University of Central Florida 2018-2019 Undergraduate Catalog

Photonic Science and Engineering (B.S.P.S.E.)

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College of Optics and Photonics
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The Bachelor of Science in Photonic Science and Engineering degree is designed to prepare the next generation of engineers for the growing optics and photonics industry, which has a broad set of applications including manufacturing, healthcare, telecommunication, defense, security and entertainment. The program draws on UCF's internationally recognized strengths in the field of optics and lasers and is matched to the strong photonics industry in Central Florida. The degree is offered jointly by the College of Optics and Photonics and the College of Engineering and Computer Science.

Admission Requirements

- Students who wish to declare their major in Photonic Science and Engineering must be in good academic standing and must have a "C" (2.0) or better in each of the following courses or their equivalents: MAC 2311C, MAC 2312, PHY 2048C, and CHS 1440 or CHM 2045C.

Degree Requirements

- Majors in the B.S.P.S.E. degree are required to achieve a 2.250 or greater GPA for their engineering core courses, including STA 3032 and PHY 3101, together with the photonics courses required for the major, technical elective courses, and the senior design courses.
- Students in the Photonic Science and Engineering major are expected to make consistent good progress toward their degrees to remain enrolled in, or eligible for, any major in the College of Engineering and Computer Science (CECS) or the College of Optics and Photonics (COP). Therefore,any student majoring in Photonic Science and Engineering who repeats any UCF course and does not earn a grade of "C" (2.0) or better on the second attempt will be placed on Lack of Progress Probation and remain on Lack of Progress Probation as long as the student is enrolled in a CECS or COP major. If a student on Lack of Progress Probation does not receive a grade of "C" (2.0) or better by the third attempt in the same UCF course, the student will be excluded from all CECS and COP majors. Any student majoring in Photonic Science and Engineering who has accumulated 7 or more unsuccessful attempts (i.e., grades below "C" (2.0) and withdrawals) over all courses taken at UCF will be placed on Lack of Progress Probation and remain on Lack of Progress Probation as long as the student is enrolled in a CECS or COP major. If a student on Lack of Progress Probation has a tenth unsuccessful attempt over all courses taken at UCF, the student will be excluded from all CECS and COP majors.
- A student who is excluded from CECS and COP majors may seek readmission to a major in CECS or COP after at least one full year has passed since exclusion. Readmission is not automatic and is dependent upon a high probability of success after readmission. Any student who is readmitted to the Photonic Science and Engineering major will be subject to all probation conditions that applied at the time of exclusion.
- Students in the BSPSE Major must obtain a 2.0 or greater GPA in the following courses: EGN 3211, EEL 3004C, EEL 3123C, and MAP 2302

General Education Program (GEP) (38 Credit Hours)

- Engineering students should closely study the requirements of the UCF GEP and the allowable substitutions detailed in paragraphs A through E below to minimize excess hours. Students transferring to UCF from within the Florida College System or State University System should complete the GEP and the Common Program Prerequisites before transferring.

Communication Foundations (9 Credit Hours)

- ENC 1101 - Composition I **Credit Hours: 3** (Required)
- ENC 1102 - Composition II **Credit Hours: 3** (Required)

Select One: (3 Credit Hours)

- SPC 1608 - Fundamentals of Oral Communication **Credit Hours: 3** (Suggested)
- SPC 1603C - Fundamentals of Technical Presentations **Credit Hours: 3**

Cultural & Historical Foundations (9 Credit Hours)

- HUM 2020 - Encountering the Humanities **Credit Hours: 3** (Suggested)
- Select one additional class from either Historical or Cultural Foundations **Credit Hours: 3**

Select One: (3 Credit Hours)

- MUL 2010 - Enjoyment of Music **Credit Hours: 3**
- PHI 2010 - Introduction to Philosophy **Credit Hours: 3** (Suggested)
- THE 2000 - Theatre Survey **Credit Hours: 3**

Mathematical Foundations (7 Credit Hours)

- MAC 2311C - Calculus with Analytic Geometry I **Credit Hours: 4** (Required)
- STA 3032 - Probability and Statistics for Engineers **Credit Hours: 3** (Required)

Social Foundations (6 Credit Hours)

- AMH 2020 - U.S. History: 1877-Present **Credit Hours: 3** (Suggested)

Select One (3 Credit Hours)

- PSY 2012 - General Psychology **Credit Hours: 3**
- SYG 2000 - Introduction to Sociology **Credit Hours: 3**
- ANT 2000 - General Anthropology **Credit Hours: 3**

Science Foundations (7 Credit Hours)

- PHY 2048C - General Physics Using Calculus I **Credit Hours: 4** (Required)
- Choose one class from Science Foundations **Credit Hours: 3**

Common Program Prerequisites (CPP) (19 Credit Hours)

These courses are specifically required for all engineering students of the Florida State University System. CPP courses are also available at other Florida postsecondary schools and may be transferred directly to UCF programs.

