**PHYS 609**

**Modern Optics**

**Fall 2021**

**Instructor:** Dr. Anthony M. Johnson

Office: TRC 029

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<http://physics.umbc.edu/people/faculty/johnson/>

<https://upl.umbc.edu/>

My Webex Room: <https://umbc.webex.com/meet/amj>

**Class: Wednesdays, 4:30-5:45PM, Janet & Walter Sondheim Rm 107**

**Fridays, 1:00-2:15PM, Janet & Walter Sondheim Rm 107**

**Office Hours:** Thursdays

10:00AM – 12:00PM, TRC 029, WEB

Or Through Email Appointment

**Text:** Eugene Hecht: Optics (4th Edition)

Lecture Notes and Slides: e.g., Rick Trebino (Georgia Institute of Technology), Andrew Weiner (Purdue), Wayne Knox (U. of Rochester) and others

**Reference:** Robert Guenther, Modern Optics (1st or 2nd Edition)

**Prerequisites:** Basic electromagnetic theory, basic theory of ordinary differential equations, vector analysis

* There will be an in-class mid-term and final exam. There will be no exam make-up except for University-policy accepted absence.
* Each student will be required to give a 15-minute oral presentation on a topic in Modern Optics. Please select your topic by Friday, October 15th at the latest. Classmates will also judge the presentation based on clearness, content, and classmates understanding of the topic.
* Each student will write a term paper on a topic in Modern Optics. The topic could be the same as the oral presentation and could be related to the student’s research. A good term paper should be stand alone and include all the necessary components, which typically includes a literature review, theory/experimental outline, applications and summary.

**Grading:** Homework: 20%

Presentation/Discussion: 10%

Term Paper: 10%

Mid-term Exam: 30%

Final Exam: 30%

**Course Topics:** Maxwell’s Equations and EM Wave Theory

EM Spectrum

Absorption and the Refractive Index

The Propagation of Light

Fresnel’s Equations of Reflection and Refraction

Fourier Series and the Fourier Transform

Polarization

Geometrical Optics

Interference and Diffraction

Coherence

Lasers and Nonlinear Optics

Ultrafast Optics

**Also Teaching: CMPE 306, Introductory Circuit Theory**

**Lecture – M, W, 1:00PM - 2:15PM**

**Lab - Th, 1:00PM – 2:50PM**

Academic Integrity

Academic integrity is an important value at UMBC. By enrolling in this course, each student assumes the responsibilities of an active participant in UMBC’s scholarly community in which everyone’s academic work and behavior are held to the highest standards of honesty. Cheating, fabrication, plagiarism, and helping others to commit these acts are all forms of academic dishonesty, and they are wrong. Academic misconduct could result in disciplinary action that may include, but is not limited to, suspension or dismissal. These principles and policies apply in both face-to-face and online classes. Resources for students about academic integrity at UMBC are available at <https://academicconduct.umbc.edu/resources-for-students/>

#### **Sexual Assault, Sexual Harassment, and Gender Based Violence and Discrimination**

[UMBC Policy](https://oei.umbc.edu/gender-discrimination-sexual-misconduct/) and Federal law (Title IX) prohibit discrimination and harassment on the basis of sex, sexual orientation, and gender identity in University programs and activities. Any student who is impacted by sexual harassment, sexual assault, domestic violence, dating violence, stalking, sexual exploitation, gender discrimination, pregnancy discrimination, gender-based harassment or retaliation should contact the [University’s Title IX Coordinator](https://oei.umbc.edu/title-ix-coordinator/) to make a report and/or access support and resources:

Mikhel A. Kushner, Title IX Coordinator (she/they)

410-455-1250 (direct line), kushner@umbc.edu

*You can access support and resources even if you do not want to take any further action.*You will not be forced to file a formal complaint or police report. Please be aware that the University may take action on its own if essential to protect the safety of the community.

If you are interested in or thinking about making a report, please use the [Online Reporting/Referral Form](https://umbc-advocate.symplicity.com/titleix_report/index.php/pid364290?). Please note that, if you report anonymously,  the University’s ability to respond will be limited.

**Notice that Faculty are Responsible Employees with Mandatory Reporting Obligations:**

All faculty members are considered *Responsible Employees*, per [UMBC’s Policy on Sexual Misconduct, Sexual Harassment, and Gender Discrimination.](https://oei.umbc.edu/policy-on-sexual-misconduct-sexual-harassment-and-gender-discrimination/) Faculty are therefore required to report any/ all available information regarding conduct falling under the Policy and violations of the Policy to the Title IX Coordinator, even if a student discloses an experience that occurred before attending UMBC and/or an incident that only involves people not affiliated with UMBC.  Reports are required regardless of the amount of detail provided and even in instances where support has already been offered or received.

While faculty members want encourage you to share information related to your life experiences through discussion and written work, students should understand that faculty are required to report *past and present* sexual assault, domestic and interpersonal violence, stalking, and gender discrimination that is shared with them to the Title IX Coordinator so that the University can inform students of their [rights, resources and support](https://oei.umbc.edu/rights-and-resources/).  While you are encouraged to do so, you are not obligated to respond to outreach conducted as a result of a report to the Title IX Coordinator.

If you need to speak with someone in confidence, who does not have an obligation to report to the Title IX Coordinator, UMBC has a number of[Confidential Resources](https://oei.umbc.edu/policy-on-sexual-misconduct-sexual-harassment-and-gender-discrimination/#confidential-resources) available to support you:

* [The Counseling Center](https://counseling.umbc.edu/) (Main Campus): 410-455-2472 / After-Hours 410-455-3230 [Monday – Friday; 8:30 a.m. – 5 p.m.]
* [Center for Counseling and Consultation](https://shadygrove.umd.edu/student-services/center-for-counseling-and-consultation) (Shady Grove Campus): 301-738-6273 (Messages checked hourly)  [Online Appointment Request Form](https://shadygrove.titaniumhwc.com/)
* [University Health Services](https://uhs.umbc.edu/): 410-455-2542 [Monday – Friday 8:30 a.m. – 5 p.m.]
* Pastoral Counseling via [Interfaith Center](https://i3b.umbc.edu/spaces/the-interfaith-center-ifc/): 410-455-3657; [interfaith@umbc.edu](mailto:interfaith@umbc.edu) [7 days a week; Fall and Spring 7 a.m. – 11 p.m.; Summer and Winter 8 a.m. – 8 p.m.]

Other Resources:

* [Women’s Center](https://womenscenter.umbc.edu/) (for students of all genders): 410-455-2714; [womenscenter@umbc.edu](mailto:womenscenter@umbc.edu). [Monday – Thursday 9:30am-6pm and Friday 9:30am-4pm]
* [Shady Grove Student Resources](https://oei.umbc.edu/shady-grove-title-ix-resources/),[Maryland Resources](https://oei.umbc.edu/maryland-resources/),[National Resources](https://oei.umbc.edu/national-resources/).

Child Abuse and Neglect:

Please note that Maryland law and[UMBC policy](https://oei.umbc.edu/child-protection/) require that faculty report all disclosures or suspicions of child abuse or neglect to the Department of Social Services and*/*or the police.