ | PHY 421 | Modern Physics Lab              | 2   | _____ |
| CIT 236  | Data Structures                | 3   | _____ | PHY 425 | Solid State Physics             | 3   | _____ |
| CIT 238  | Algorithms                     | 2   | _____ | PHY 442 | Quantum Mechanics               | 3   | _____ |
| MTH 230  | Calculus/Analytical Geom II    | 4   | _____ | PHY 444 | Advanced Laboratory             | 2   | _____ |
| MTH 231  | Calculus/Analytical Geom III   | 4   | _____ | PHY 445 | Math Methods of Physics         | 3   | _____ |
| MTH 335  | Ordinary Diff Equations        | 3   | _____ | PHY 446 | Math Methods of Physics II      | 3   | _____ |
| PHY 211  | University Physics             | 4   | _____ | PHY     | Capstone                        | 2   | _____ |
| PHY 202  | General Physics I Lab          | 1   | _____ | 491/492 |                                 |     |       |
| PHY 213  | University Physics II          | 4   | _____ | _____   | PHY Elective (PHY 314/415 Rec.) | 5   | _____ |
| PHY 204  | General Physics II Lab         | 1   | _____ | _____   | Free Elective                   | 3   | _____ |
| PHY 308  | Thermal Physics                | 3   | _____ | _____   | Free Elective                   | 3   | _____ |

### MAJOR INFORMATION

- Students are required to know and track their degree requirements for graduation or for entrance to a professional school.
- In addition to the Core General Education requirements, the College of Science requires 3 hours of Calculus, and 40 hours of upper level credit.
- Coursework listed as "elective" may vary for each student. Students are encouraged to use elective hours toward a 2nd minor or toward prerequisites.
- Students are strongly encouraged to select courses that meet two or more Core or College requirements. For example, a writing intensive literature course could satisfy the Core II Humanities requirement as well as the university writing intensive requirement.
- Course offerings and course attributes are subject to change each semester. Please consult each semester's schedule of courses for availability and attributes.
- Math is based on an ACT Mathematics score of 27 or higher. Students with

- an ACT Mathematics score less than 27 will be placed in the appropriate prerequisite mathematics and science courses.
- In order to graduate, students must maintain a 2.00 Overall GPA and receive a grade of C or better in each course required for the major.
- Advanced physics courses are offered every two to three semesters; check with the Physics Department for availability.
- Let the Department Chair know if you have an interest in a particular elective course as soon as possible.

Milestone Course: This is a key success marker for your major. See your advisor to discuss the importance of this course in your plan of study.

# PHYSICS APPLIED PHYSICS

A course of study in physics, resulting in a B.S. degree in physics, prepares students for a wide variety of opportunities, such as engineering careers in the private sector, careers in the health professions, employment in industry and government laboratories, advanced technology jobs in science and technology related fields, and careers as science teachers. The B.S. degree program is also excellent preparation for advanced degrees in physics, astronomy, engineering, medicine, or law. The Applied Physics major is designed for those who are interested in future study or work in an applied physics or engineering field.

| YEAR ONE | FALL SEMESTER           |                              |           |       | SPRING SEMESTER    |                                 |           |       |
|----------|-------------------------|------------------------------|-----------|-------|--------------------|---------------------------------|-----------|-------|
|          | CODE                    | COURSE NAME                  | HRS       | GRADE | CODE               | COURSE NAME                     | HRS       | GRADE |
|          | PHY 211                 | University Physics           | 4         | _____ | MTH 230            | Calculus/Analytical Geom II     | 4         | _____ |
|          | PHY 202                 | General Physics I Lab        | 1         | _____ | PHY 204            | General Physics II Lab          | 1         | _____ |
|          | MTH 229                 | Calculus I (CT)              | 5         | _____ | PHY 213            | University Physics II           | 4         | _____ |
|          | FYS 100                 | First Year Sem Crit Thinking | 3         | _____ | ENG 201            | Advanced Composition            | 3         | _____ |
|          | ENG 101                 | Beginning Composition        | 3         | _____ | _____              | Core I Critical Thinking (MC/I) | 3         | _____ |
|          | UNI 100                 | Freshman First Class         | 1         | _____ |                    |                                 |           |       |
|          | <b>TOTAL HOURS</b>      |                              | <b>17</b> |       | <b>TOTAL HOURS</b> |                                 | <b>15</b> |       |
|          | Summer Term (optional): |                              |           |       |                    |                                 |           |       |

