Physics (B.A.)

College of Sciences

Department of Physics, Physical Sciences, Room: 430

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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, Nanoscale Science and 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 2045C	Chemistry Fundamentals I	4 hrs
CHM 2046	Chemistry Fundamentals II	3 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

[1] With Department permission this course can be substituted by PHY 2053C.
[2] With Departmental 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

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
BSC 2010C	Biology I		4 hrs

2. Common Program Prerequisites (CPP) (20 hrs)

MAC 2311C	Calculus with Analytic Geometry I	GEP
MAC 2312	Calculus with Analytic Geometry II	4 hrs
MAC 2313	Calculus with Analytic Geometry III	4 hrs

Select one of the following sequences of courses:

CHM 2045C	Chemistry Fundamentals I	4 hrs

or 6 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
CHM 2046L	Chemistry Fundamentals Laboratory	1 hr
PHY 2048C	General Physics Using Calculus I	GEP
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	CPP

-or

CHM 2040	Chemistry Fundamentals IA and	CPP
CHM 2041	Chemistry Fundamentals IB	CPP

-and

MAC 2311C	Calculus with Analytic Geometry I	GEP/CPP
MAC 2312	Calculus with Analytic Geometry II	CPP
MAC 2313	Calculus with Analytic Geometry III	CPP
[1] PHY 2048C	General Physics Using Calculus I	CPP
[2] PHY 2049C	General Physics Using Calculus II	CPP

[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

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 Students in Schools	3 hrs
SCE 4360	Science Instructional Analysis	4 hrs
SCE 4361	Programs in Teaching Science	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 adviser approval.

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 3752C	Physics of Scientific Instruments	3 hrs
EMA 3014	Nanomaterials Characterization and Applications	3 hrs
PHZ 3151	Computer Methods in Physics	3 hrs
BSC 3424	Nanobiotechnology	3 hrs
OSE 3490	Nanophotonics	3 hrs
PHY 5933	Selected topics in biophysics of macromolecules	3 hrs
PHI 4690	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 3223C	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 3241	Writing for the Technical Professional	3 hrs
ENC 4280	Technical Writing Style	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 PHY, PHZ, or AST 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 3455	Writing about Science and Technology	3 hrs
LIT 4433	Literature of Science and Technology	3 hrs
ENC 3314	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.

- 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).
- Students will be required to take a nationally normed test in Physics during their last year.
- Students will have an exit interview in their last semester with a representative of the Physics Undergraduate Committee.

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 ~ *http://knightsource.sdes.ucf.edu/* placement
- Prior to enrolling in Math, take Math Placement Test ~ *http://utc.sdes.ucf.edu/math*
- 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		**15 hrs**
MAC 2311C	Calculus with Analytic Geometry I	4 hrs
CHM 2045C	Chemistry Fundamentals I	4 hrs
GEP		4 hrs
GEP		3 hrs

Freshman Year - Spring		**15 hrs**
PHY 2048C	General Physics Using Calculus I	4 hrs
MAC 2312	Calculus with Analytic Geometry II	4 hrs
CHM 2046	Chemistry Fundamentals II	3 hrs
CHM 2046L	Chemistry Fundamentals Laboratory	1 hr
Note: Lab may be taken later if seats are not available.		
GEP		3 hrs

Sophomore Year - Fall		**17 hrs**
PHY 2049C	General Physics Using Calculus II	4 hrs
MAC 2313	Calculus with Analytic Geometry III	4 hrs
GEP		3 hrs
GEP		3 hrs
GEP		3 hrs

Sophomore Year - Spring		**15 hrs**
PHY 3101	General Physics Using Calculus III	3 hrs
PHZ 3113	Introduction to Theoretical Methods of Physics	3 hrs
MAP 2302	Ordinary Differential Equations I	3 hrs
GEP		3 hrs
GEP		3 hrs

Junior Year - Fall		**15 hrs**
PHY 3802L	Intermediate Physics Laboratory	3 hrs
PHY 3323	Electricity and Magnetism I	3 hrs
PHY 3513	Thermal and Statistical Physics	3 hrs
Directed Elective		3 hrs
Free Elective		3 hrs

Junior Year - Spring		**15 hrs**
PHY 3220	Mechanics I	3 hrs
Restricted Elective		3 hrs
Directed Elective		3 hrs
Directed Elective		3 hrs
GEP		3 hrs

Senior Year - Fall		**13 hrs**
PHY 4604	Wave Mechanics I	3 hrs
Restricted Elective		3 hrs
Directed Elective		3 hrs
Directed Elective		3 hrs
Free Elective		1 hr

Senior Year - Spring		**15 hrs**
Restricted Elective		3 hrs
Directed Elective		3 hrs
GEP		3 hrs
Free Elective		3 hrs
Directed Elective		3 hrs
Physics Test - Nationally Normed		

Program Academic Learning Compacts

- Program Academic Learning Compacts (student learning outcomes) for undergraduate programs are located at: *http://www.oeas.ucf.edu/alc/academic_learning_compacts.htm*