[1] A "C" (2.0) or better is required in these courses to enroll in PSE major courses.

- MAC 2311C - Calculus with Analytic Geometry I **Credit Hours: 4** [1] (GEP)
- MAC 2312 - Calculus with Analytic Geometry II **Credit Hours: 4** [1]
- MAC 2313 - Calculus with Analytic Geometry III **Credit Hours: 4** [1]
- MAP 2302 - Ordinary Differential Equations I **Credit Hours: 3** [1]

- PHY 2048C - General Physics Using Calculus I **Credit Hours: 4** [1] (GEP)
- PHY 2049C - General Physics Using Calculus II **Credit Hours: 4** [1]

Select One: (3 Credit Hours)

- CHS 1440 - Principles of Chemistry **Credit Hours: 4** [1]
- CHM 2045C - Chemistry Fundamentals I **Credit Hours: 4** [1]

Core Requirements: Basic Level (6-8 Credit Hours)

[1] C (2.0) or better required

- EGS 1006C - Introduction to the Engineering Profession **Credit Hours: 1**
- EGN 1007C - Engineering Concepts and Methods **Credit Hours: 1**
- EGN 3211 - Engineering Analysis and Computation **Credit Hours: 3** [1]
- PHY 3101 - General Physics Using Calculus III **Credit Hours: 3**
- STA 3032 - Probability and Statistics for Engineers **Credit Hours: 3** (GEP)

Core Requirements: Advanced Level (47 Credit Hours)

Engineering Requirements (17 Credit Hours)

[1] C (2.0) or better required.

- EEL 3004C - Electrical Networks **Credit Hours: 3** [1]
- EEE 3350 - Semiconductor Devices I **Credit Hours: 3**
- EEL 3123C - Networks and Systems **Credit Hours: 3** [1]
- EEE 3307C - Electronics I **Credit Hours: 4**
- EEL 3552C - Signal Analysis and Analog Communication **Credit Hours: 4**

Photonics Requirements (30 Credit Hours)

- OSE 3200 - Geometric Optics **Credit Hours: 3**
- OSE 3200L - Geometric Optics Lab **Credit Hours: 1**
- OSE 3052 - Foundations of Photonics **Credit Hours: 3**
- OSE 3052L - Foundations of Photonics Laboratory **Credit Hours: 1**
- OSE 3053 - Electromagnetic Waves for Photonics **Credit Hours: 3**
- OSE 4520 - Laser Engineering **Credit Hours: 3**
- OSE 4520L - Laser Engineering Laboratory **Credit Hours: 1**
- OSE 4410 - Optoelectronics **Credit Hours: 3**
- OSE 4410L - Optoelectronics Laboratory **Credit Hours: 1**
- OSE 4470 - Fiber-Optic Communications **Credit Hours: 3**
- OSE 4470L - Fiber-Optic Communications Laboratory **Credit Hours: 1**
- OSE 4830 - Imaging and Display **Credit Hours: 3**
- OSE 4830L - Imaging and Display Laboratory **Credit Hours: 1**
- OSE 4930 - Frontiers of Optics and Photonics **Credit Hours: 3**

Restricted Electives

- Students must select at least 3 credit hours of restricted electives with the course prefix OSE. The remaining 7 hours may be taken from approved upper level photonics, engineering, physics, mathematics, or other related electives. All electives must be approved by the program advisor. See myKnight audit for complete list of approved electives. If EGS 1006C and EGN 1007C are not completed, the restricted electives requirement increases to 12 hrs.

- The courses used to satisfy the restricted elective requirement and used as part of the major GPA calculation will be those with the highest grades out of all restricted elective courses the student has completed.

Capstone Requirements (6 Credit Hours)

- OSE 4951 - Senior Design I **Credit Hours: 3**
- OSE 4952 - Senior Design II **Credit Hours: 3**

Electives

- None

Foreign Language Requirements

Admissions

- Two years of one foreign language in high school, or one year of one foreign language in college (or equivalent proficiency exam) prior to graduation.

Graduation

- None

Additional Requirements

- Photonic science and engineering students must earn at least 32 hours in residence at UCF. 24 of the 32 Residency hours must be at the 3000-5000 level, in courses taken from the College of Optics and Photonics at UCF and applicable to the degree program.

Required Minors

- None

Departmental Exit Requirements

- None

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 Undergraduate Credit Hours Required: 128

Additional Information

Honors In Major

- Application and admissions through The Burnett Honors College and department. More information about Honors in the Major can be found at honors.ucf.edu/research

Related Programs

- Electrical Engineering - Accelerated Undergraduate-Graduate (B.S.E.E. / M.S.E.E.)
- Computer Engineering (B.S.Cp.E. / M.S.Cp.E.)
- Physics (B.S.)