| YEAR TWO | FALL SEMESTER           |                              |           |       | SPRING SEMESTER    |                            |           |       |
|----------|-------------------------|------------------------------|-----------|-------|--------------------|----------------------------|-----------|-------|
|          | CODE                    | COURSE NAME                  | HRS       | GRADE | CODE               | COURSE NAME                | HRS       | GRADE |
|          | MTH 231                 | Calculus/Analytical Geom III | 4         | _____ | PHY 446            | Math Methods of Physics II | 3         | _____ |
|          | PHY 320                 | Intro Modern Physics         | 3         | _____ | PHY 304            | Optics                     | 3         | _____ |
|          | PHY 421                 | Modern Physics Lab           | 2         | _____ | PHY 405            | Optics Lab                 | 2         | _____ |
|          | PHY 445                 | Math Methods of Physics      | 3         | _____ | MTH 335            | Ordinary Diff Equations    | 3         | _____ |
|          | _____                   | Core II Social Science (WI)  | 3         | _____ | CIT 163            | Intro to Programming: C++  | 3         | _____ |
|          | <b>TOTAL HOURS</b>      |                              | <b>15</b> |       | <b>TOTAL HOURS</b> |                            | <b>14</b> |       |
|          | Summer Term (optional): |                              |           |       |                    |                            |           |       |

| YEAR THREE | FALL SEMESTER           |                         |           |       | SPRING SEMESTER    |                                 |           |       |
|------------|-------------------------|-------------------------|-----------|-------|--------------------|---------------------------------|-----------|-------|
|            | CODE                    | COURSE NAME             | HRS       | GRADE | CODE               | COURSE NAME                     | HRS       | GRADE |
|            | PHY 330                 | Mechanics               | 3         | _____ | _____              | PHY Elective (PHY 314/415 Rec.) | 5         | _____ |
|            | PHY 300                 | Electricity & Magnetism | 3         | _____ | PHY 442            | Quantum Mechanics               | 3         | _____ |
|            | PHY 308                 | Thermal Physics         | 3         | _____ | ENGR 111           | Engineering Computations        | 3         | _____ |
|            | CIT 236                 | Data Structures         | 3         | _____ | CIT 238            | Algorithms                      | 3         | _____ |
|            | _____                   | Core II Communication   | 3         | _____ |                    |                                 |           |       |
|            | <b>TOTAL HOURS</b>      |                         | <b>15</b> |       | <b>TOTAL HOURS</b> |                                 | <b>14</b> |       |
|            | Summer Term (optional): |                         |           |       |                    |                                 |           |       |

| YEAR FOUR | FALL SEMESTER           |                               |           |       | SPRING SEMESTER    |                                |           |       |
|-----------|-------------------------|-------------------------------|-----------|-------|--------------------|--------------------------------|-----------|-------|
|           | CODE                    | COURSE NAME                   | HRS       | GRADE | CODE               | COURSE NAME                    | HRS       | GRADE |
|           | PHY 491                 | Capstone                      | 1         | _____ | PHY 492            | Capstone                       | 1         | _____ |
|           | PHY 425                 | Solid State Physics           | 3         | _____ | CHM 212            | Principles of Chemistry II     | 3         | _____ |
|           | PHY 444                 | Advanced Laboratory           | 2         | _____ | CHM 218            | Principles of Chemistry II Lab | 2         | _____ |
|           | CHM 211                 | Principles of Chemistry I     | 3         | _____ | _____              | Core II Humanities (WI)        | 3         | _____ |
|           | CHM 217                 | Principles of Chemistry I Lab | 2         | _____ | _____              | Free Elective (CIT Rec.)       | 3         | _____ |
|           | _____                   | Free Elective (CIT Rec.)      | 3         | _____ | _____              | Core II Fine Arts              | 3         | _____ |
|           | _____                   | Writing Intensive             | 3         | _____ |                    |                                |           |       |
|           | <b>TOTAL HOURS</b>      |                               | <b>17</b> |       | <b>TOTAL HOURS</b> |                                | <b>15</b> |       |
|           | Summer Term (optional): |                               |           |       |                    |                                |           |       |

● General Education Requirement  
 ■ College Requirement  
 ◆ Major Requirement  
 ● Area of Emphasis

● General Education Requirement  
 ■ College Requirement  
 ◆ Major Requirement  
 ● Area of Emphasis

Milestone Course: This is a key success marker for your major. See your advisor to discuss the importance of this course in your plan of study.

