



UNIVERSITY OF
CENTRAL FLORIDA

OSE 4952 - Senior Design II

Section: 0001

Optics and Photonics

Course Information

Term: Spring 2026

Class Meeting Days: F

Class Meeting Time: 09:00AM - 11:50AM

Class Meeting Location: CB1 O318

Modality: P

Credit Hours: 3.00

Instructor Information

Name: Aravinda Kar

Title: Prof.

Office Location: CREOL 284

Office Hours

By appointment

Phone: (407) 823-6921

Email: akar@creol.ucf.edu

Name: Paul Leisher

Office Location: CREOL 237

Email: paul.leisher@gmail.com

Course Description

OSE 4952 OPT-OPT 3(3,1) Senior Design II: PR: OSE 4951. Execution of project developed in OSE 4951, including complete project design review, prototyping, construction, testing, cost, functionality, demonstration, presentation, and reporting. Emphasis on team effort. Fall, Spring.

OSE 4952 OPT-OPT 3(3,1) Senior Design II: PR: OSE 4951. Execution of project developed in OSE 4951, including complete project design review, prototyping, construction, testing, cost, functionality, demonstration, presentation, and reporting. Emphasis on team effort.

The Senior Design courses are intended to serve as capstone courses for the Bachelor of Science Degree in the Photonic Science and Engineering. These courses subject the students to an environment unlike majority of their previous curriculum. Students will encounter aspects of engineering design not found in prior course works. Students will be responsible for their own learning as a team. In other classes, students are given homeworks, quizzes, labs and tests in a structured and scheduled manner, but in Senior Design it is the team's responsibility to schedule their project, assign responsibilities, build the functioning device or system that meets specifications, document the results of the team's efforts in written reports.

Student Learning Outcomes

After successful completion of this course, students will be able to:

- Identify specific goals of the designed system, including specifications and realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability constraints,
- Collect information on available components and standards related to design needs,
- Develop appropriate models and using computer tools for system analysis,
- Perform testing and failure analysis,
- Prepare written proposals and deliver technical information through oral presentations, reports and logbooks,
- Work in a team environment,
- Recognize and address ethical issues related to design and engineering,
- Develop customer relationships and mentality.

Required Course Materials and Resources

No required course

Recommended Course Materials

Title: DESIGN FOR ELECTRICAL AND COMPUTER ENGINEERS, McGraw-Hill (Ch. 3), Recommended

Title: SENIOR DESIGN FOR ELECTRICAL AND COMPUTER ENGINEERING STUDENTS, Pearson Custom Publishing (3 chapters), Recommended

Title: Varies by Project, Circuit Simulation Software, Schematic Capture Software, PCB Software, Matlab, Zeemax, Light Tools, etc., Recommended

Course Assessment and Grading Procedure

Attendance: The Final Grade will be based on your attendance, exam performance, presentation performance, and final project documentation. **Attendance in-person is mandatory and failure to meet this requirement may result in one letter grade deduction in the Final Grade.** In addition, failure to comply with course requirements or expectations may further lower your grade as determined to be appropriate by the instructor. Any act of academic dishonesty or unprofessional behavior will result in a failing grade on an exam or in the course.

Project review meetings: As the semester progresses, each student group must schedule Project Review meetings, such as the Critical Design Review (CDR) and Project Demo meetings, by ensuring that Dr. Kar and one of the instructors of EEL 4915L can attend each meeting. The PSE students of each group must confirm the time with Dr. Kar before setting up an appointment with Dr. Chan or one of the instructors of EEL 4915L, depending on whether the student group number is odd or even respectively. **Failure to do so may result in one letter grade deduction from the Final Grade of each photonics student in the group.** Include your Group number on the subject line in all emails to the instructors.

