OSE 4930 - FRONTIERS OF OPTIC & PHOTONICS

Section: 0001

Optics and Photonics

Course Information

Term: Fall 2025
Class Meeting Days: WF
Class Meeting Time: 03:00PM - 04:15PM
Class Meeting Location: BA1 O121
Modality: P
Credit Hours: 3.00

Instructor Information

Name: Stephen Kuebler
Title: Professor of Chemistry and Optics
Office Location: PSB 347
Office Hours
Office hours available throughout the week. Please email to make an appointment so we can find a time that fits with your busy schedule.
Email: Stephen.Kuebler@ucf.edu

Course Description

OSE 4930 OPTIC 3(3,0)Frontiers of Optics and Photonics: PR: C grade (2.0 gpa) or higher in OSE 3052 or passing grade in PHY 4424 or EEL 4440C, Senior Standing. Introduction to recent advances in optics & photonics, to ethical issues, and to effective communication appropriate to the field of optics & photonics. Fall

This course introduces recent advances in optics and photonics and enables students to enhance professional skills needed for success in the career. Throughout the semester, students will complete scaffolded assignments that build and assess their applied understanding of:

- Written, oral, and multi-media communication;

- Interpersonal skills and professional networking;

- Literature research methods;

- Structure of the local, national, and global optics and photonics industry;

- Intellectual property and entrepreneurship;

- Ethical and responsible conduct;

- Professional and ethical use of artificial intelligence (AI); and

- Philosophical origins of science and the scientific method.

Students will read and critique case studies, including ethical issues associated with research and data management, and selected papers from technical magazines and journals (e.g., *J. Modn. Opt.*, *J. Opt. Soc. Amer.*, *Optics and Photonics News*, *Physics Today*, *IEEE Spectrum*, *IEEE Circuits & Devices*). Students will hear presentations from experts in our field, to accompany selected readings and assignments. As possible, site visits will be arranged to local companies working at the frontier of optics and photonics.

By the end of the course, each student will have created a portfolio of writings and presentation materials that showcase their understanding of modern optics and photonics; communication skills; interdisciplinarity; professional ethics and responsibility; and how their technical field is connected with issues like manufacturability, sustainability, health and safety, and other economic, environmental, or social constraints.

The course includes several tours of local optics companies. The tours are optional, but participation is strongly encouraged -- past students have obtained internships and other valuable connections through the tours. Some companies are involved in protected work under federal contracts which prevents them from admitting foreign nationals. For many tours, students will be asked to voluntarily provide their citizenship.

Students do not have to provide this information, but they may not be able to participate in a given tour if they do not. Grades are not affected by participation in the tours.

Class Schedule

Click the link below to view our course schedule.

https://webcourses.ucf.edu/courses/1486780/pages/course-schedule?module_item_id=19779940

Student Learning Outcomes

This course is structured around learning outcomes that map to [Criteria for Accrediting Engineering Programs (ABET)](#). Outcomes relevant to this course are listed below, along with specific measures and performance criteria used to gauge overall success of the course. The table below indicates the level at which ABET Criteria are emphasized in the course.

Outcome 3: Graduates have an ability to communicate effectively with a range of audiences.

Measure 3.1:
A passing student must be able to demonstrate effective written communication for specified audiences using technical written communication modes, such as reports, publication, patents, or proposals.

Performance criteria:
90% of passing students are proficient or minimally proficient.

Measure 3.2:
A passing student must be able to demonstrate effective oral communication techniques for specified audiences, using conference presentations, posters, seminars, "elevator speeches", or presentations without visual aids.

Performance criteria:
90% of passing students are proficient or minimally proficient.

Outcome 4: Graduates have an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts.

Measure 4.1:
A passing student must be able to demonstrate knowledge of the ethical issues regarding publications and the peer review process, work credit sharing allocations, data management and reporting, citations and plagiarism.

Performance criteria:
100% of passing students are proficient or minimally proficient.

