**Course Approval Form**

**Action Requested:**
- [x] Create new course
- [ ] Inactivate existing course
- [ ] Reinstate inactive course
- [ ] Modify existing course (check all that apply)
  - [ ] Title
  - [ ] Prereq/coreq
  - [ ] Credits
  - [ ] Schedule Type
  - [ ] Repeat Status
  - [ ] Restrictions
  - [ ] Other:

**Course Level:**
- [x] Undergraduate
- [ ] Graduate

**College/School:**
- COS

**Department:**
- Physics & Astronomy

**Submitted by:**
- Rubin

**Ext:**
- 3815

**Email:**
- prubin@gmu.edu

**Effective Term:**
- Fall

**Subject Code:**
- PHYS

**Number:**
- 312

**Effective Term:**
- [x] Fall
- [ ] Spring
- [ ] Year 2017
- [ ] Summer

**Title:**
- Current: Waves and Optics
- New: Waves and Optics

**Credits:**
- [x] Fixed
- [ ] Repeatable:
  - [x] Not Repeatable (NR)
  - [ ] Repeatable within degree (RD)
  - [ ] Repeatable within term (RT)

**Grade Mode:**
- [x] Regular (A, B, C, etc.)
- [ ] Satisfactory/No Credit
- [ ] Special (A, B, C, etc. +IP)

**Schedule Type:**
- [x] Lecture (LEC)
- [ ] Lab (LAB)
- [ ] Recitation (RCT)
- [ ] Internship (INT)
- [ ] Seminar (SEM)
- [ ] Studio (STU)

**Prerequisite(s):**
- PHYS 251, PHYS 261

**Corequisite(s):**

**Restrictions Enforced by System:**
- Major, College, Degree, Program, etc. Include Code.

**Fulfills Mason Core Req? (undergrad only):**
- [ ] Currently fulfills requirement
- [ ] Submission in progress

**Catalog Copy for NEW Courses Only** (Consult University Catalog for models)

<table>
<thead>
<tr>
<th>Description</th>
<th>Notes</th>
<th>Notes</th>
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<tbody>
<tr>
<td>Laboratory survey of wave and optical phenomena and associated instrumentation</td>
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**Indicate number of contact hours:**
- Hours of Lecture or Seminar per week:
- Hours of Lab or Studio:

**When Offered:**
- [x] Fall
- [ ] Summer
- [x] Spring

**Approval Signatures**

**Department Approval**
- Date

**College/School Approval**
- Date

**If this course includes subject matter currently dealt with by any other units, the originating department must circulate this proposal for review by those units and obtain the necessary signatures prior to submission. Failure to do so will delay action on this proposal.**

**Unit Name**

<table>
<thead>
<tr>
<th>Unit Name</th>
<th>Unit Approval Name</th>
<th>Unit Approver’s Signature</th>
<th>Date</th>
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**For Graduate Courses Only**

**Graduate Council Member**

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<tr>
<th>Graduate Council Member</th>
<th>Provost Office</th>
<th>Graduate Council Approval Date</th>
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**For Registrar Office’s Use Only:**
- Banner:
- Catalog:

**revised 10/16/14**
FOR ALL COURSES (required)
Course Number and Title: PHYS 312 – Waves and Optics

Date of Departmental Approval:

FOR NEW COURSES (required if creating a new course)
- Reason for the New Course: No undergraduate instrumentation or optics courses exist
- Relationship to Existing Programs: This course will be integral to the revised Physics B.S., required for the degree without concentration and for several of the concentrations
- Relationship to Existing Courses: There exists a graduate course, PHYS 513 – Modern Instrumentation, which covers some of the same material at the graduate level
- Semester of Initial Offering: Spring 2018
- Proposed Instructors: Cressman, Rubin, Sauer, Tian, Vora
- Insert Tentative Syllabus Below
Physics 312 – Waves and Optics
Syllabus

Instructor: Phil Rubin
Office: PH 253
Phone: 703.993.3815
E-mail: prubin@gmu.edu
Office Hours: Monday and Wednesday 10:30-12:00
Prerequisite: PHYS 251 and 261 (strictly enforced)

Please note:

- All e-mail communication from the instructor concerning this course will be to GMU accounts only.
- If you are a student with a disability and require academic accommodations, please see me and contact the Office of Disability Resources at 703.993.2474. All academic accommodations must be arranged through that office.

Course Goals:

- To learn about basic science laboratory instruments
- To become familiar with interactions of waves and particles, radiation detection, spectroscopy, interferometry, and lasers
- To become proficient at keeping a laboratory notebook and producing technical notes

Textbooks:

- Instrumentation for Engineers and Scientists, J. Turner and M. Hill
- An Introduction to Practical Laboratory Optics, J. F. James

Requirements:

- All technical work for this lab course must be kept and maintained in a bound notebook; notebooks will be checked weekly
- All projects are to be reported in a short technical note due the week after the project has been undertaken

Grading:

- Laboratory Notebook Checks: 50%
- Technical Notes: 50%

Topics:

1. Laboratory Notebooks and Technical Notes
2. Sensors and Calibration
3. Noise and Signal Averaging
4. Transmission Lines and Waveguides
5. Lasers
6. Interferometry
7. Spectroscopy
8. Diffraction
9. Telescopes
10. Photometers and Cameras
11. Polarimeters
12. CCDs

**Honor Code Violations:**

Science is impossible when dishonesty, in any manifestation, exists. It's the worst possible conduct a scientist can display. Dishonesty of any sort (cheating, plagiarism, lying, stealing) will be addressed in accordance with the GMU Honor Code.

Don't cheat. Don't even look like you're cheating.

The GMU Honor Code: [http://www.gmu.edu/catalog/9798/honorcod.html#code](http://www.gmu.edu/catalog/9798/honorcod.html#code)

**GMU Diversity Statement:**