## INVOLVEMENT OPPORTUNITIES

- SGA
- Campus Activity Board
- JMELI
- Commuter Student Advisory Board
- Community Engagement Ambassadors
- Club Sports
- Religious Organizations
- Political Organizations
- Residence Hall Association
- Cultural Organizations
- National Society of Leadership and Success
- Greek Life

## RELATED MAJORS

- Mechanical Engineering
- Civil Engineering
- Safety Technology
- Computer Science
- Chemistry
- Biology

## GRADUATION REQUIREMENTS

- Have a minimum of 120 credit hours (some colleges or majors require more);
- Have an overall and Marshall Grade Point Average of 2.00 or higher;
- Have an overall Grade Point Average of 2.00 or higher in the major area of study;
- Have earned a grade of C or better in English 201 or 201 H;
- Have met all major(s) and college requirements;
- Have met the requirements of the Core Curriculum;
- Have met the residence requirements of Marshall University, including 12 hours of 300/400 level coursework in the student's college (see section entitled "Residence Requirements" in the undergraduate catalogue);
- Be enrolled at Marshall at least one semester of the senior year;
- Have transferred no more than 72 credit hours from an accredited West Virginia two-year institution of higher education.

Colleges and specific programs may have unique requirements that are more stringent than those noted above. Students are responsible for staying informed about and ensuring that they meet the requirements for graduation.

This academic map is to be used as a guide in planning your coursework toward a degree. Due to the complexities of degree programs, it is unfortunate but inevitable that an error may occur in the creation of this document. The official source of degree requirements at Marshall University is DegreeWorks available in your myMU portal. Always consult regularly with your advisor.

# APPLIED PHYSICS – 2020-2021

## YEAR ONE



Have questions? Need to talk? You already have a Friend-At-Marshall ready to help you succeed. Find your FAM Peer Mentor here: [www.marshall.edu/fam](http://www.marshall.edu/fam)



Stay on the Herd Path and come to class! Class attendance is more important to your success than your high school GPA, your class standing, or your ACT/SAT scores.



Participate in a Career Exploration Experience (job shadow) to help identify your career goals.



In order to graduate on time, you need to take an average of 15 credits per semester. Are you on track? Take 15 to Finish!



Join or create a club or organization on campus about a particular issue you care about. Marshall has more than 200 student organizations.



College is a great time to experience the world! Consider studying abroad in the summer, during Spring Break, or for an entire semester.



Take a career self-assessment to help determine what majors fit your talents and interests.

## YEAR THREE



Submit your work for the annual competitions and awards.



Meet with a career education specialist to conduct a "gap analysis." Figure out the skills you'll need for the career you want while you still have time to build them.



Complete graduate admissions exams (GRE, MCAT, LSAT) the summer before your senior year.



Are you on track to graduate? Meet with your advisor for your Junior Eval to make sure you know what requirements you have left.



Apply to be a New Student Orientation Leader or a Campus Tour Guide.



Take an elective course that links diversity to your field of study.



Want to continue your education and increase your opportunities? Talk to a faculty member about whether graduate school fits your career goals.

## YEAR TWO



Develop relationships with professors who can serve as future references by attending their office hours.



Are you completing enough credits to graduate on time? Dropping or failing a class can put you behind. Use summer terms to quickly get back on track.



Did you do really well in a hard course? Become a Tutor or a Supplemental Instructor.



Begin your Math Methods of Physics to meet your prerequisites for upper division classes.



Take a pulse check. Know what you need to do every year to keep your grants, scholarships, or federal financial aid.



No need to wait until graduate school. Discuss undergraduate research opportunities with faculty in your major right now.



Think about who can help you grow as a student and a professional—professors, advisors, alumni, etc.—and ask at least one to be your mentor.

## YEAR FOUR



This is it! Are you on track to graduate? Meet with your advisor for your Senior Eval to see what requirements you have left.



Strengthen your resume and enhance your presentation skills. Present what you've learned at an academic conference off campus.



Did you do really well in a hard course? Become a Tutor or a Supplemental Instructor.



Networking is key! Attend a Career Expo to seek employment opportunities and network with employers in your field.



Be at the top of your professional game! Prepare a final resume and practice your interview skills with a career coach in Career Education.



Participate in Department of Physics outreach events with local high school students. Stay engaged and make a difference.



Prepare to present at Physics Department Research and Convocation Day and CoS Research EXPO in April.

## TRANSFERABLE SKILLS ASSOCIATED WITH THIS MAJOR

- Mathematical Ability
- Scientific Ability
- Attention to Detail
- Strong Oral and Written Communication Skills
- Organizational Skills

## ASSOCIATED CAREERS

- Acoustical Physics
- Astronomy
- Astrophysics
- Biophysics
- Chemical Physics
- Research and Development
- Nuclear Physics
- High Energy Physics
- Science Education



Marshall University  
College of Science  
One John Marshall Drive  
Huntington, WV 25755  
1-304-696-2371  
[cos@marshall.edu](mailto:cos@marshall.edu)  
[marshall.edu/cos](http://marshall.edu/cos)