Measure 4.2:
A passing student must be able to recognize ethical and professional conduct by being well informed about global, economic, environmental and societal issues as an engineering solution is realized.

Performance criteria:
100% of passing students are proficient or minimally proficient.

Outcome 7: Graduates have an ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

Measure 7.2:
A passing student must be able to demonstrate the ability to self-learn content beyond that taught in classroom instruction.

Performance criteria:
80% of passing students are proficient or minimally proficient.

Level of ABET-Criterion Emphasis

	Criteria (adopted 2019)	*Emphasis*
1.	Graduates have an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics.	Medium
2.	Graduates have an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors.	High
3.	Graduates have an ability to communicate effectively with a range of audiences.	High

4.	Graduates have an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts.	High
5.	Graduates have an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives.	High
6.	Graduates have an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions.	Medium
7.	Graduates have an ability to acquire and apply new knowledge as needed, using appropriate learning strategies.	High

Topics Covered in Course

The topics covered in this course are listed below. These are divided among weekly modules. Please see *Assignments* and *Class Schedule* for full details on all activities and deliverables.

- Historical perspective of the field of Optics and Photonics
- Engaging the optics literature
    - Refereed vs. non-refereed journals, books, proceedings, conference papers
    - Major journals in the field and quality measures
    - Peer review process
    - Publishing research
- Ethics and responsible conduct
    - Professional and ethical use of artificial intelligence (AI), including large-language models (LLMs), such as ChatGPT
    - Handling and reporting data

- - Authorship, and peer review
  - Conflict of interest and disclosure
  - Fostering a professional relationship between mentor and mentee or supervisor and employee
  - The value of diversity
- Philosophy of science and development and application of scientific method
- Communicating effectively
  - Written forms: abstracts, reports, publications, patents, proposals
  - Oral forms: "elevator speeches", conference talks, posters, seminars.
  - Multimedia: developing and presenting with audio-visual (AV) material
  - Tailoring communication to the audience
  - Non-verbal communication (e.g., facial expression, haptics, proximics, etc.)
- Structure of the optics industry
- Intellectual property
- Entrepreneurship
- Students' team-assignments: Investigating the Focus Topic; reading and analyzing the literature; creating written descriptions of the Focus Topic; creating and delivering oral presentations on the Focus Topics; working as a team.

Required Course Materials and Resources

All materials are available through WebCourses (see below).

Course Assessment and Grading Procedure

Rubric for Scoring Assignments

The table below provides the rubric that will be used for scoring written and oral assignments. The weighting is divided according to the skills that are emphasized in the course across all activities.

Rubric for Scoring Assignments

	Criteria	Points
1.	Knowledge of professional ethics and responsibility (thoroughness in team work, acknowledging credit, citation, and handling data).	15
2.	Effectiveness in communication (expression of ideas, accessibility by the target audience, clarity, conciseness).	20
3.	Knowledge of historical perspectives and societal impacts.	15
4.	Creativity, originality, and ability to self-learn.	15
5.	Technical understanding of the field (e.g., technical content, thoroughness of research, knowledge of products, intellectual property, and research and development).	15
6.	Professionalism (e.g., proper use of formatting, spelling, neatness, consistency).	20
	Totals	**100**

Method of Scoring

Scores earned for the various assignments will be weighted per the table below and summed to obtain an overall course-score. The final letter grade for the course will be determined according to the subsequent table. Scores and grades will not be rounded up under any circumstances. Grades for all assignments will be posted on WebCourses. Further information on assignments follows below.

