Course Syllabus

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CREOL, The College of Optics and Photonics

Frontiers in Optics

OSE 4930

Instructor Information

- Instructor: Dr. Stephen M. Kuebler
- Office Location: Physical Sciences Building (PSB), Room 347
- Office Hours: By appointment, via Zoom or in-person when possible
- Phone: 407-823-3720
- Email: kuebler@ucf.edu (mailto:kuebler@ucf.edu;)
- Web-page: https://npm.creol.ucf.edu/ (https://npm.creol.ucf.edu/)

Course Information

- Term: Fall 2020
- Course Number & Section: OSE 4030, Section 0001, Course ID 89126
- Course Name: Frontiers in Optics
- Credit Hours: 3
- Class Meeting Days: Wednesday and Friday
- Class Meeting Time: 3:00 pm - 4:15 pm
- Class Location: All synchronous meetings are online, via Zoom
- Course Modality: V (synchronous meetings blended with online)

COVID-19 Return-to-Campus Plan and Requirements

COVID-19 has made life more complicated, to be certain! By working together and following UCF policies, we can help ensure all students enjoy high-quality and safe learning. Follow the link below to find out what UCF's policies are related to learning during COVID-19 and what your responsibilities are. UCF's policies will be strictly enforced in this course.

https://www.ucf.edu/coronavirus/ (https://www.ucf.edu/coronavirus/)

https://policies.ucf.edu/documents/PolicyEmergencyCOVIDRet urnPolicy.pdf (https://policies.ucf.edu/documents/PolicyEmergencyCOVIDReturnPolicy.pdf)

University-Wide Face Covering Policy for Common Spaces and Face-to-Face Classes

To protect members of our community, everyone is required to wear a facial covering inside all common spaces including classrooms (https://policies.ucf.edu/documents/PolicyEmergencyCOVIDReturnPolicy.pdf (https://policies.ucf.edu/documents/PolicyEmergencyCOVIDReturnPolicy.pdf) . Students who choose not to wear facial coverings will be asked to leave the classroom by the instructor. If they refuse to leave the classroom or put on a facial covering, they may be considered disruptive (please see the Golden Rule (https://goldenrule.sdes.ucf.edu/) for student behavior expectations). Faculty have the right to cancel class if the safety and well-being of class members are in jeopardy. Students will be responsible for the material that would have been covered in class as provided by the instructor.

Notifications in Case of Changes to Course Modality

Depending on the course of the pandemic during the semester, the university may make changes to the way classes are offered. If that happens, please look for announcements or messages in Webcourses@UCF or Knights email about changes specific to this course.

COVID-19 and Illness Notification

Students who believe they may have a COVID-19 diagnosis should contact UCF Student Health Services (407-823-2509) so proper contact tracing procedures can take place.

Students should not come to campus if they are ill, are experiencing any symptoms of COVID-19, have tested positive for COVID, or if anyone living in their residence has tested positive or is sick with COVID-19 symptoms. CDC guidance for COVID-19 symptoms is located here: (https://www.cdc.gov/coronavirus/2019-ncov/symptoms-testing/symptoms.html (https://www.cdc.gov/coronavirus/2019-ncov/symptoms-testing/symptoms.html))

Students should contact their instructor(s) as soon as possible if they miss class for any illness reason to discuss reasonable adjustments that might need to be made. When possible, students should contact their instructor(s) before missing class.

In Case of Faculty Illness

If the instructor falls ill during the semester, there may be changes to this course, including having a backup instructor take over the course. Please look for announcements or mail in Webcourses@UCF or Knights email for any alterations to this course.

Course Accessibility and Disability COVID-19 Supplemental Statement

Accommodations may need to be added or adjusted should this course shift from an on-campus to a remote format. Students with disabilities should speak with their instructor and should contact **sas@ucf.edu (mailto:sas@ucf.edu)** to discuss specific accommodations for this or other courses.

Abbreviated Course Description

Introduction to recent advances in optics and photonics, to ethical issues, and to effective communication appropriate to the field of optics and photonics.

Detailed Course Description

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; 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, social, or political constraints.

Student Learning Outcomes

This course is structured around learning outcomes that map to **Criteria for Accrediting Engineering Programs (ABET) (https://www.abet.org/accreditation/accreditation-criteria/criteria-for-**

accrediting-engineering-programs-2020-2021/) . Outcomes relevant to this course are listed below, along with specific measures and performance criteria used to gauge overall success of the course. Table 1 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.

Table 1. Level of emphasis of ABET Criteria in the course.

	ABET 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. Please see Assignments and the Course 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
  - Handling and reporting data
  - Authorship, and peer review
  - Conflict of interest and disclosure

    - Diversity and inclusion
- 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
    - Writing abstracts
- Students’ projects: select topics, prepare literature reviews, present oral presentations on topics, write abstracts of presentations
- Structure of the optics industry
- Intellectual property
- Entrepreneurship
- History of optics and photonics
- Philosophy of science and development and application of scientific method

Prerequisites

- Senior standing
- Introduction to Photonics (OSE 3052), Optics (PHY 4424), or Optical Engineering (EEL 4440).
- There are no co-requisites

Required Course Materials and Resources

- Access to WebCourses
- Access to the UCF library's holdings, public-use computers, and information technology resources
- Use of Zoom for synchronous learning
- Email

WebCourses

This syllabus, other course materials, and assignments are available on WebCourses. All students are already enrolled in WebCourses. WebCourses is accessible from **https://my.ucf.edu/ (https://my.ucf.edu/)** . Many of the assignments require you to read materials that are available for download from WebCourses or elsewhere on the web. To be successful in this course, it is essential that you read these materials carefully and complete the corresponding assignments prior to each class period, per the assignment schedule below. Scores for all assignments and final grades in the course will be posted on WebCourses.