The final grade will be primarily based on the final project documentation and the prototyping and testing of critical project elements. However, the overall course grade may be modified by attendance and by performance in other elements that are submitted for grading as well as for instructors' review, including the initial project idea report, initial project documentation, several draft reports, and quizzes given on the course material. No grades are assigned for each of these elements, only indications of completion are recorded. All course elements are evaluated by the course instructor. All team members are usually awarded the same grade, however, under certain circumstances team members may receive different grades. In cases where group members do not adequately contribute to the project, members may be dropped from the group and those students will receive an F grade for the course.

Outline of Senior Design II (SD2) Grading Rubrics: Due to the complex nature of senior design, the Grading Rubrics may not cover all eventualities. The students should use it as a general guideline to understand the grading policy for the SD1 course.

Group Base Grade (GBG): The base grade for a group in SD2 is determined by averaging over the reviewer panel scores after Presentation and Demonstration (PD) at the end of SD2 with minor adjustment by the instructors (for example, accounting for reviewers' bias, level of photonics content, etc.). The range of average scores and the corresponding grades are listed in the "Grading Scale" section of this syllabus. If a PSE student is in a group with students of another Senior Design course different from EEL 4915L, the students' performance evaluation procedure and the grading rubric of that course will be followed to grade the PSE student.

Note 1: It is the group's responsibility to form a review panel and submit Project Reviewer Commitment Form on time. Panels for Photonics groups must have representation from Optics and Photonics Faculty. If the group fails to form a panel, then the group will receive an F grade.

Note 2: If the group fails to show up at scheduled presentation or arrive late for 15 minutes or more, then the group will receive an F grade. If one member fails to show up at the final presentation, then this individual will receive an F grade and redo SD1 and SD2.

Note 3: If the group fails to demonstrate their project as workable during the period of Live Demo, i.e., Presentation and Demonstration (PD) to the reviewer panel, then the group needs to reschedule the demo within a week (before the final submission date) and receive one letter grade deduction in GBG. If the group cannot demonstrate their project to be workable by then, then the group will receive an F grade.

Note 4: The Photonics Science and Engineering program requires that the project must have substantial photonics design content, and the photonics systems must be well-constructed consistent with the intended use of the product (not using tape, flimsy materials, and not optical breadboard). Also, the final report must include results of testing of the final device or system/prototype. The ECE program requires that the project include substantial PCB design. Noncompliance may affect the photonics and ECE students differently – see the section on the "Justification of each individual grade" below.

For any group that receives an F grade, the whole group must EITHER: Redo SD2 if the whole group can re-enroll together OR: redo SD1 if the whole group cannot hold together or if the Photonics and ECE instructors decide that the group needs to be broken up.

Group Final Grade (GFG): After the Group Base Grade (GBG) is decided, the Photonics and ECE instructors will check the following items to determine the Group Final Grade (GFG). Failure to meet any one of the following requirements will result in one letter grade deduction from the GBG. Multiple failures may result in multiple letter grade deductions.

1. Does the SD2 final report meet the requirements? (page, content, submission on time, hard copy, soft copy). The SD2 report requirements are identical to the SD1 report requirements.
2. Were all group activities on time? (Absence in Critical Design Review (CDR) presentation? Final presentation on time? CDR meeting on time, middle term demo on time? reviewer commitment form on time?)
3. Is the group Website ready? Has the group presented at Senior Design Showcase?

All team members will typically receive the GFG as his or her individual grade for most groups, but each member of some groups may receive a different grade according to the following rules.

Justification of each individual grade: Each team member's grade can be altered from GFG, i.e., each team member may receive a different grade due to following factors. Multiple violations may result multiple letter grade deduction. For example, a student who fails to attend ABET section for 3 times may receive 3 letter grade deductions.

