Physics (B.A.)
College of Sciences
Department of Physics, Physical Sciences, Room: 430
Chair: Dr. Talat Rahman
http://www.physics.ucf.edu
Email: physics@ucf.edu

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Phone: 407-823-1156

Physics majors can select from two curricular options: BA in Physics, which gives students the flexibility to combine physics with another focus area in an interdisciplinary program, in particular Physics Education, Nanoscience and Science Technology, Biophysics, Information Technology/Data Science, Technical Writing; and BS in Physics, which is intended to prepare students for the study of physics or a closely related subject in graduate school. In consultation with their academic advisors, students can choose between Option I and II by the end of the sophomore year.

Admission Requirements
- None

Degree Requirements
- Students who change degree programs and select this major must adopt the most current catalog.
- Grades below "C" (2.0) in any required physics or mathematics courses are not acceptable; they must be repeated with a higher grade.
- Students must achieve a minimum cumulative GPA of 2.0 in all courses taken that could meet major requirements.
- All attempts that could meet requirements are included in the major GPA calculation. All attempts of courses listed for the major taken beyond the minimum required are included in the GPA calculation (e.g., additional restricted electives).
- Departmental Residency Requirement consists of at least 15 semester hours of regularly scheduled 3000-4000 level courses taken from the UCF Department of Physics.
- Physics majors are discouraged from taking courses as a transient student at a Florida College System institution, except in situations where one semester of a two semester sequence has already been taken at the Florida College System institution.
- All prerequisites of courses taught within the College of Sciences will be enforced.
- Courses designated in 2 (Common Program Prerequisites) are usually completed in the first sixty hours.
- AA transfer students are expected to have completed the following courses before enrolling as Physics major.
- These classes are prerequisites for advanced science classes and students entering without these classes will be unable to register for most of the advanced courses.
- CHM 2046 - Chemistry Fundamentals I 4 hrs
- CHM 2046L - Chemistry Fundamentals Laboratory 1 hr
- MAC 2311C - Calculus with Analytic Geometry I 4 hrs
- MAC 2312 - Calculus with Analytic Geometry II 4 hrs
- 1 PHY 2048C - General Physics Using Calculus I 4 hrs
- 2 PHY 2049C - General Physics Using Calculus II 4 hrs
- With Department permission this course can be substituted by PHY 2053C.
- With Department permission this course can be substituted by PHY 2054C.

1. UCF General Education Program (GEP) (39 hrs)
- Note: Certain courses must be selected in the GEP for this major which brings the GEP hours above 36.

A: Communication Foundations (9 hrs)
- Prefer SPC 1603C - Fundamentals of Technical Presentations 3 hrs
- Required ENC 1101 - Composition I and 3 hrs
- Required ENC 1102 - Composition II 3 hrs

Take all of the following: 6 hrs
- Required ENC 1101 - Composition I and 3 hrs
- Required ENC 1102 - Composition II 3 hrs

B: Cultural & Historical Foundations (9 hrs)
- Prefer PHI 2010 - Introduction to Philosophy 3 hrs
- Prefer HUM 2210 - Humanistic Tradition I 3 hrs
- Prefer HUM 2230 - Humanistic Tradition II 3 hrs

C: Mathematical Foundations (7 hrs)
- Required MAC 2311C - Calculus with Analytic Geometry I 4 hrs
- Suggested STA 2023 - Statistical Methods I 3 hrs

D: Social Foundations (6 hrs)
- Prefer ECO 2023 - Principles of Microeconomics 3 hrs
- Prefer PSY 2012 - General Psychology 3 hrs

E: Science Foundations (8 hrs)
- Required PHY 2048C - General Physics Using Calculus I 4 hrs
- Required PHY 2049C - General Physics Using Calculus II 4 hrs

Select one of the following sequences of courses:
- CHM 2045C - Chemistry Fundamentals I 4 hrs
- CHM 2040 - Chemistry Fundamentals IA and 3 hrs
- CHM 2041 - Chemistry Fundamentals IB 3 hrs

Take all of the following:
- CHM 2046 - Chemistry Fundamentals II 3 hrs
- MAC 2311C - Calculus with Analytic Geometry I 4 hrs
- MAC 2312 - Calculus with Analytic Geometry II 4 hrs
- MAC 2313 - Calculus with Analytic Geometry III 4 hrs
- PHY 2048C - General Physics Using Calculus I 4 hrs
- PHY 2049C - General Physics Using Calculus II 4 hrs

3. Core Requirements: Basic Level (24 hrs)
- In addition to those courses specified in the Common Program Prerequisites, students also must complete the following:
- Core: Required, satisfies the CPP
- CHM 2045C - Chemistry Fundamentals I 4 hrs
- or
- CHM 2040 - Chemistry Fundamentals IA and 3 hrs
- CHM 2041 - Chemistry Fundamentals IB 3 hrs

Take all of the following:
- MAC 2311C - Calculus with Analytic Geometry I 4 hrs
- MAC 2312 - Calculus with Analytic Geometry II 4 hrs
- MAC 2313 - Calculus with Analytic Geometry III 4 hrs
- 1 PHY 2048C - General Physics Using Calculus I 4 hrs
- 2 PHY 2049C - General Physics Using Calculus II 4 hrs

1 With Department permission this course can be substituted by PHY 2053C.
2 With Department permission this course can be substituted by PHY 2054C.