Email

The instructor will communicate with students frequently using e-mail. ***UCF requires faculty to communicate with students exclusively via knights.ucf.edu accounts***. Make sure that you check

your knights account frequently. If you do not, you may miss important announcements regarding grades, exam content, etc.

University Writing Center

The University Writing Center (UWC) offers writing support to UCF students from first-year to graduate in every discipline. Trained peer consultants provide help at every stage of the writing process, including understanding assignments, researching, drafting, revising, incorporating sources, and learning to proofread and edit. The UWC's purpose is not merely to fix papers or to make better writers, but to teach writers strategies to navigate complex situations for writing, both in and outside the University.

Consultations are available for individuals and small groups. To make the best use of the UWC, visit at the start of the semester and several times with drafts for review far enough before your due date to allow yourself time to revise after your consultation. Browse the writing resources on their website, and arrange a regular weekly appointment for longer-term help. You may schedule a 45-minute appointment by phone or by using the TutorTrac scheduler on the UWC website. Walk-in consultations are also available.

Contact UWC staff:

- Email: **uwc@ucf.edu (mailto:uwc@ucf.edu)**
- **(mailto:uwc@ucf.edu)** Web: **http://uwc.ucf.edu (http://uwc.ucf.edu)**
- Tele: 407-823-2197
- Trevor Colbourn Hall, Rm 109
- Satellite Locations: Main Library & Rosen Library

Privacy and Use of Third-Party Tools

Throughout the course we will use third-party tools, such as EndNote and LinkedIn, that can be used free of charge, or are made available through normal student- activity fees. Students are responsible for reading and understanding the terms of use for these products. Students should bring to the instructor any questions or concerns they have about using these products.

Students should carefully consider what information disclose in assignments and what they enter into third-party systems. For example, students will create a personal account on LinkedIn and develop an online resume that helps develop a professional network. Students are encouraged to include information that showcases professional achievements and qualifications. But students should only post information they are are comfortable disclosing. They are not required to disclose any personal and identity-sensitive information. Where appropriate you may use a pseudonym or nickname.

Students should never disclose private information or make non-constructive comments about classmates. Some assignments will be reviewed by classmates to obtain valuable peer-feedback that helps improve skills, such as writing and oral communication. Students providing feedback should be considerate, constructive, and respectful with their remarks.

Grading and Assessment

Method of scoring

Scores earned for the various assignments will be weighted per Table 1 and summed to obtain an overall course score. The final letter grade for the course will be determined according to Table 2. Scores and grades will not be rounded under any circumstances. Grades for all assignments will be posted on WebCourses. Further information on assignments follows below.

Table 1. Weighting of assignments and course components.

	Component	***Weighting***
1.	Engagement and participation (e.g., participation in online and/or synchronous discussions, preparedness via outside reading)	10%
2.	Short-form assignments (Significance-of-Optics essay, Technical Abstract, Layman's Abstract, and Elevator Speech, each weighted equally)	15%
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%**

Table 2. 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

83 to < 87	B	concepts and is able to apply them to stated and defined situations.
80 to < 83	B -	
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.

Rubric for Scoring Assignments

Table 3 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.

Table 3. Rubric for scoring assignments.

	Criteria	***Points***
1.	Knowledge of professional ethics and responsibility.	15
2.	Effectiveness in communication.	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.	15
6.	Professionalism (e.g., proper use of formatting, spelling, neatness, consistency).	20
	Totals	**100**

Make-Up Exams and Assignments

Assignments missed without an approved University excuse will receive a zero. Per **UCF policy #4-401 (http://policies.ucf.edu)** , 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.

If an illness/emergency arises and a student cannot submit assigned work on or before the scheduled due date or cannot take an exam on the scheduled date, the student **must** notify the instructor **no less than 24 hours before** the scheduled date and **no more than 48 hours after the** scheduled date. An assignment missed for illness/emergency will be excused if the student provides a note signed by their health provider stating they were unable to take the test on the scheduled day due to malady. The final grade will then be calculated from a proportionally weighted average of the remaining exams and assignments.

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 will not be considered.

University Services and Resources

Academic Services and Resources

A list of available academic support and learning services is available at **UCF Student Services (https://www.ucf.edu/services/)** . Click on "Academic Support and Learning Services" on the right-hand side to filter.

Non-Academic Services and Resources

A list of non-academic support and services is also available at **UCF Student Services (https://www.ucf.edu/services/)** . Click on "Support" on the right-hand side to filter. If you are a UCF Online student, please consult the **UCF Online Student Guidelines (https://www.ucf.edu/online/resources/guidelines/)** for more information about your access to non-academic services.

Policy Statements

Academic Integrity and Misconduct

Students should familiarize themselves with **UCF's Rules of Conduct (http://osc.sdes.ucf.edu/process/roc)** . According to Section 1, "Academic Misconduct," students are prohibited from engaging in:

- *Unauthorized assistance*: Using or attempting to use unauthorized materials, information or study aids in any academic exercise unless specifically authorized by the instructor of record. The unauthorized possession of examination or course-related material also constitutes cheating.
- *Communication to another through written, visual, electronic, or oral means*: The presentation of material which has not been studied or learned, but rather was obtained through someone else's efforts and used as part of an examination, course assignment, or project.
- *Commercial Use of Academic Material*: Selling of course material to another person, student, and/or uploading course material to a third-party vendor without authorization or without the express written permission of the university and the instructor. Course materials include but are not limited to class notes, Instructor's PowerPoints, course syllabus, tests, quizzes, labs, instruction sheets, homework, study guides, handouts, etc.
- *Falsifying or misrepresenting* the student's own academic work.
- *Plagiarism*: Using or appropriating another's work without any indication of the source, thereby attempting to convey the impression that such work is the student's own.
- *Multiple Submissions*: Submitting the same academic work for credit more than once without the express written permission of the instructor.
- *Helping another violate* academic behavior standards.