1. Issues with clearly identifiable parts of the project: For example, if the photonics part of the project is trivial, then photonics student(s) will receive a lower grade, or if the PCB does not work, then the ECE student will receive a lower grade. Additionally, if the final report does not include evidence of testing of the final device or system, the photonics student(s) will receive a letter grade penalty. Also, if, for example, faculty reviewers note that "power did not work", the person in charge of power may receive a lower grade. Another example, "optics part is great", so the person in charge of optics may receive a better grade.
2. Peer review form (team member peer review form can alter an individual grade, either lower or higher)
3. Instructor's judgement (the entire SD2 performance and the student's attendance in the "ABET" classes, or attendance in group meetings with instructors can alter an individual grade, either lower or higher).

Assignment Schedule

Due Date	Assignment Name	Assignment Type	Points
	See the "Deadlines" section for project activities and report submissions.		

Grading Scale

Letter Grade	Percentage
A	90% -100%
B	80% - Below 90%
C	70% - Below 80%
D	60% - Below 70%
F	Below 60%

Policies for Course Grade

Make-up Work Policy: Make-ups for assignments are only allowed for special or genuine extenuating circumstances. Per university policy, students must be allowed to turn in make-up work for university-sponsored events, religious observances, or legal obligations such as jury duty. For all other circumstances, the instructor has the final authority to decide whether a make-up is allowed. To be considered for any make-up assignments, students must report to the instructor within 24 hours before or after the missed assignment, and provide justification with appropriate documents.

Missed/Late Assignments: Missed/Late assignments will lead to letter grade deductions. Details are described in the Grading Rubrics.

Attendance: Attendance in classes, bootcamp, and group meetings are all required. A missed attendance with a valid reason can be considered for an override. The instructor has the final authority to decide whether an override is allowed. To be considered for an override, students must report to the instructor within 24 hours before or after the missed attendance, and provide justification with appropriate documents.

Artificial Intelligence (AI) Use Policy

Comparison of ChatGPT with other Similar Platforms:

- compare the limitations, pros and cons of these platforms
- provide 3-4 examples to show how these platforms benefit (or harm) your learning experience in Senior Design

NOTE: you must provide proper citation to any content copied from ChatGPT; failure to do so will result in plagiarism.

Disability Access & Accommodations

The University of Central Florida is committed to providing equal access to all students with disabilities (ADHD, learning disabilities, Autism, chronic medical conditions, physical disabilities, etc.). To receive consideration for reasonable disability-related course accommodations, disabled students must contact Student Accessibility Services (SAS) and complete the steps required for SAS to review accommodation requests. More information can be found on the UCF [Student Accessibility Services](#) website under the Start Here tab or by contacting SAS directly (Ferrell Commons 185; sas@ucf.edu; Phone - 407-823-2371).

Approved accommodations are shared with course instructors via the SAS Course Accessibility Letter. Implementing certain accommodations may require discussion about specific considerations of the course design, course learning objectives, and the individual academic and course challenges experienced by the student. While students with disabilities or chronic health needs are also encouraged to discuss any course concerns with professors in addition to contacting SAS, professors are not required to facilitate disability-related adjustments to the course unless the professor has received a Course Accessibility Letter from SAS that outlines approved accommodations.

Academic Integrity

Students should familiarize themselves with UCF's Code of Conduct at Student Conduct and Integrity Office. According to Section 1, "Academic Misconduct,"

students are prohibited from engaging in:

1. Academic misconduct is defined as any submitted work or behavior that obstructs the instructor of record's ability to accurately assess the student's understanding or completion of course materials or degree requirements (e.g., assignment, quiz, and/or exam). Examples of academic misconduct include but are not limited to: plagiarism, unauthorized assistance to complete an academic exercise; unauthorized communication with others during an examination, course assessment, or project; falsifying or misrepresenting academic work; providing misleading information to create a personal advantage to complete course/degree requirements; or multiple submission(s) of academic work without permission of the instructor of record.
2. Any student who knowingly helps another violate academic behavior standards is also in violation of the standards.
3. Commercial Use of Academic Material. Selling of course material to another person and/or uploading course material to a third-party vendor without authorization or without the express permission of the University and the instructor of record. Course materials include but are not limited to class notes, the instructor of record's slide deck, tests, quizzes, labs, instruction sheets, homework, study guides, and handouts.
4. Soliciting assistance with academic coursework and/or degree requirements. The solicitation of assistance with an assignment, lab, quiz, test, paper, etc., without authorization of the instructor of record or designee is prohibited. This includes but is not limited to asking for answers to a quiz, trading answers, or offering to pay another to complete an assignment. It is considered Academic Misconduct to solicit assistance with academic coursework and/or degree requirements, even if the solicitation did not yield actual assistance (for example, if there was no response to the solicitation).

