PH-UY 2033G – Waves, optics and thermodynamics

Instructor Information

- Katharine Suzanne Whitehead
- Official office hour TBA

Course Information

- Tu Th 4:30-5:45pm
- Bedford Square TBA
- Prerequisites: PH-UY 2121 and PH-UY 2023.
- Co-requisites: PH-UY 2131, and EX-UY 1.

Course Overview and Goals

Topics covered include:
Oscillations and SHM; Wave motion and interaction, standing waves, sound propagation and effects; EM waves, ray model of light, the wave model of light.
Temperature, thermal effects on solids, ideal gases; Kinetic theory of gases; 1st and 2nd law of thermodynamics.

Upon Completion of this Course, students will be able to:

- Students will learn about the above topics and gain fluency in problem solving for each topic involving both conceptual and theoretical question types.
- Students will develop their critical thinking and reasoning.
- Students will work on analytical skills and transfer these skills into the laboratory portion of the course.

Course Requirements

Grading of Assignments

The grade for this course will be determined according to these assessment components:
Assignments/Activities | Description of Assignment | % of Final Grade | Due
--- | --- | --- | ---
Homework | Average of 13 weekly homework assignments – lowest 2 dropped | 5% | One week
Quizzes | 15 min recitation quiz average – lowest 2 dropped | 25% | In class
Mid term test | Multiple choice exam | 30% | In class
Final exam | Cumulative end of semester exam | 40% | In class

Failure to submit or fulfill any required course component results in failure of the class the passing cut off is set at 50% of the total points available.

Grades
Letter grades for the entire course will be assigned as follows:

<table>
<thead>
<tr>
<th>Letter Grade</th>
<th>Percent</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>90.5 or higher</td>
<td>Demonstration of knowledge and understanding of all the topics covered in the course, including an ability to apply this to solving problems and demonstrate both independent and collaborative competency.</td>
</tr>
<tr>
<td>B</td>
<td>75 – 90</td>
<td>Demonstration of knowledge and understanding of most of the topics covered in the course, with an ability to apply this knowledge to solving problems with significant work in groups and individually.</td>
</tr>
<tr>
<td>C</td>
<td>60-74.5</td>
<td>Demonstration of familiarity and some understanding of most the topics covered in the course, together with an ability to solve some problems based on these topics. Some collaboration</td>
</tr>
</tbody>
</table>
Letter Grade | Percent | Description
---|---|---
D | 50-59.5 | Demonstration of familiarity with most the topics covered in the course, and at least a modest ability to solve some problems based on these topics. Some independence in lab and some work in groups.
F | 49.5 and lower | Failure to demonstrate familiarity with most of the topics covered in the course, and little ability to solve problems based on them, failure to work actively in the lab. Failure to be punctual and show willing.

Course Materials

Required Textbooks & Materials

- Scientific Calculator
- Geometry drawing set

Resources

- Access your course materials: [NYU Classes](nyu.edu/its/classes)
- Databases, journal articles, and more: [Bobst Library](library.nyu.edu)
- NYUL Library Collection: [Senate House Library](catalogue.libraries.london.ac.uk)
- Assistance with strengthening your writing: [NYU Writing Center](nyu.mywconline.com)
- Obtain 24/7 technology assistance: [IT Help Desk](nyu.edu/it/servicedesk)