For more information about Academic Integrity, students may consult **The Center for Academic Integrity (https://academicintegrity.org/)** . For more information about plagiarism and misuse of sources, see "**Defining and Avoiding Plagiarism: The WPA Statement on Best Practices (http://wpacouncil.org/node/9)** ."

Response to Academic Misconduct

Students should also familiarize themselves with the procedures for academic misconduct in UCF's student handbook, **The Golden Rule. (http://goldenrule.sdes.ucf.edu/docs/goldenrule.pdf)** UCF faculty members have a responsibility for students' education and the value of a UCF degree, and so seek to prevent unethical behavior and when necessary respond to academic misconduct. Penalties can include a failing grade in an assignment or in the course, suspension or expulsion from the university, and/or a "Z Designation" on a student's official transcript indicating academic dishonesty, where the final grade for this course will be preceded by the letter Z. For more information about the Z Designation, see **http://goldenrule.sdes.ucf.edu/zgrade (http://goldenrule.sdes.ucf.edu/zgrade)** .

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. You will submit all assignments electronically through

WebCourses. 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 (http://www.turnitin.com/) . Plagiarism is academic misconduct that incurs penalties as discussed above.

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 (http://www.goldenrule.sdes.ucf.edu), 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.

Course Accessibility Statement

The University of Central Florida is committed to providing access and inclusion for all persons with disabilities. Students with disabilities who need disability-related access in this course should contact the professor as soon as possible. Students should also connect with Student Accessibility Services (http://sas.sdes.ucf.edu/) (http://sas.sdes.ucf.edu/ (http://sas.sdes.ucf.edu/) , phone (407) 823-2371, sas@ucf.edu (mailto:sas@ucf.edu) , Ferrell Commons 185). Through Student Accessibility Services, a Course Accessibility Letter may be created and sent to professors, which informs faculty of potential access and accommodations that might be reasonable. Determining reasonable access and accommodations requires consideration of the course design, course learning objectives and the individual academic and course barriers experienced by the student.

If anyone believes the design of this course poses barriers to participating effectively and/or demonstrating learning in this course, please contact the instructor (with or without an SDS accommodation letter) to discuss reasonable options or adjustments. During our discussion, the instructor may suggest the possibility/necessity of consulting SDS staff to talk about academic accommodations. You are welcome to discuss accommodations with the instructor at any time, but accommodations cannot be arranged within one week of the due date of an assignment, so it is best to raise such issue as soon as possible.

Diversity and Inclusion

In order to learn, we must be open to the views of people different from ourselves. Each and every voice in the class is important and brings with it a wealth of experiences, values, and beliefs. Please

honor the uniqueness of your fellow classmates, and appreciate the opportunity we have to learn from each other. Please respect your fellow students' opinions and refrain from personal attacks or demeaning comments.

The University of Central Florida recognizes that our individual differences can deepen our understanding of one another and the world around us, rather than divide us. In this class, people of all ethnicities, cultures, gender identities, religions, ages, sexual orientations, disabilities, and socioeconomic backgrounds are strongly encouraged to share their rich array of perspectives and experiences. If you feel your differences may in some way isolate you from UCF's community or if you have a need of any specific accommodations, please speak with the instructor early in the semester. We will work together to address your concern and make all reasonable steps to help you become an active and engaged member of our class and community.

Campus Safety

Emergencies on campus are rare, but if one should arise during class, everyone needs to work together. Students should be aware of their surroundings and familiar with some basic safety and security concepts.

- In case of an emergency, dial 911 for assistance.
- Every UCF classroom contains an emergency procedure guide posted on a wall near the door. Students should make a note of the guide's physical location and review the online version at <**http://emergency.ucf.edu/emergency_guide.html (http://emergency.ucf.edu/emergency_guide.html)** >.
- Students should know the evacuation routes from each of their classrooms and have a plan for finding safety in case of an emergency.
- If there is a medical emergency during class, students may need to access a first-aid kit or AED (Automated External Defibrillator). To learn where those are located, see <**http://www.ehs.ucf.edu/AEDlocations-UCF (http://www.ehs.ucf.edu/AEDlocations-%0A%0AUCF)** > (click on link from menu on left).
- To stay informed about emergency situations, students can sign up to receive UCF text alerts by going to <**https://my.ucf.edu (https://my.ucf.edu/)** > and logging in. Click on "Student Self Service" located on the left side of the screen in the toolbar, scroll down to the blue "Personal Information" heading on the Student Center screen, click on "UCF Alert", fill out the information, including e-mail address, cell phone number, and cell phone provider, click "Apply" to save the changes, and then click "OK."
- Students with special needs related to emergency situations should speak with their instructors outside of class.
- To learn about how to manage an active-shooter situation on campus or elsewhere, consider viewing this video (<**You CAN Survive an Active Shooter (https://youtu.be/NlKYajEx4pk)** >).

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 related arrangements.

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 may contain copyright protected materials such as audio or video clips, images, text materials, etc. These items are being used with regard to the Fair Use doctrine in order to enhance the learning environment. Please do not copy, duplicate, download or distribute these items. The use of these materials is strictly reserved for this online classroom environment and your use only. All copyright materials are credited to the copyright holder.

Submitting Assignments

All assignments are submitted through WebCourses. Assignments will not be scored unless all requirements are met. Written assignments must be completed using Microsoft (MS) Word. 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__Laymans_Abstract__ver_1.docx"

"Mike_McKee__Slides_1st_Draft__ver_1.ppxt"

Assignments

Overview

Throughout the semester you are responsible for reading multiple sources, preparing for discussion of these materials, completing written assignment submitted via WebCourses, and delivering presentations at designated times (or uploading to pre-recorded videos to WebCourse). The assignments in written, oral, and multi-media communication will expand on a "Focus Topic" in Optics and Photonics. The assignments are "scaffolded" − increasing in complexity, length, and the required use of communication methods − so that you can progressively develop your skills throughout the semester.