Responses to Academic Dishonesty, Plagiarism, or Cheating

Students should also familiarize themselves with the procedures for academic misconduct in UCF's student handbook, [The Golden Rule](#). UCF faculty members have a responsibility for students' education and the value of a UCF degree, and so seek to prevent unethical behavior and respond to academic misconduct when

necessary. Penalties for violating rules, policies, and instructions within this course can range from a zero on the exercise to an "F" letter grade in the course. In addition, an Academic Misconduct report could be filed with the Office of Student Conduct and Academic Integrity, which could lead to disciplinary warning, disciplinary probation, or deferred suspension or separation from the University through suspension, dismissal, or expulsion with the addition of a "Z" designated on one's transcript.

Being found in violation of academic conduct standards could result in a student having to disclose such behavior on a graduate school application, being removed from a leadership position within a student organization, the recipient of scholarships, participation in University activities such as study abroad, internships, etc.

Let's avoid all of this by demonstrating values of honesty, trust, and integrity. No grade is worth compromising your integrity and moving your moral compass. Stay true to doing the right thing: take the zero, not a shortcut.

Title IX

Title IX prohibits sex discrimination, including sexual misconduct, sexual violence, sexual harassment, and retaliation. If you or someone you know has been harassed or assaulted, you can find resources available to support the victim, including confidential resources and information concerning reporting options at [Let's Be Clear](#) and [UCF Cares](#).

For more information on access and community engagement, Title IX, accessibility, or UCF's complaint processes contact:

- Title IX – ONAC – [Office of Nondiscrimination & Accommodations Compliance](#) & askanadvocate@ucf.edu
- Disability Accommodation – Student Accessibility Services – [Student Accessibility Services](#) & sas@ucf.edu
- [Access and Community Engagement](#) (including the Ginsberg Center for Inclusion and Community Engagement, Military and Veteran Student Success, and HSI Initiatives)

- UCF Compliance and Ethics Office – [Compliance, Ethics, and Risk Office](#) & complianceandethics@ucf.edu
- The [Ombuds Office](#) is a safe place to discuss concerns.

Reporting an Incident or Issue

If you believe you have experienced discrimination by any faculty or staff member, contact the Office of Nondiscrimination & Accommodations Compliance via the [ONAC website](#) or at 407-823-1336. You can also choose to report using the UCF Integrity Line either anonymously or as yourself at 1-855-877-6049 or by using the [online form](#). UCF cares about you and takes every report seriously. For more information see the [Reporting an Incident or Issue Webpage](#).

Deployed Active-Duty Military Students

Students who are deployed active-duty military and/or National Guard personnel and require accommodation should contact their instructors as soon as possible after the semester begins and/or after they receive notification of deployment to make arrangements.

Campus Safety

At UCF's Public Safety and Police, safety is the top priority. Emergencies on campus are rare, but if one should arise, it's important to be familiar with some basic safety and security concepts.

- In an emergency, always dial 911.
- Every UCF Classroom has an Emergency Procedure Guide posted on a wall near the door, which will show you how to respond to a variety of situations. This guide can also be found online [here](#).
- In the event of an active threat, remember **AVOID, DENY, DEFEND**. Choose the best course of action and act immediately. Watch the video [here](#) to learn more.
 - **AVOID**. Pay attention to your surroundings and have an exit plan. Get as much distance and as many barriers between you and the threat as

quickly as possible.

