

CENTER FOR INNOVATIVE TECHNOLOGIES
MASTER COURSE DOCUMENT

EMET 245 Laser Foundations and Safety

Spring 2019

Note: The contents of this outline are subject to change.

Instructor and Office Hours:

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Course Description:

A course on the operational theory and safe use of lasers. Topics include: properties of laser light, elements of the laser, laser classifications, structure of the eye, and hazards associated with laser light.

Prerequisites(s): EMET 150 and MAT-121

Corequisite(s): No corequisite

Lecture Hours: 2	Lab Hours: 3	Credit Hours: 3
Lab Fee: 60	Supplemental Fee: 0	Purpose:

Course Required Text:

Title: LIGHT - Introduction to Optics and Photonics	Edition: 1st
Author(s): Judith Donnelly and Nicholas Massa	
Publisher: New England Board of Higher Education	
ISBN: 9780981531809	

Supplemental Materials:

PASCO-8151C Photonics Kit

Course Outcomes:

1	Read critically, including the ability to analyze and interpret a variety of printed books, documents, and articles.
2	Produce clear, logical, correct, coherent, and properly documented prose.
3	Plan, write, and deliver an effective oral presentation.
4	Use mathematical skills to solve practical problems.
5	Analyze, interpret, and critically respond to non-print media/sources.
6	Explain how social, organizational, and technological systems work.
7	N/A
8	Demonstrate self-management skills such as being able to accurately self-assess, set personal goals, and monitor personal progress.
9	N/A

CENTER FOR INNOVATIVE TECHNOLOGIES
MASTER COURSE DOCUMENT

Additional Course Outcomes:

1	The student should be aware of the safe operating procedures around laser applications
2	The student should be capable of making basic calculations and component selection for optic components
3	The student should be capable of making measurements of optical power and energy
4	The student should have a basic understanding of the types and properties of lasers used in industrial applications

CENTER FOR INNOVATIVE TECHNOLOGIES
MASTER COURSE DOCUMENT

Course Grading Scale:

<u>Grading</u>	<u>Points</u>
A = 90-100	Quizzes, Labs & HW 60
B = 80-89	Exam 20
C = 70-79	Final Exam 20
D = 50-69	100
F < 50	

Lecture Material Format:

The lectures will be available in different formats. Example, I may put the lectures on the whiteboard, in Blackboard with PowerPoint, Word and/or PDF formats. Also, there may be handouts from time to time.

Homework, Labs and Test

Homework and labs will be PowerPoint, Word and/or PDF formats and the answers submitted via Blackboard **or In-Person. This may vary week to week, assignment-by-assignment.**

There will be 5% off per day late and a 0% after a week.

Attendance and Classroom Etiquette:

Required! If you miss more than two weeks you will fail the class. If you miss the Midterm Exams or Final Exam you will fail the class.

Please refrain from using cell phones and media devices during class periods. E-smoking is not permitted while class is in session. For rooms equipped with workstation computers, the computers are not to be used during lectures unless authorized by the instructor. *Texting in class will not be tolerated. You may step outside of the classroom if necessary.*

For class periods longer than two (2) hours, breaks for free time will be given as necessary.

Student Responsibility:

Students are responsible for material that may be assigned on this syllabus as well as additional information announced in class. The instructor will not rely exclusively on material from the textbook(s).

Good note taking is highly encouraged and helps makes learning successful. Often class sessions are conversational in nature with much of the information presented orally. Students are advised to capture key ideas and instructions on paper as formal notes will generally not be presented on the board.

E-mail Communication:

Electronic-mail (e-mail) is a valuable communication tool and especially useful in distance learning and online education programs. The ease of sending e-mail however has encouraged the loss of writing etiquette and social courtesy. Good message composition has given way to fragments and absent punctuation. I encourage students to read *E-Mail Etiquette: The Do's and Don'ts* in hardcopy or online. *At a minimum, when sending e-mail messages please include in the subject line the class number and section. And, in the body, open with a greeting and close with a salutation including your name. The instructor will only correspond via email using your Cincinnati State account. It is mandatory that this account be checked at least once daily.*

CENTER FOR INNOVATIVE TECHNOLOGIES
MASTER COURSE DOCUMENT

Academic Integrity:

Please maintain academic integrity in this and all classes as academic dishonesty of any type will not be tolerated. Refer to the Academic Integrity Policy of the current college catalog for information, available online at <http://www.cincinnatiatstate.edu/real-world-academics/catalogs/>. All work submitted in class not original to the student must be cited. This includes text, graphics, images, and the like. **No excuses.**

Disabled Students: (Office of Disability Services)

Note: If you need these services you need to contact the Office of Disability before classroom activities start.