Core: Additional requirements
- PHY 3101 - General Physics Using Calculus III 3 hrs
- PHY 3220 - Mechanics I 3 hrs
- PHY 3513 - Thermal and Statistical Physics 3 hrs
- PHY 3323 - Electricity and Magnetism I 3 hrs
- PHY 4604 - Wave Mechanics I 3 hrs
- PHZ 3113 - Introduction to Theoretical Methods of Physics 3 hrs
- MAP 2302 - Ordinary Differential Equations I 3 hrs

Laboratory Requirements
- PHY 3802L - Intermediate Physics Laboratory 3 hrs
UCF Degree Programs

4. Core Requirements: Advanced Level
   ■ Select one specialization

4.1 Education
   ■ Students in this specialization must declare and be admitted to the Science Education Minor.

Required: 19 hrs
- PHY 4012 Teaching Introductory Physics 3 hrs
- EDG 4410 Teaching Strategies and Classroom Management 3 hrs
- EDF 4467 Learning Theory and Assessment 3 hrs
- TSL 4080 Theory and Practice of Teaching ESOL 3 hrs
- PCB 3703 Human Physiology 4 hrs
- PCB 4054 Biochemistry II 3 hrs
- BCH 3063L Genetics Laboratory 1 hr
- BCH 4054 Biochemistry II 3 hrs

Restricted electives: 9 hrs
■ Select 9 credits from upper division PHY, PHZ, or AST courses or approved education courses to fulfill a double major or a minor in Science Education - Physics.
■ The courses will be selected with advisor approval.

Directed electives: 15 hrs
■ The elective courses will be selected with advisor approval.
- PHY 3722C Physics Laboratory-Electronics 3 hrs
- PHY 3752C Physics of Scientific Instruments 3 hrs
- EMA 3014 Nanomaterials Characterization and Applications 3 hrs
- PHZ 3051 Computer Methods in Physics 3 hrs
- PHZ 3107 Nanobiotechnology 3 hrs
- OSE 3490 Nanophotonics 3 hrs
- PHY 3593 Selected topics in biophysics of macromolecules 3 hrs
- PHI 4890 Ethics in Nanoscience and Nanotechnology 3 hrs
- PHZ 5425C Electron Solid Interactions 3 hrs
- PHZ 5445 Nanofabrication using Focused Ion Beam 3 hrs
- PHY 5704 Physics of Nanoelectronics Devices 3 hrs

4.2 Nanoscale Science and Technology
Required: 12 hrs
- PHZ 3462 Nanoscience I: The Science and Societal Impacts 3 hrs
- PHZ 3464 Nanoscience II: Technological Applications 3 hrs
- PHZ 3466 Nanoscience III: A Virtual Laboratory 3 hrs
- EMA 3691 Nanomaterials Process Engineering 3 hrs

Restricted electives: 9 hrs
■ Selected from upper division physics, mathematics, chemistry, computer science or engineering courses.

Directed electives: 15 hrs
■ The elective courses will be selected with advisor approval.
- PHY 3722C Physics Laboratory-Electronics 3 hrs
- PHY 3722C Physics of Scientific Instruments 3 hrs
- EMA 3014 Nanomaterials Characterization and Applications 3 hrs
- PHZ 3101 Computer Methods in Physics 3 hrs
- BSC 3424 Nanobiotechnology 3 hrs
- OSE 3490 Nanophotonics 3 hrs
- PHY 3593 Selected topics in biophysics of macromolecules 3 hrs
- PHI 4890 Ethics in Nanoscience and Nanotechnology 3 hrs
- PHZ 5425C Electron Solid Interactions 3 hrs
- PHZ 5445 Nanofabrication using Focused Ion Beam 3 hrs
- PHY 5704 Physics of Nanoelectronics Devices 3 hrs

4.3 Biophysics
Required: 18 hrs
- BSC 2011C Biology II 4 hrs
- CHM 2210 Organic Chemistry I 3 hrs
- CHM 2211 Organic Chemistry II 3 hrs
- CHM 2211L Organic Laboratory Techniques I 2 hrs
- MCB 1310 Introduction to Biotechnology and Genetic Engineering 3 hrs
- BSC 3424 Nanobiotechnology 3 hrs

Restricted electives: 9 hrs
■ Select 9 credits from upper division PHY, PHZ, or AST courses.
■ The elective courses will be selected with advisor approval.