Teaming and Focus Topic

Students are assigned to teams of two or more. Each team will explore their assigned Focus Topic together. Your assignment to teams can be found in WebCourses under <Files>. Several assignments listed will be completed individually (e.g., the Technical Abstract, Layman's Abstract, and Elevator Speech). The team will work together on the 1000 Word Essay, Power Point Presentation, and the Oral Presentation, submitting those as a group and delivering the Oral Presentation to the class as a group. Each member of the group is expected to speak, presenting a reasonably equal part of the presentation.

Scoring Assignments

All assignments will be evaluated and returned for your review to help you improve your skills. For lengthier assignments, you are asked to submit multiple drafts so the instructor can provide feedback that helps you improve your technique and the quality of the final product. All assignments will be scored according to the rubric in Table 3. The rubric maps to the specific learning objectives associated with this course.

Correct use of grammar and spelling is essential! Scores in the "Professionalism" category (see Table 3) will be significantly reduced for each instance of incorrect grammar or spelling. To ensure that assignments are free of grammar and spelling errors, use the following resources: 1) Use the spelling and grammar checking tools built into MS-Word; 2) Proofread your work carefully; 3) Consult references texts like Strunk and White's *The Elements of Style* (see reading list) for proper grammar usage; 4) Have a peer proof-read your work; 5) use the University Writing Center; 6) Consider using online tools like Grammarly, but be careful -- these tools are not always correct, particularly for discipline specific usage.

Rescoring and Formative Assessment

Students are permitted to re-work and re-submit drafts to improve scores!

This aspect of our course is quite unusual, but intentionally structured to help students develop their professional skills. Students' skills in writing can vary widely, and the expectation is not that everyone will become a perfect writer. Rather, the goal is to help everyone improve substantially.

The instructor will give detailed feedback on each assignment submitted by the due date. The feedback will follow the scoring rubric and be provided as a commented draft uploaded back to WebCourses. Assignments submitted on time can be re-worked to address issues raised in the comments and then re-submitted for re-scoring. If the re-submission is ***substantively re-worked***, then the instructor will re-score and provide feedback. This process can be continued until the student is satisfied with the score, but ***individual submissions must include substantial changes. Assignments that include only marginal improvement or partially address feedback will not be re-scored***.

Students are not required to re-submit assignments for re-scoring. But some assignments are lengthy and complex -- such as the Research Paper and the PowerPoint Presentation -- so these are structured with multiple drafts. Each draft will be scored as though it were the final submission, so scores on early

drafts may well be low initially. But if scores increase on later drafts, the increased score will be applied to all prior drafts, so the overall score on the assignment rises as the quality of the work improves.

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 visible in the Course Summary below and your Course Calendar. You are responsible for carefully monitoring the due dates and ensuring that assignments are submitted on time. Late submissions will be marked down by 10% for each day they are late.

Cover Sheet and Formatting

For all assignments, add a clear and professional header to the document that provides a) your name, b) the assignment number, c) the name of the course, and d) the semester. You are free to 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 with the description of assignments.

Participation and Engagement

Upper-level undergraduate students should be able to learn for themselves. The instructor's job is to help students learn the material and develop their skills. To help you learn, we will discuss concepts (a) in online discussions and (b) during class meetings (in-person and/or synchronous-online). Credit will be awarded for discussions. These types of activities require that students read all materials prior to discussions and take notes or consult secondary materials as needed to grasp the concepts. Full credit can only be earned by actively contributing to discussions, with meaningful responses to questions and discussion that reflect thorough study and comprehension of the assigned reading. The instructor will provide regular feedback to students individually concerning the quality of their contributions, and the final score will be based on a semester-long assessment of your contributions to discussion.

First-Week Assignment and Financial Aid

Faculty members are required to document students' academic activity at the beginning of each course. In order to document that you began this course, ***please ensure you complete the first week's assignment on time***. Failure to do so might delay disbursal of your financial aid.

Reading Assignments

All readings listed below can be downloaded from <Files> in WebCourses, or obtained from the UCF library or the link provided.

Graff & Birkenstein's *They Say / I Say*

Read the sections listed below. The first two chapters are on WebCourses and the complete book is available through the library.

Graff and C. Birkenstein, *They Say / I Say: The Moves That Matter in Academic Writing*, 3rd. edn., by (W. W. Norton: New York, 2014), ISBN 978-0-393-93584-4. Available from Amazon.com (~$22). Note that the version "With Readings" is more expensive, and not required.

1. Introduction pp. 1-15.
2. Part 1.1: "They say: Starting with what others are saying", pp. 19 - 29.
3. Part 1.2: "Her point is: The art of summarizing", pp. 30 - 41.
4. Part 2.4: "Yes / No / Okay, But: Three ways to respond", pp. 55 - 67.
5. Part 2.5: "And Yet: Distinguishing what you say from what they say", pp. 68 - 78.

Read Patel's "Technical Presentations"

Read "Book 1: Strategy, Preparation, and Planning" of Patel's *Technical Presentations*, Books 1 - 4 (IEEE-USE E-Books, 2010). *Take notes*. Pay particularly close attention to the discussion of:

1. Why effective communication is central to science and engineering;
2. How different communication formats differ;
3. Pitching your presentation appropriately for a given audience;
4. Developing an appropriately limited number of key themes;
5. Communication formats that are relevant to industry.