Weighting of Assignments and Course Components

	Component	Weighting
1.	Engagement and participation (e.g., engagement in the course, preparedness when called on, evidence of completing outside reading)	10%
2.	Short-form assignments (e.g., Significance-of-Optics essay, Abstracts, and Elevator Speech, each weighted equally)	15%

	Component	Weighting
3.	Professional development exercises (EndNote Library, CITI training, Resume, LinkedIn Page, each weighted equally)	15%
4.	Reviews of technical papers (each weighted equally)	10%
5.	1000-word essay on focus topics	15%
6.	Multi-media presentation	10%
7.	Oral delivery of multi-media presentation	5%
8.	Final Exam	20%
	Total	**100%**

Grading Scale

Rubric for Assigning Letter Grades

Course score	Grade	Rubric description
93 to 100	A	Excellent. Demonstrates strong understanding and of all concepts and is able to express and apply them in novel ways. Has full mastery of the content of the course.
90 to < 93	A -	
87 to < 90	B +	Good. Demonstrates strong understanding of most or all of the concepts and is able to apply them to stated and defined situations.
83 to < 87	B	
80 to < 83	B -	

Course score	Grade	Rubric description
77 to < 80	C +	Satisfactory. Demonstrates a basic understanding of the major concepts and is able to apply them to basic situations.
73 to < 77	C	
70 to < 73	C -	
67 to < 70	D +	Below satisfactory. Demonstrates rudimentary understanding of concepts and applied a limited number in basic situations.
63 to < 67	D	
60 to < 63	D -	
< 60	F	Did not demonstrate adequate understanding of the concepts.

Grade Objections

All objections to grades should be submitted by email within one week of the work in question. Objections made after this period has elapsed cannot be considered.

Policies for Course Grade

Attendance

In-person attendance is required at all class meetings. Concepts will be discussed heavily in class and students will earn credit toward *Engagement and Participation* by actively engaging in discussion. Students need to be prepared by studying assigned materials prior to class. Students may also need to go beyond the material provided by

looking up terms and concepts and consulting secondary sources. Full credit for participation is earned by actively contributing to discussions with thoughtful responses that reflect thorough study and comprehension of assigned readings. The instructor will provide regular feedback concerning the quality of their contributions, and the final score will be based on a semester-long assessment of contributions to discussion.

Course Schedule and Due Dates

Many assignments are designed to run over several weeks, or in some cases, throughout the entire semester. The <Assignments> link includes start dates and due dates. These are also visible in the *Course Schedule* and your *Course Calendar*. You are responsible for carefully monitoring the due dates and ensuring that assignments are submitted on time. *Submissions will be marked down by 10% for each day they are late.*

Some assignments are eligible for resubmission and rescoring. The higher score from the two submissions will be retained as the final score for the assignment. You do not have to re-submit if you are satisfied with your score from the first version. The instructor will provide feedback on each assignment. You have seven (7) days after receiving feedback to re-submit a corrected version via WebCourses. The system will automatically mark the second version as submitted "LATE," but do not be concerned about that. The instructor must prioritize scoring of first-submissions for all assignments, so it you may not receive a score on your second draft until several weeks later in the semester.

Make-Up Assignments

Assignments missed without an approved University excuse will receive a zero. Per UCF policies, you are allowed to submit make-up work (or an equivalent, alternate assignment) for authorized university-sponsored activities, religious observances, or legal obligations (such as jury duty). If this participation conflicts with your course assignments, you will be offered a reasonable opportunity to complete missed assignments. The make-up assignment and grading scale will be equivalent to those of the missed assignment. For authorized university activities, submit a signed copy of the Program Verification Form at least one week before the absence. Contact the instructor ahead of time to notify of upcoming needs.

Sickness

The student must notify the instructor as soon as possible if they must miss class or cannot complete an assignment due to sickness. An assignment missed for illness will be excused only if the student provides a note signed by their health-provider stating they were unable to attend class of complete the assignment by the due date because of the malady.

Emergencies

"Life happens" and real emergencies due occur! These can prevent a student from attending class or completing assignments. If an emergency occurs, contact the instructor when you are able. Be prepared to provide valid documentation that enables the instructor to justify why you might be given an extension on an assignment or excused from it altogether.