Support in the pursuit of your educational goals

The Office of Disability Services (ODS) works with students having special needs to ensure they receive reasonable academic accommodations in courses of study, according to their individual needs. The goal: to guarantee that all students with disabilities have an equal opportunity in the pursuit of their educational objectives. Eligible students are strongly encouraged to tap the services of this office. College studies show that students who consistently use ODS resources and accommodation services earn higher grades and graduate at a higher rate than students who choose not to use them.

Who is eligible?

Any otherwise qualified student or prospective student who states that he or she has a disability as defined under the Americans with Disabilities Act of 1990 (ADA) or the guidelines for section 504 of the Rehabilitation Act of 1973 may register with this office.

How to register?

To register for services, a student or prospective student must meet with the special needs counselor and provide appropriate documentation of a disability.

What services are available?

The following Disability Services documents provide details about the counseling services, assistive services, and technology available to students with disabilities free of charge, as well eligibility guidelines..

Contact Information

Office of Disability Services
Room 129 – Main Building
(513) 569-1775 phone
(513) 559-1527 tty
(513) 569-4744 fax

CENTER FOR INNOVATIVE TECHNOLOGIES
MASTER COURSE DOCUMENT

Tutoring Services:

The College provides free individual or group tutoring. Students may request a tutor through the Success Center. Walk-in help is available. The approximate hours for the Success Center are Monday through Thursday from 9am to 8pm, Friday from 9am to 4pm, and Saturday from 9am to 3pm in Main 261.

Plagiarism: (Produced by Writing Tutorial Services)

What is Plagiarism and Why is it Important?

In college courses, we are continually engaged with other people's ideas: we read them in texts, hear them in lecture, discuss them in class, and incorporate them into our own writing. As a result, it is very important that we give credit where it is due. Plagiarism is using others' ideas and words without clearly acknowledging the source of that information.

How Can Students Avoid Plagiarism?

To avoid plagiarism, you must give credit whenever you use

- another person's idea, opinion, or theory;
- any facts, statistics, graphs, drawings—any pieces of information—that are not common knowledge;
- quotations of another person's actual spoken or written words; or
- paraphrase of another person's spoken or written words.

Course Topics:

Topic 1	Laser Safety: Nominal hazard zones, maximum permissible exposure, laser classifications.
Topic 2	Laser Safety (continued): Eyewear selection, personal protective equipment and engineering controls.
Topic 3	Nature and properties of light: wavelength, frequency energy.
Topic 4	Absorption, scattering and transmission of light in optical components.
Topic 5	Index of refraction, velocity of light, wavelength shifts in optical mediums.
Topic 6	Mechanical and physical properties of optic mediums and antireflection coatings
Topic 7	Light sources: incandescent, flash-lamp, arc-lamp and lasers. Spectral and temporal properties.
Topic 8	Methods of optical measurement. Power and energy meters
Topic 9	Construction of the human eye and the regions affected by different wavelengths.
Topic 10	Geometric optics: thin lens and thick lens selection, single and multiple lens system calculations. Object image relationships, magnification.
Topic 11	Geometric optics (continued): Prisms, mirrors and beam splitters.
Topic 12	Principles of lasers, lasing action.
Topic 13	Optical cavities and modes of operation
Topic 14	Temporal and spatial characteristics of lasers
Topic 15	Introduction to the common types of industrial and research lasers.

Works Cited

Office of Disability Services, Cincinnati State. Students with Disabilities. 2009-2012. 25 August 2012
<<http://www.cincinnati-state.edu/real-world-academics/student-services/students-with-disabilities?searchterm=disability>>.

Produced by Writing Tutorial Services, Indiana University, Bloomington, IN. Plagiarism: What It is and How to Recognize and Avoid It. 24 April 2004. <<http://www.indiana.edu/~wts/pamphlets/plagiarism.shtml>>.