Read "On Being a Scientist: A Guide to Responsible Conduct in Research"

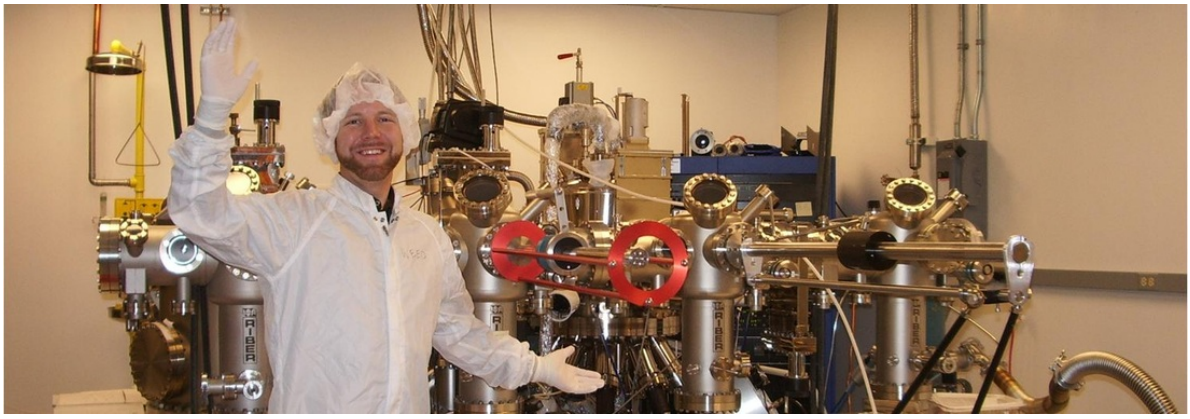
This work is available at **http://www.nap.edu/download.php?record_id=12192 (http://www.nap.edu/download.php?%0A%0Arecord_id=12192)** . Read this text closely, particularly the case studies. Create written answers to the questions and bring these to class for discussion on weeks labelled "Responsible Conduct."

Read C. Jansseens' "Let's clarify authorship on scientific publications."

Note the arguments that are made for how authorship has ethical implications and what the responsibilities are of a scientist/engineer when they author work, particularly when others have contributed to the work in various ways.

Read "A Curriculum Vitae Makeover" by M. Weed and J.-L. Doumont

Download and read "A Curriculum Vitae Makeover" by M. Weed (a graduate of CREOL) and J.-L. Doumont, published in *Opt. Photonics. News*, Mar. 2013, pp. 20-22. Think about how to revise your resume using principles covered in this reading, as well as discussion with the class and guest speakers.



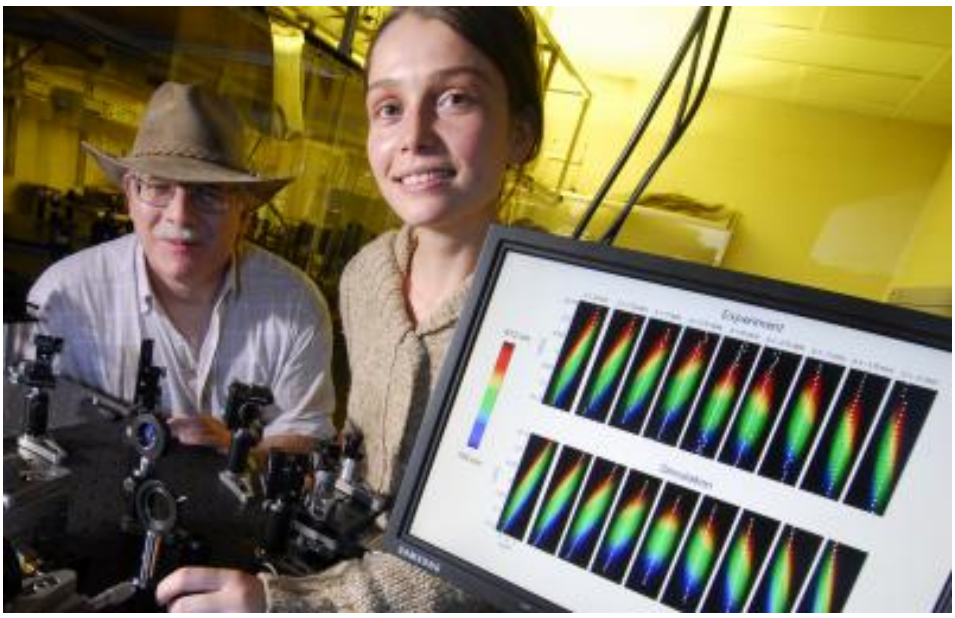
Dr. Matt Weed (https://www.mattdweed.com/biosketch.html) (MS '09 & PhD '13 in Optics, UCF) Director of Technology Strategy, Luminar (https://www.luminartech.com/) .

Read Bertolotti's "The Misfortune (or Fortune) of Gordon Gould"

Note how credit for research and publication differs from that associated with inventorship, and how complex the assignment of credit for inventorship can become. Note also how credit for inventorship can obscure the huge contributions to a field made by others who may not be directly known or associated with an invention in question.

Optional reading -- but well worth it, and very funny!

Read M. R. Trebino's account of his attempt to submit a scientific Comment to a journal, in 123 easy steps (on WebCourses)! Dr. Rick Trebino (Elec. Eng., GaTech) is one of the top scientists in the field of nonlinear optics and characterizing ultrashort pulses. His article is a satirical account of his less-than-perfect experiences with publishing peer- reviewed work. Dr. Trebino is an incredibly creative scientist, and equally effective as a humorist. Enjoy!



(Left) Georgia Tech physics professor Rick Trebino and (Right) graduate student Pam Bowlan showcasing a instrument for measuring the duration and form of focused ultrashort laser pulses. Georgia Tech Photo: Gary Meek.