Directed electives: 9 hrs
■ Select 9 credits from upper division biology or chemistry
■ The elective courses will be selected with advisor approval.

Pre-meds are advised to take:
- PCB 3063 Genetics 3 hrs
- PCB 3063L Genetics Laboratory 1 hr
- PCB 3703C Human Physiology 4 hrs
- BCH 4053 Biochemistry I 3 hrs
- BCH 4054 Biochemistry II 3 hrs

4.4 Information Technology / Data Science
Required: 18 hrs
- COP 3220C Introduction to Programming with C 3 hrs
- COP 3502C Computer Science I 3 hrs
- COP 3330 Object Oriented Programming 3 hrs
- COP 4710 Database Systems 3 hrs
- CIS 3362 Cryptography and Information Security 3 hrs

Select 1:
- COT 3100C Introduction to Discrete Structures or 3 hrs
- MAD 2104 Foundations of Discrete Math 3 hrs

Restricted electives: 9 hrs
■ Select 9 credits from upper division PHY, PHZ, or AST courses.
■ The elective courses will be selected with advisor approval.

Directed electives: 6 hrs
■ Select 6 credits from the following, or other approved upper division computer science, mathematics or engineering:
■ The elective courses will be selected with advisor approval.
- CDA 3103C Computer Logic and Organization 3 hrs
- COP 3402 Systems Software 3 hrs
- COP 4516C Problem Solving Techniques and Team Dynamics 3 hrs

4.5 Technical Writing
Required: 15 hrs
- ENC 3351 Writing for Publication 3 hrs
- ENC 4293 Documentation and the Collaborative Process 3 hrs
- ENC 4290 Usability Testing for Technical Communication 3 hrs
- ENC 4218 The Visual in Technical Documentation 3 hrs

Restricted electives: 9 hrs
■ Select 9 credits from upper division writing or communication courses.
■ The elective courses will be selected with advisor approval.

Directed electives: 6 hrs
■ Select 6 credits from upper division writing or communication courses:
■ The elective courses will be selected with advisor approval.
- ENC 3245 Writing about Science and Technology 3 hrs
- LIT 4433 Literature of Science and Technology 3 hrs
- ENC 3455 Writing and Rhetoric Foundations 3 hrs
- ENC 3250 Professional Writing 3 hrs
- ENC 3351 Writing for Publication 3 hrs
- ENC 4262 International Technical Communication 3 hrs

5. Restricted Electives
■ None

6. Capstone Requirements
■ None

7. Foreign Language Requirements
Admissions
■ Met by graduation requirement

Graduation
■ Proficiency equivalent to one year of college instruction in a foreign language taught by the Department of Modern Languages and Literatures or Judaic Studies. Standardized examinations for foreign languages may be used to meet the requirement.

8. Electives
■ None

9. Additional Requirements
■ None

10. Required Minors
■ None

11. Departmental Exit Requirements
■ Grades below “C” (2.0) in any required physics or mathematics courses are not acceptable; they must be repeated with a higher grade.
■ Students must achieve a minimum cumulative GPA of 2.0 in all courses taken that could meet major requirements.
12. University Minimum Exit Requirements

- A 2.0 UCF GPA
- 60 semester hours earned after CLEP awarded
- 48 semester hours of upper division credit completed
- 30 of the last 39 hours of course work must be completed in residency at UCF.
- A maximum of 45 hours of extension, correspondence, CLEP, Credit by Exam, and Armed Forces credits permitted.
- Complete the General Education Program, the Gordon Rule, and nine hours of Summer credit.

Total Semester Hours Required

- 120

Honors in Major

- None

Related Programs

- None

Certificates

- None

Related Minors

- None

Advising Notes

- None

Transfer Notes

- Lower division courses do not substitute for upper division courses.
- Courses transferred from private and out-of-state schools must be evaluated for equivalency credit. The student must provide all supporting information.

Acceptable Substitutes for Transfer Courses

- The following substitutions for common program prerequisites are acceptable if taken prior to transferring to UCF:
  
  - CHM 2045C: may use CHM 1040 plus CHM 1041 or CHM 2040C plus CHM 2041C

Plan of Study

- This is one of numerous possible plans of study. See program description for all requirements. Consult a departmental advisor for alternate, new or more appropriate selections.
- Prior to enrolling in Chemistry, take Chemistry Placement Test ~ [link]
- Prior to enrolling in Math, take Math Placement Test ~ [link]
- Although all classes are listed during the academic year, you may be required to complete 9 hours of them during the Summer. Consult with an advisor to determine if you are exempt.

Freshman Year - Fall

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<th>Course Title</th>
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Freshman Year - Spring

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<td>CHM 2046</td>
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Sophomore Year - Fall

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Sophomore Year - Spring

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Program Academic Learning Compacts

- Program Academic Learning Compacts (student learning outcomes) for undergraduate programs are located at: [link]