

Dr. Rama Balasubramanian (a.k.a) Dr. Bala

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Office Hours: WF 11 am- 12 noon; Th 1-2 pm; Additional Hours: By Appointment

Lectures: Block 2 – MWF 9.40-10.40 am

Required Textbook: Optics M.P. Vaughn, University College, Cork (2014)

PDF of the book posted on Inquire

Additional Readings:

Optics by Eugene Hecht, 4th edition, Addison Wesley, (2002)

Physics of Light and Optics by Justin Peatross, Michael Ware. (URL: www.optics.byu.edu/BYUOpticsBook_2015.pdf)

Overview: An introduction to the physics of optics and spectroscopy

Learning Objectives: By the end of this course, successful students will be able to

- understand the propagation and behavior of electromagnetic waves
- describe interaction of plane waves and complex waves with different media
- explain the superposition principles to waves describe interference and diffraction phenomena
- understand the applications of wave optics and spectroscopy techniques

Expectation: Students are expected to put in a minimum of 12 hours/ week work outside the class in order to successfully complete this course.

Homework: Homework will be assigned weekly and due at the beginning of class on the announced due date. Late homework will not be accepted, unless you have my prior approval. One low homework score will be dropped.

In-Class Activity: You will also be required to complete problems assigned in class. In addition, you must participate in discussions of journal articles, latest trends in materials science and technology, e-Kit activities. The evaluation for in class activity will be based on individual participation as well as participation as a team.

MCSP Colloquium Series: You are required to attend at least 3 of the several talks as a part of the MCSP colloquia this semester. You have to write up a paper on your reflections of the talk to get full credit. You must submit your MCSP papers via *Turnitin* on Inquire.

Quiz: There will be 15 minute long quizzes based on the lecture material covered during the two week period. Announcement about the quiz will be made in the class.

Exams: There will be two mid-term exams, indicated in your syllabus. Both will be take home exams. If you have any problems with these dates, **tell me soon**. There will also be a 3-hour final exam

Presentation: At the end of the semester you will give a 20 minute presentation as a team. Presentations topics will be related to applications of optics and spectroscopy. More information on this will be provided after Spring Break.

Grading:

Homework	15 %
Mid-term Exam1	15 %
Mid-term Exam 2	15 %
Presentation (Team Project)	10 %
Quiz	7 %
MCSP Colloquium	3 %
In-class Activity	10 %
Final Exam	25 %

The following point system will be used to assign letter grades at the end of the semester.

Points	Grade	Points	Grade
<60	F	76-79	C+
60-62	D-	80-82	B-
63-65	D	83-85	B
66-69	D+	86-89	B+
70-72	C-	90-94	A-
73-75	C	≥95	A

Attendance: It is your responsibility to show up for the lecture in a timely manner and complete all the work assigned in class. Should you have a medical condition/emergency situation/participation in a conference or sporting events representing the College, that you cannot attend the class, you must let me know immediately. Proper documentation (like doctor's note, court order, and schedule of conference/sports events) must be presented. **Just sending an email will not be sufficient.** You must meet with me in person. It is your responsibility to make up for the work that you missed. I will not extend the deadline for turning in homework or other work assigned in the class unless you have my prior approval.

Class Disruption: All students are entitled to a professional learning environment. Students should not act in a manner which will distract and disrupt the class learning experience. Such practices will not be tolerated.

Cell-phones, or any other electronic communication/entertainment devices must be turned off at all times during the lecture period.

Academic Integrity: Policies of Academic integrity are enforced in all aspects of this course. It is the responsibility of the student to strictly adhere to the policies of Academic Integrity of Roanoke College.

Philosophy: My teaching philosophy is not to make you memorize equations but rather help you understand the Physics. Please talk to me if you have any problems understanding the materials presented. I will not usually offer help over phone/e-mail.

Course Plan: We will cover as much of the following material as possible.

Week of	Chapter	Topic
16-Jan	Ch 1,2	Introduction, Optics, Waves and Photons
23-Jan	Ch 2	Electromagnetic Radiation, Quantum Waves
30-Jan	Ch 3	Wave Equation, Plane waves, Index of refraction
6-Feb	Ch 4	Huygens-Fresnel Principle
13-Feb	Ch 5	Interference and Diffraction
20-Feb		
	24-Feb	Exam 1 (Ch 2,3,4, 5)
27-Feb	Ch 6	Maxwell's equations, Dispersion
6-Mar	Spring Break No classes	
13-Mar	Ch 6	Poynting Vector
20-Mar	Ch 7	Polarisation, Jones Matrices
27-Mar	Ch 8	Fresnel and Fraunhofer Criteria
3-Apr		
	7-Apr	Exam 2 (Ch 6, 7,8)
10-Apr	Applications : Spectroscopy / Project	
17-Apr		
	21-Apr	Project Presentation
28-Apr	2-5 pm	Final exam

Disclaimer: Everything above is subject to change with notice and, where appropriate, your approval.