Note that not life-events are true emergencies. Each situation is subject to review by the instructor. The instructor will use professional judgement to determine if the student had reasonable opportunity to complete the assignment on time or if their situation should be accommodated in a special way. Keep in mind that University policy requires that all students are treated fairly. The instructor can not justify excusing an assignment or granting extra opportunity or time to complete an assignment without good justification.

Final Grade with Excused Assignments

When assignments are excused for illness of emergency, the final grade will be calculated from a proportionally weighted average of the remaining assignments.

Plagiarism Checking and TurnItIn.com

In this course we will utilize TurnItIn, an automated system which instructors can use to compare each student assignments quickly and easily with billions of web sites, as well as an enormous database of student papers that grows with each submission. Submissions will be automatically run through TurnItIn. After the assignment is processed, the instructor receives a report that states if and how another author's work was used in the assignment. For a more detailed look at this process, please visit

http://www.turnitin.com. Plagiarism is academic misconduct that incurs penalties as discussed below.

Courtesy and Professional Behavior

All students are expected to conduct themselves in a manner consistent with the student code of conduct, as set forth in the Golden Rule, so that everyone in the class has an opportunity to learn, free from interruptions and distractions. This means that during synchronous learning, in-class, and off-campus visits:

- Cell phones are off, or only used for class activities;
- Students are attentive do not text or engage in distracting computers use, including email, surfing the web, playing video games, etc.
- Students do not converse outside of directed discussion.
- Students arrive/log-in on time.

Please do all you can to help maintain a positive and productive classroom environment.

Amendment of Syllabus

The instructor reserves the right to modify the schedule, the testing procedure, and the grading basis if, in the professional judgment of the instructor, such modification is in the best interest of fulfilling the course objectives and assuring the academic integrity of the course and the University.

Copyright

This course contains copyright-protected materials, including teaching materials, audio and video clips, images, etc. These items are being used in accordance with the Fair Use doctrine to facilitate learning. Do not copy, duplicate, or distribute these items. The use of these materials is strictly reserved for your learning. All copyright materials are credited to the copyright holder. Violating copyright is a crime and subject to legal prosecution.

Artificial Intelligence (AI) Use Policy

For each assignment, you must carefully review the instructions to determine whether AI-generated content (GenAI) is permitted. A few assignments specifically require use of GenAI. For all others, using GenAI is not permitted. When using GenAI, you must disclose specifically where and how it was used in the process of completing the assignment. Unless explicitly allowed, all components of your work must be fully prepared by you. Any attempt to represent GenAI output inappropriately as your own work will be treated as plagiarism. Ultimately, students are responsible for the accuracy and veracity of submitted work whether AI-generated or not.

Submitting Assignments

Work will not be scored unless <u>all</u> of the following requirements are met.

- All assignments are submitted through WebCourses.

- Written assignments must be completed using Microsoft (MS) Word, unless stated otherwise.

- The multimedia presentation must be completed in PowerPoint.

- All assignments should be submitted in their native format (e.g., .doc/docx for MS Word and .ppt/pptx for PowerPoint). Do not submit PDFs unless otherwise requested.

- Name submitted files using the format shown below.

    Format:

        "First_and_Last_Name__Assignment_Name__ver_#.docx"

    Examples:

        "Stephen_Kuebler__Technical_Abstract__ver_1.docx"

        "Mike_McKee__Slides_1st_Draft__ver_1.ppxt"

To see an example of a submission, click here: [Example submission, showing formatting and use of LLM](#).

You could create your own format, but make it professional, as if it were being submitted it to a supervisor in a company. This will help you to begin developing

professional habits that serve you throughout your career. Follow any additional formatting requirements provided in the description of individual assignments.

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 assignment, 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" designation 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.

Notifications in Case of Changes to Course Modality

If the instructor falls ill during the semester, there may be temporary changes to this course, including having a backup instructor take over the course or going remote for a short time. Please look for announcements or mail in WebCourses@UCF or your UCF email for any temporary alterations to this course.

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 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 cell 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/faculty 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.