- **DENY.** When avoiding is difficult or impossible, deny the threat access to you and your space. Lockdown by creating barriers, turning the lights off and remaining quiet and out of sight. Make sure your phone is silenced, but do not turn it off.
- **DEFEND.** When you are unable to put distance between yourself and the threat, be prepared to protect yourself. Commit to your actions, be aggressive and do not fight fairly. Do whatever it takes to survive.
- For emergencies on campus, UCF will utilize the [UCF Alert](#) system. All UCF students, faculty, and staff are automatically enrolled to receive these email and text alerts, however, it's a good idea to frequently ensure your [contact information is up to date](#).

Financial Aid Accountability

All instructors are required to document students' academic activity at the beginning of each course. In order to document that you began this course, please complete this activity by the end of the first week of classes or as soon as possible after adding the course. Failure to do so may result in a delay in the disbursement of your financial aid.

Class Schedule

Tentative Weekly Plan: This table provides an overview of course topics by week.

Week	Topic
1	Introduction, syllabus, ABET 1 Critical Design Review (CDR) meeting, Formats & Hints, ABET 1 Technical tips for project completion
2	ABET 2 Technical tips for project completion
3	CDR report preparation
4	CDR report preparation
5	ABET3 CDR1
6	ABET4 CDR2

Week	Topic
7	ABET5 CDR3
8	ABET6 CDR4
9	Optical system testing and performance verification to meet the engineering requirements specification, integration of optical system with other team members' systems to build the final integrated system/device/prototype
10	End of semester (EOS) lecture, Testing the performance of the integrated system
11	Midterm demo meeting
12	Midterm demo meeting
13	Midterm demo meeting
14	Prototyping and testing of the integrated system to meet the engineering requirements specification, design constraints and standards
15	Live demo and final review meeting, showcase competition
16	Final report due, final exam week

Course Notes

Project Topics: Projects can be in any area of Photonic Science and Engineering but must also have elements that are suitable for members of the group who are electrical and/or computer engineers. Projects are subject to instructor's approval. The instructor may propose some projects. However, it is the student's responsibility to find a suitable project. All projects must be physically realized, documented, and demonstrated by the end of the semester.

Expenses: The university will not provide project parts beyond what is available in school laboratories. The cost of the project may be exclusively yours, exclusively your sponsor's, or may be shared. The most common case is that the project is funded by the student group, or by a sponsoring group, agency or corporation.

NOTE: If project expenses are paid in part or in whole by UCF, then the project becomes the property of the school and it must remain at UCF.

CREOL Purchasing Office: If your Senior Design project has received grants to cover the expenses partially or fully, you should utilize the CREOL Purchasing Office to buy components for your project instead of incurring out-of-pocket expenses. There have been some changes to the reimbursement process. To start, orders should be placed through creol-purchasing@creol.ucf.edu whenever possible. CREOL has accounts with Amazon (Prime), Fisher Scientific, Thorlabs, and many other frequently used vendors. Going through CREOL will make sure that you get the appropriate discounts and tax exemption. In the event, you do need to make an emergency purchase and get reimbursed, here is what you need to do:

1. Send an email to creol-purchasing@creol.ucf.edu detailing what was purchased, why it had to be done as a reimbursement, and provide an account number to charge. Attach copies of your receipts/invoices to the email. They must show what was bought, amounts, and confirm payment was made – an order acknowledgement will not be accepted.
2. Do not stockpile receipts/invoices over many weeks and months. To avoid accounting issues, the receipts/invoices should be submitted to Matt Petrone (creol-purchasing@creol.ucf.edu) as soon as possible. Reimbursements that exceed 60 days could be considered as taxable income or may be ineligible for reimbursement.
3. If you need to make an out-of-pocket purchase more than \$500, check with Matt Petrone (creol-purchasing@creol.ucf.edu) first.