Short-Form Assignments

Research-Team Work-Plans for Weeks 1 - 5

- Format: Timeline with task, assignee, and due dates

Create and submit a work plan for weeks 1 - 5 for your research team. Identify a team-lead who will be responsible for submitting *group* assignments. Note that there are separate assignments focused on your research topic that are submitted by each individual member (e.g., layman's abstract).

Meet with your team virtually, or face-to-face if possible. Discuss your Focus Topic and how duties will be partitioned. Generate a list of *specific* deliverables and due dates for each team member. Generate a professional looking research plan includes time line indicating which team member will do what task(s) by what dates. The team leader will submit the team's plan for review and scoring. Other team members do not need to submit in parallel, but of course they must contribute to development of the team's plan. The scores for this assignment will be recorded for all team members. After submission, continue to meet with your team regularly to move your team's project forward.

First-Week Assignment -- The Significance of Optics and Photonics

- Format: 250 word essay

Submit a ***single*** paragraph on WebCourses between 200 and 250 words in length that explains to a lay person why Optics and Photonics (O&P) are significant to modern life. Create a professional layout. Include a title, your name, the name of the assignment, and due date. In the abstract, describe technologies that are enabled as well as everyday activities that would not be possible without O&P. Use persuasive arguments to convince the reader that O&P are just as important as other high-profile fields, such as cancer research or space exploration. The essay will help the instructor establish the baseline for your current writing skills.

Technical Abstract

- Format: 250 word essay

Each team-member will write their own version of this assignment and submit it on WebCourses. Write a ***single-paragraph*** technical abstract on your Focus Topic with a length of 200 to 250 words. Submit the work on WebCourses as an MS Word document. As this is a technical abstract, write it with the expectation that your reader has the education level of an undergraduate in science and engineering or higher, using technical terms as appropriate. Create a professional layout. Include a title, your name, the name of the assignment, and due date.

Layman's Abstract

- Format: 250 word essay

Each team-member will write their own version of this assignment and submit it on WebCourses. Write a ***single-paragraph*** layman's abstract on your Focus Topic with a length of 200 to 250 words.

Submit the work on WebCourses as an MS Word document. Create a professional layout. Include a title, your name, the name of the assignment, and due date. Write this abstract with the expectation that your reader has no more than a high school level of education. Avoid using technical jargon. The abstract should provide a description that is well balanced between the scientific and/or engineering goals and how these are relevant to the reader as a consumer of science and engineering.

Elevator speech

- Format: Oral description of topic, 60 seconds, circa 150 words, delivered to class face-to-face, or synchronously online when necessary.

Prepare, practice, and deliver an "elevator speech" that describes your Focus Topic within 60 second (*circa* 150 words), using a normal pace of speech. Assume your listener has no more than a high school level of education. Avoid using technical jargon. The speech should explain how research work or industrial products and services are relevant to the listener as a consumer of science and engineering. You will deliver your elevator speech to the class, either online, or face-to-face as possible. Other students will be responsible for paying close attention and writing down constructive comments on what worked well and what could be improved in the speech. Students will be called upon to offer their critiques. Active participation in the critiquing will count toward the Participation score for the course.

Reviews of Technical Papers

Download "Reviewer_Template.docx". Read the template and instructions carefully to understand how the technical paper should be judged and how to complete the written review.

Download "Technical_Paper_X" and read the paper with sufficient care to be able to discuss the science in class and complete the written review. Take notes while reading the Technical Paper. Look up terms and concepts that are unfamiliar. The expectation is that you may well have to do a bit of background reading to understand the paper.

Open the template and write your review. As you answer questions, indicate what is unclear and how it can be improved. In all instances, cite specific examples and provide a re-written sentence or word choice as an example of how the problem might be addressed. Bring a copy of the Technical Paper, your notes, and your review to class for discussion.

Team's Research Paper on Focus Topic

Outline of 1000-Word Research Paper

- Format: Detailed, MLA-style outlined, with *at least* 15 - 20 lines of points and subpoints.

Team-member #1 should submit one version of this assignment for the whole team on WebCourses. The whole team will work together to develop the draft submitted.

Here is a link to tell you about how to structure an outline properly: https://humblethird.weebly.com/rules-on- making-an-outline-2.html. For the drafts, create a professional layout for sections, captions, and figures. Follow the formats recommended by the *Journal of Optics* (http://iopscience.iop.org/2040-8986). *Make sure your formatting is consistent throughout the work*. For all submissions, include a coversheet with the title, your names, the name of the assignment, and due date.

You will use the outline to organize your team's thoughts for the content of the paper. The outline should actually take a lot of time because this is the exercise in which you think **carefully** about what content to include in your paper. *An outline with perhaps only 5 - 10 lines of points and sub-points is not satisfactory*. A detailed outline for a work of this scope should have at least 15 - 20 lines of points and sub-points. It should be sufficiently detailed and complete that you can use it to start writing paragraphs. Each sub-point should map onto a few sentences within each paragraph, giving you the memory-jogs needed to write a well-structured paper. But sub-points within the outline itself should NOT be complete sentences! Rather they should be key ideas in bulleted form that are a starting point for writing the corresponding sentences. The outline will also help you think as a team about 1) which figures to include and 2) who will write which sections, to divide up the effort equitably.

1000-Word Research Paper on Focus Topic

- Format: 1000-word essay, three drafts required, with figure, captions, and complete citations using EndNote.

Description:

Team-member #1 should submit one version of this assignment for the whole team on WebCourses. The whole team will work together to develop three draft submitted.

With your assigned team, write a 1000-word essay on your Focus Topic for an audience having an undergraduate education in science or engineering. You will submit an outline and three drafts for scoring and feedback that will enable you to improve the content and writing.

Minimize the use of technical jargon, and provide explanations where technical terms are essential. The work should include a clear explanation of how the topic is relevant to the reader as a consumer of science and engineering. Include three to five figures, with captions and explicit call-outs to the figures in the main text.