Certificates

- None

Related Minors

- Engineering Leadership Minor
- Mathematics Minor
- Physics Minor

Advising Notes

- Each engineering student should meet with their academic advisor in the department of their major regularly.
- Each student should seek academic advisement before registering for classes each semester to minimize excess hours.
- Students are assumed to have knowledge of a higher level programming language (C preferred).
- Students in the BSPSE Major are required to take OSE-prefixed lab courses in the same semester as the corresponding lecture course.
- Prior to enrolling in OSE 3200, students are required to meet with the BSPSE Academic Advisor.

Transfer Notes

- Courses taken from Florida College System institutions do not substitute for upper division courses unless part of an articulated pre-engineering degree program.
- Courses transferred must be formally evaluated for equivalency credit. The student must provide all supporting information with his/her petition for this evaluation.
- EGS 1006C and EGN 1007C are required courses for incoming freshmen only and without completion of these courses,restricted elective requirement increases to 12 credit hours.

Acceptable Substitutes for Transfer Courses

- None

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*

Equipment Fees

- Part-Time Student: $30 per term
- Full-Time Student: $60 per term

Plan of Study (128 Credit Hours)

Freshman Year - Fall (15 Credit Hours)

- Historical Foundation **Credit Hours: 3**
- MAC 2311C - Calculus with Analytic Geometry I **Credit Hours: 4**
- SPC 1608 - Fundamentals of Oral Communication **Credit Hours: 3**
- EGS 1006C - Introduction to the Engineering Profession **Credit Hours: 1**
- CHS 1440 - Principles of Chemistry **Credit Hours: 4**

Freshman Year - Spring (15 Credit Hours)

- ENC 1101 - Composition I **Credit Hours: 3**
- EGN 1007C - Engineering Concepts and Methods **Credit Hours: 1**
- MAC 2312 - Calculus with Analytic Geometry II **Credit Hours: 4**
- PHY 2048C - General Physics Using Calculus I **Credit Hours: 4**
- AMH 2020 - U.S. History: 1877-Present **Credit Hours: 3**

Sophomore Year - Fall (14 Credit Hours)

- MAC 2313 - Calculus with Analytic Geometry III **Credit Hours: 4**
- PHY 2049C - General Physics Using Calculus II **Credit Hours: 4**
- ENC 1102 - Composition II **Credit Hours: 3**
- EGN 3211 - Engineering Analysis and Computation **Credit Hours: 3**

Sophomore Year - Spring (16 Credit Hours)

- MAP 2302 - Ordinary Differential Equations I **Credit Hours: 3**
- EEL 3004C - Electrical Networks **Credit Hours: 3**
- PHY 3101 - General Physics Using Calculus III **Credit Hours: 3**
- OSE 3200 - Geometric Optics **Credit Hours: 3**
- OSE 3200L - Geometric Optics Lab **Credit Hours: 1**
- Science Foundation **Credit Hours: 3**

Sophomore Year - Summer (12 Credit Hours)

- EEL 3123C - Networks and Systems **Credit Hours: 3**
- EEE 3350 - Semiconductor Devices I **Credit Hours: 3**
- STA 3032 - Probability and Statistics for Engineers **Credit Hours: 3**
- GEP Social Foundation **Credit Hours: 3**

Junior Year - Fall (15 Credit Hours)

- EEE 3307C - Electronics I **Credit Hours: 4**
- OSE 3052 - Foundations of Photonics **Credit Hours: 3**
- OSE 3052L - Foundations of Photonics Laboratory **Credit Hours: 1**
- EEL 3552C - Signal Analysis and Analog Communication **Credit Hours: 4**
- HUM 2020 - Encountering the Humanities **Credit Hours: 3**

Junior Year - Spring (14 Credit Hours)

- OSE 3053 - Electromagnetic Waves for Photonics **Credit Hours: 3**
- OSE 4410 - Optoelectronics **Credit Hours: 3**
- OSE 4410L - Optoelectronics Laboratory **Credit Hours: 1**
- OSE 4520 - Laser Engineering **Credit Hours: 3**
- OSE 4520L - Laser Engineering Laboratory **Credit Hours: 1**
- Restricted Elective (Suggested OSE 4240 - Optics & Photonics Design) **Credit Hours: 3**

Senior Year - Fall (14 Credit Hours)

- OSE 4470 - Fiber-Optic Communications **Credit Hours: 3**
- OSE 4470L - Fiber-Optic Communications Laboratory **Credit Hours: 1**
- OSE 4951 - Senior Design I **Credit Hours: 3**
- OSE 4930 - Frontiers of Optics and Photonics **Credit Hours: 3**

- OSE 4830 - Imaging and Display **Credit Hours: 3**
- OSE 4830L - Imaging and Display Laboratory **Credit Hours: 1**

Senior Year - Spring (13 Credit Hours)

- OSE 4952 - Senior Design II **Credit Hours: 3**
- Restricted Elective - Suggest MAS 3105 Matrix and Linear Algebra **Credit Hours: 4**
- Restricted Elective **Credit Hours: 3**
- Historical Foundation **Credit Hours: 3**

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