Reimbursements up to \$250 will be paid out in cash; Tavis McLelland will contact you when it's ready for pickup. Reimbursements that are more than \$250 will be processed through Accounting and be direct-deposited into your bank account. The turn-around is usually 1-2 months, depending on the volume of reimbursements. Do not make out-of-pocket purchases if two months without the money will cause you financial hardship.

If you have any questions, please feel free to reach out to creol-purchasing@creol.ucf.edu, or Mark Wagenhauser at markw@creol.ucf.edu.

Laboratory: No formal laboratory work is required. However, virtually all projects require hardware prototyping which will include construction and testing. Laboratory space and facilities will be available for this purpose.

To protect project installations, only students that are registered in the class will be allowed in the lab. You can work in the EECS senior design laboratories during non-business hours and on weekends by using your college keycards, and if needed requesting entry to the engineering building from the UCF Police Department. Identification will be required. Due to the policy stated below, the police will not provide entry to a single student. A minimum of two students are required when working in the laboratory. Permission to use the Photonics senior design lab can be obtained through Mr. Michael McKee.

Safety: University policy requires that for safety reasons, at least two people must be present in the laboratory premises at any time. Violators will be asked to leave the laboratory premises. Since it is not possible to police this policy at all the times, violators will be working entirely at their own risk.

Consultations: Consulting on each project will be available either from the course instructor or from any other Optics or ECE Department faculty member who has expertise on the topics of your project. Each team is encouraged to find a faculty member who will act as a technical advisor for the project. Appointments should be made for consultation times.

Final Documentation: The required final documentation consists of a formal technical document consisting of research, design, theory of operation, construction and testing.

Important: Final reports for photonics projects **MUST** contain a section at the end which contains results of testing of the final device or system/prototype built during the SD2 semester. Where appropriate, this section should describe any explanation of why specifications or constraints were not met.

Deadlines

The deadlines for a few selected topics are presented in the table below. The deadlines for other project activities (e.g., report submission, presentation, project review meetings, live demo, and CECS showcase) will be announced during the semester.

Topic	Deadline
-------	----------

Academic activity verification	Students' academic activity is required by UCF to be recorded at the beginning of each course. The assignment to complete the academic activity verification is that you upload a pdf file to the OSE 4952 webcourse Assignments Section on or before Friday in the first week of classes. The pdf file should contain your name, group number and the title of your project. Failure to do so may result in a delay in the disbursement of your financial aid.
Project summary report (1-page limit) for the CREOL showcase competition	April 3, Friday. Each PSE group is required to submit a one-page Project Summary report to the Assignment Section of OSE4952_CMB-26Spring 00233. The files of all the PSE groups will be sent to the judges of the CREOL showcase competition as a brief description of the projects. We may also upload the files to a CREOL website to publicize the projects. The details of the submission procedure will be provided in the Assignment Section of OSE4952_CMB-26Spring 00233 webcourse. Failure to submit this assignment may result in one letter grade deduction from the Final Grade of the photonics student.
CREOL showcase competition (in-person event)	April 23, Thursday (9:00 AM – 12:00 PM, CREOL lobby). Showcase your entire project. The project must be set up before 9 AM to have it ready for demo at 9 AM. Failure to do so may result in one letter grade deduction from the Final Grade of each photonics student in a group.
Reflective memo	April 27, Monday. Each PSE student is required to submit a Reflective Memo to the Assignment Section of OSE4952_CMB-26Spring 00233. Failure to submit this assignment may result in one letter grade deduction from the Final Grade of the photonics student.

.zip file	April 29, Wednesday. Each PSE student is required to submit a .zip file to the Assignment Section of OSE4952_CMB-26Spring 00233. The contents (8-page conference paper, Final Report, and Final Presentation Slides) of the .zip file will be posted on CREOL's webpage. The details of the submission procedure will be provided in the Assignment Section of OSE4952_CMB-26Spring 00233 webcourse. Failure to submit this assignment may result in one letter grade deduction from the Final Grade of the photonics student.
-----------	--