The essay is expected to be supported by at least 15 references. Include full citations, formatted using EndNote. When illustrations or figures are pulled from work by others, include a complete citation. If you include a figure taken from a source, then the caption must end with the following sentence: "Figure taken from Ref. [#]." You are encouraged to create your own illustrations using PowerPoint or other graphical-editing software. Illustrations should be simple, accurate, and visually appealing. Acknowledge sources which inspire your figure by end the caption with the following sentence: "Figure adapted from Ref. [#]."

Multimedia Presentation

PowerPoint Slides

- Power Point slides, three drafts, submitted on WebCourses for feedback and scoring.
- The whole team will work together to develop drafts submitted.
- Team-member #1 submits drafts on behalf of the team.

With your assigned team, create an oral presentation and accompanying PowerPoint slides that describe your Focus Topic for an audience having an undergraduate education in science or engineering. The presentation should be no more than 15 minutes long and use about 10 slides. Minimize the use of technical jargon, and provide explanations of technical terms, when they must be used. Explain clearly how the topic is relevant to the listener as a consumer of science and engineering.

The 1000-word essay is intended to serve as an outline that helps you develop this presentation and from which you may draw content, including figures. Include movies and animation as appropriate. You are encouraged to create your own illustrations and animations using PowerPoint or other graphical software.

The final slide must be a bibliography for all content that is not original to you, including figures, movies, etc. Also include in this list some citations for literature that you read to develop the oral content of your presentation. Within the presentation, include abbreviated citations for content not original to you. For example, if you use a figure from the following paper:

Z. Luo and S. M. Kuebler, "Axial superresolution of focused radially polarized light using diffractive optical elements," *Opt. Commun.* **315**, 176-182 (2013)."

include this complete citation in the bibliography, and give the following abbreviated citation under the image itself:

"Luo and Kuebler, *Opt. Commun.* (2013)."

Oral presentation

- Oral presentation delivered to entire class face-to-face, or synchronous-online when necessary.

Each team will give an oral presentation on the Focus Topic using the Power Point slides. Bring your presentation on a thumb- drive for the day of in-class presentations.

Professional Development Exercises

Short Quizzes and Other Assignments

Several short quizzes and short-entry assignments are scattered throughout Modules of the course. These enable the student to earn points for responding to short questions that help them confirm understanding of material. Points vary by assignment and contribute toward the total for Professional Development Exercises.

Complete CITI Training Online

The Collaborative Institutional Training Initiative (CITI) has developed a series of courses for teaching online the standards for Responsible Conduct of Research (RCR) and related topics of professional and ethical conduct. Many federal agencies and companies require participants to complete the CITI courses prior to undertaking a project. You will complete the courses 1) "Responsible Conduct of Research for Engineers" and 2) "Export Compliance". Follows the steps listed below to complete the course and submit proof of its successful completion.

1. Navigate to: **https://www.citiprogram.org (https://www.citiprogram.org/)** .
2. Find "Log in through my institution" and below that click the button reading <Log in via SSO>.
3. Scroll down the list of institutions and click on "University of Central Florida."
4. You will be taken to a UCF ID login page. Enter your Network ID (NID) and password. This will bring you to the CITI Main Menu page.
5. On the main page, select <Courses> from options at the top-menu.
6. Scroll down below the title *Institutional Courses* and at right of label "University of Central Florida" select <View Courses>.
7. Scroll through the list of UCF courses to *Responsible Conduct of Research for Engineers*. Add the course, then complete it.
8. At the conclusion of each course, submit a copy of the "Completion Report".
    - Go the the main menu. From the main menu, choose <View previously completed coursework>.
    - Select <View> to view the completion reports for both courses. Print the completion reports as a PDF. Upload both PDFs to WebCourses before the due date.

Resume

Read "A Curriculum Vitae Makeover" (on WebCourses) by M. Weed (a graduate of CREOL) and J.-L. Doumont, published in *Opt. Photonics. News*, Mar. 2013, pp. 20-22.

Next create/revise your resume, applying guidance provided by our industry speakers. Submit drafts of your resume on WebCourses for feedback and revision.

LinkedIn Page

Create/revise your LinkedIn page, applying guidance provided by our industry speakers, and using content from your resume. Send "Follow" request to the instructor so that he/she may review and critique your page. Print your LinkedIn page as a PDF and submit the PDF-file for review through WebCourses.

EndNote Library

- Format: Semester-long development

EndNote is a citation database and management tool that is available for free download via the UCF Library at **http://guides.ucf.edu/citations-endnote (http://guides.ucf.edu/citations-endnote)** . Students will install this tool on their own computers and learn to use it proficiently. Throughout the semester students will build their own EndNote library for all references consulted for their Focus Topic, and then use it to format citations and bibliographies in all submission. Students will submit the library as the native .enl file periodically throughout the semester for review and feedback, and the final version will be submitted for scoring on or before the day of the final exam.

Final Exam

- Format: Essay-style test with short and long-response questions, completed in class, or take-home when taught mixed-mode.

The final exam will be comprehensive to all topics covered in the course. Students will be asked to apply communication skills developed throughout the semester to answer questions related to historical perspectives of O&P; the O&P industry; publication and the technical literature; communication techniques; professional ethics and responsibility; professional preparation; and how their technical field is connected with issues like manufacturability, sustainability, health and safety, and other economic, environmental, social, or political constraints.

Recommended References

1. S. Capers and E. Lipton, "Hubble Error: Time, Money, and Millionths of an Inch," *Hartford Courant* (31 Mar. - 3 Apr. 1991). Reprinted in abbreviated form in *Academy of Management Executive*, **7**, 41 - 57 (1993), and available as a PDF from WebCourses.
2. C. Janssens, "Let's clarify authorship on scientific papers," *Chron. Higher Ed.* (11 Aug. 2014). Available as PDFs on WebCourses.