Course Schedule
<table>
<thead>
<tr>
<th>Session/Date</th>
<th>Topic</th>
<th>Reading</th>
<th>Assignment Due</th>
</tr>
</thead>
<tbody>
<tr>
<td>Session 1:</td>
<td>Oscillations SHM</td>
<td>14.1-14.5</td>
<td></td>
</tr>
<tr>
<td>Session 2:</td>
<td>Travelling waves</td>
<td>15.1-15.5</td>
<td></td>
</tr>
<tr>
<td>Session 3:</td>
<td>Travelling waves</td>
<td>15.1-15.5</td>
<td></td>
</tr>
<tr>
<td>Session 4:</td>
<td>Superposition and standing waves</td>
<td>15.6-15.9</td>
<td></td>
</tr>
<tr>
<td>Session 5:</td>
<td>Superposition</td>
<td>15.6-15.9</td>
<td></td>
</tr>
<tr>
<td>Session 6:</td>
<td>Sound</td>
<td>16.1-16.4, 16.6-16.7</td>
<td></td>
</tr>
<tr>
<td>Session 7:</td>
<td>Sound</td>
<td>16.1-16.4, 16.6-16.7</td>
<td></td>
</tr>
<tr>
<td>Session 8:</td>
<td>EM Waves</td>
<td>31.1-31.9</td>
<td></td>
</tr>
<tr>
<td>Session 9:</td>
<td>EM Waves</td>
<td>31.1-31.9</td>
<td></td>
</tr>
<tr>
<td>Session 10:</td>
<td>Van der Waal's equation and gas motion</td>
<td>18.5-18.7</td>
<td></td>
</tr>
<tr>
<td>Session 11:</td>
<td>Ray model of light</td>
<td>32.1-32.7, 35.11</td>
<td></td>
</tr>
<tr>
<td>Session 12:</td>
<td>Ray model of light</td>
<td>32.1-32.7, 35.11</td>
<td></td>
</tr>
<tr>
<td>Session 13:</td>
<td>Optics mirrors lenses</td>
<td>33.1-33.7</td>
<td></td>
</tr>
<tr>
<td>Session 14:</td>
<td>Optics mirrors lenses</td>
<td>33.1-33.7</td>
<td></td>
</tr>
<tr>
<td>Session 15:</td>
<td>Review</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Session 16:</td>
<td>TEST</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Session 17:</td>
<td>Wave nature of light</td>
<td>34.1-34.5, 35.7</td>
<td></td>
</tr>
<tr>
<td>Session 18:</td>
<td>Interference</td>
<td>34.1-34.5, 35.7</td>
<td></td>
</tr>
<tr>
<td>Session 19:</td>
<td>Diffraction</td>
<td>35.1-35.6</td>
<td></td>
</tr>
<tr>
<td>Session 20:</td>
<td>Diffraction</td>
<td>35.1-35.6</td>
<td></td>
</tr>
<tr>
<td>Session 21:</td>
<td>Temperature, Ideal gas law</td>
<td>17.1-17.9</td>
<td></td>
</tr>
<tr>
<td>Session 22:</td>
<td>Ideal gas law</td>
<td>17.1-17.9</td>
<td></td>
</tr>
</tbody>
</table>
Session/Date | Topic | Reading | Assignment Due
---|---|---|---
Session 22: | Kinetic theory of gases, specific heat | 18.1, 19.1-19.4 |  
Session 23: | Latent heat, transfer of heat | 19.5, 19.10 |  
Session 24: | 1st law of thermodynamics | 19.6-19.9 |  
Session 25: | 1st law of thermodynamics | 19.6-19.9 |  
Session 26: | 2nd law of thermodynamics, Heat engines | 20.1-20.8 |  
Session 27: | 2nd law of thermodynamics, Heat engines | 20.1-20.8 |  
TBA | Final exam | 2hrs 30 mins |  

Co-Curricular Activities

Suggested trips:
- Meridian telescope – Greenwich Observatory
- Faraday museum – Royal Institute of Great Britain
- Science museum
- UCL observatory – booking required
- British Optical Association Museum
- Free public lectures in the evenings at RS, IOP etc. will be announced each week and are not required but recommended to see a couple.

Classroom Etiquette

- No mobile phones in class, no laptops unless for academic accommodations or your instructor requests. Food may not be consumed in the classrooms. Lectures are 1 hour and 15 minutes long and you are expected to attend each full session. Please arrive a couple of minutes before the class is due to start.

NYUL Academic Policies

Attendance and Tardiness

- Key information on NYU London’s absence policy, how to report absences, and what kinds of absences can be excused can be found on our website (http://www.nyu.edu/london/academics/attendance-policy.html)
Assignments, Plagiarism, and Late Work

- You can find details on these topics and more on this section of our NYUL website (https://www.nyu.edu/london/academics/academic-policies.html) and on the Policies and Procedures section of the NYU website for students studying away at global sites (https://www.nyu.edu/academics/studying-abroad/upperclassmen-semester-academic-year-study-away/academic-resources/policies-and-procedures.html).

Classroom Conduct

Academic communities exist to facilitate the process of acquiring and exchanging knowledge and understanding, to enhance the personal and intellectual development of its members, and to advance the interests of society. Essential to this mission is that all members of the University Community are safe and free to engage in a civil process of teaching and learning through their experiences both inside and outside the classroom. Accordingly, no student should engage in any form of behaviour that interferes with the academic or educational process, compromises the personal safety or well-being of another, or disrupts the administration of University programs or services. Please refer to the NYU Disruptive Student Behavior Policy for examples of disruptive behavior and guidelines for response and enforcement.

Disability Disclosure Statement

Academic accommodations are available for students with disabilities. Please contact the Moses Center for Students with Disabilities (212-998-4980 or mosescsd@nyu.edu) for further information. Students who are requesting academic accommodations are advised to reach out to the Moses Center as early as possible in the semester for assistance.

Instructor Bio