3. C. A. Mack. *How to Write a Good Scientific Paper*. SPIE: Bellingham, Washington, USA, 2018, https://doi.org/10.1117/3.2317707.sup (https://doi.org/10.1117/3.2317707.sup) . Available as a PDF on WebCourses.
4. D. Meredith, *Explaining Research: How to Reach Key Audiences to Advance Your Work* (Oxford Univ. Press: Oxford, 2010), ISBN 978 -0-19-973205-0. Available from Amazon.com (~$33).
5. M. Bertolotti. "Ch. 12: The Misfortune (or Fortune) of Gordon Gould", in *History of the Laser*, Institute of Physics Publishing: Bristol and Philadelphia, 2005.
6. C. Hamilton, *Essentials of Public Speaking*, 5th edn. (Cengage Advantage Books, 2012), ISBN-10: 049590113X, ISBN-13: 9780495901136.
7. H. Schwartz, "Not all scientific studies are created equal." https://ed.ted.com/lessons/not-all-scientific-studies-are-created-equal-david-h-schwartz (https://ed.ted.com/lessons/not-all-scientific-studies-are-created-equal-david-h-schwartz) .
8. W. Strunk and E. B. White, *The Elements of Style*, 4th edn. (Allyn and Bacon: Boston, 1999).
9. D. B. Newell, E. Tiesinga, Eds. NIST Special Publication 330: The International System of Units (SI). 2019 edn., Physical Measurement Laboratory, National Institute of Standards and Technology, US Dept. of Commerce: Gaithersburg, MD, 2019, https://doi.org/10.6028/NIST.SP.330-2019 (https://doi.org/10.6028/NIST.SP.330-2019) .

Course Summary:

Date	Details	
Thu Sep 12, 2019	EndNote Library -- Draft/Review (https://webcourses.ucf.edu/courses/1361537/assignments/6722772)	due by 6pm
Thu Sep 26, 2019	CITI Training (https://webcourses.ucf.edu/courses/1361537/assignments/6722771)	due by 6pm
Thu Oct 3, 2019	1st Draft of Research Paper (https://webcourses.ucf.edu/courses/1361537/assignments/6722767)	due by 6pm
Thu Oct 10, 2019	Technical Review 1 (https://webcourses.ucf.edu/courses/1361537/assignments/6722788)	due by 6pm
Thu Oct 17, 2019	2nd Draft of Research Paper (https://webcourses.ucf.edu/courses/1361537/assignments/6722770)	due by 6pm
Thu Oct 24, 2019	Technical Review 2 (https://webcourses.ucf.edu/courses/1361537/assignments/6722789)	due by 6pm
Thu Dec 5, 2019	EndNote Library -- Final Draft (https://webcourses.ucf.edu/courses/1361537/assignments/6722773)	due by 6pm

Date	Details	
Wed Aug 26, 2020	Focus-Topic Research: Team-Plan for Weeks 1 - 5 (https://webcourses.ucf.edu/courses/1361537/assignments/6722777)	due by 11:59pm
Sat Aug 29, 2020	Short essay (participation assignment): Significance of optics & photonics (https://webcourses.ucf.edu/courses/1361537/assignments/6722786)	due by 6pm
Sun Sep 6, 2020	Technical Abstract on Focus Topic (https://webcourses.ucf.edu/courses/1361537/assignments/6722787)	due by 11:59pm
Fri Sep 11, 2020	250-Word Layman's Abstract (https://webcourses.ucf.edu/courses/1361537/assignments/6722768)	due by 11:59pm
	Outline of 1000-word Essay on Focus-Topic (https://webcourses.ucf.edu/courses/1361537/assignments/6722782)	due by 11:59pm
Fri Oct 23, 2020	Final Draft of Research Paper (https://webcourses.ucf.edu/courses/1361537/assignments/6722775)	due by 11:59pm
Fri Oct 30, 2020	1st Draft of PowerPoint Slides (https://webcourses.ucf.edu/courses/1361537/assignments/6722766)	due by 11:59pm
	Resume 1st draft (https://webcourses.ucf.edu/courses/1361537/assignments/6722784)	due by 11:59pm
Fri Nov 13, 2020	2nd Draft of PowerPoint Slides (https://webcourses.ucf.edu/courses/1361537/assignments/6722769)	due by 11:59pm
Fri Nov 20, 2020	Final Draft of PowerPoint Slides (https://webcourses.ucf.edu/courses/1361537/assignments/6722774)	due by 11:59pm
Fri Nov 27, 2020	Resume Final Draft (https://webcourses.ucf.edu/courses/1361537/assignments/6722785)	due by 11:59pm
Fri Dec 4, 2020	LinkedIn Page -- 1st Draft (https://webcourses.ucf.edu/courses/1361537/assignments/6722779)	due by 11:59pm
Wed Dec 9, 2020	Final Exam (4:00 pm, 10 Dec.) (https://webcourses.ucf.edu/courses/1361537/assignments/6722776)	due by 3pm

Date	Details	
	In-class participation (https://webcourses.ucf.edu/courses/1361537/assignments/6722778)	due by 3pm
	LinkedIn Page -- Final Draft (https://webcourses.ucf.edu/courses/1361537/assignments/6722780)	due by 3pm
	Oral Presentation (https://webcourses.ucf.edu/courses/1361537/assignments/6722781)	due by 3pm
	Prepare and Deliver an Elevator Speech (https://webcourses.ucf.edu/courses/1361537/assignments/6722783)	due by 3pm
	Quiz: Research Team- and Focus-Topic Assignment (https://webcourses.ucf.edu/courses/1361537/assignments/6722765)	