

COURSE SYLLABUS FORM

**American University of Beirut
Faculty of Arts and Sciences
Department of Physics**

Course Number and Title: Physics 204, Classical Physics for the Life Sciences

1. Course Description and Learning Outcomes

a- Course description:

Physics 204 is the second part of a three-semester non-calculus introductory course in physics designed primarily for students in the life sciences. This course is among the pre-medical study requirements and has Physics 103 (Physics for the Life Sciences: mechanics or any equivalent course) as a prerequisite. The main topics covered in Physics 204 are: Fluids, Thermodynamics, Wave phenomena, Geometrical and Physical Optics.

b- Intended Learning Outcomes:

The student should be able to:

- i- Grasp the physical concepts related to the material covered in the course.
- ii- Understand the mathematical aspects used to describe and formulate physical principles.
- iii- Evaluate the power and limitations of mathematics in describing our physical world.
- iv- Apply the mathematical formulae used to quantify the various physical phenomena presented.
- v- Develop problem-solving skills through conceptual understanding and mathematical modeling of the underlying physics.
- vi- Appreciate the importance of physical principles that govern our world as well as the role of physics in our modern society.
- vii- Acquire scientific and intellectual abilities such as critical thinking and independent learning.

2. Resources Available to Students

Textbook:

College Physics, Serway and Faughn, 6th Ed. Brooks/Cole Publishing, 2003.

Library resources:

Solutions of the recommended homework problems (see below) will be placed on reserve, in the Science Library.

On-Line resources:

- i. <http://info.brookscole.com/serway/>: web site of the textbook
- ii. http://www.brookscole.com/physics_d/: additional weblinks.
- iii. <http://www.phschool.com/science/cpsurf/index.html>: site containing links to physics simulations and demonstrations on the web.

3. Grading Criteria

The final grade will be a weighted average of the three quizzes (20% each), the reading quizzes (5%) and the final exam (35%).

4. Schedule

a- Lectures:

There will be two 50 min. Physics 204 lectures per week, on Tuesdays and Thursdays, in the Science Lecture Hall (S.L.H.). In these lectures, the most important aspect of the course material will be presented in an interactive manner. In addition to the presentation of the most important aspects of the material, students will be asked to think and answer conceptual questions that will be posed during class time.

Lectures	Topic	Reading assignments: Sections in textbook
Lecture 1	Introduction	-
Lecture 2	States of matter; solids	9.1-9.3
Lecture 3	Fluid statics	9.4-9.6
Lecture 4	Fluid dynamics	9.7-9.8
Lecture 5	Surface tension and transport phenomena	9.9-9.10
Lecture 6	Thermal properties of solids and liquids	10.1-10.3
Lecture 7	Gas law and the kinetic theory of gases	10.4-10.6
Lecture 8	Heat, calorimetry and phase changes	11.1-11.4
Lecture 9	Heat transfer	11.5-11.9
Lecture 10	First law of thermodynamics	12.1-12.3
Lecture 11	Engines and 2 nd law of thermodynamics	12.4-12.5
Lecture 12	Carnot engines; entropy	12.6-12.8
Lecture 13	Hooke's law and elastic potential energy	13.1-13.4
Lecture 14	Simple harmonic motion, simple pendulum	13.5-13.8
Lecture 15	Types of waves, interference and reflection	13.9-13.13
Lecture 16	Characteristics of sound waves	14.1-14.4
Lecture 17	Doppler effect; interference of waves	14.5-14.7
Lecture 18	Standing waves and resonance	14.8-14.9
Lecture 19	Standing sound waves; Beats;	14.10-14.13
Lecture 20	Reflection and refraction of light	22.1-22.4
Lecture 21	Dispersion and total internal reflection	22.5-22.8
Lecture 22	Flat and spherical mirrors	23.1-23.2
Lecture 23	Images by refraction	23.3-23.5
Lecture 24	Thin lenses; lens aberrations	23.6-23.7
Lecture 25	Light interference and reflection	24.1-24.3
Lecture 26	Thin films interference and diffraction	24.4-24.6
Lecture 27	Single slit diffraction; Grating; Polarization	24.7-24.9

b- Recitations

There will be 50 min. recitations held in Bustani Hall each week. Students should attend the weekly recitation in which they are registered. These recitation sessions are devoted to answering questions and to solving problems (especially class problems, see table below) related to the materials covered in the previous week.

Selected Home work and class problems:

Chapter	Homework problems	Class problems
9	5,8,16,23,26,36,37,40,45,51,52,55,66,71	3,12,14,28,42,44,49,56,59
10	3,17,23,28,36,50,54,55	6,15,29,34,37
11	7,12,18,29,31,35,39,41,48	2,3,9,11,28,40
12	5,6,12,14,19,24,26,30,44	3,4,17,19,23,34,50
13	3,7,11,17,26,29,33,61,64	1,6,12,23,32,43
14	6,7,12,18,31,37,43,52,55	3,10,11,20,34,41
22	6,7,12,16,20,29,30,35,37,45	9,10,22,27,34,49
23	4,5,7,14,20,28,33,38,40,60	8,10,19,23,44,45
24	2,8,14,26,32,36,41,57	3,12,15,17,31,37

c- Examinations

There will three quizzes (60-75 minutes each) to be given during the semester and a final examination (2 to 3 hours) to conclude the course. No documentation can be used during the quizzes and the FE both of which will consist of short multiple-choice questions/problems, conceptual essay questions and conventional problems.

Quiz I: covering Chapters 9 to 11, Week 5.

Quiz II: covering Chapters 12-14, Week 9.

Quiz III: covering Chapters 22-23, Week 13.

Final Exam: covers all the material taught in the course; End of semester.

5. Course Policy

- i. *Attendance:* Attendance of the lectures and recitations is mandatory. If a student misses a lecture or a recitation, he/she is entirely responsible for the material covered as well as any announcement that was done during class time. Any student arriving late (i.e. after the start of a lecture or a recitation) may not be allowed to attend the rest of the class.
- ii. *Reading quizzes:* Reading part of the material before coming to class is an essential step to fully benefit from the interactive aspect of the lectures. Five minutes reading quizzes will be administered at the beginning of some lectures. These quizzes will consist of short straightforward multiple-choice questions to check whether the assigned material has been read. Missing a reading quiz (either due to absence or late arrival to the lecture) is considered as a grade of zero on the corresponding quiz.

- iii. *Missing a quiz or the Final Exam:* No make-ups will be given for missed quizzes. In case of absence from a quiz due to a “force majeure”, the weights of the remaining quizzes may be readjusted, if the instructor of the course considers the reason for the absence valid. Medical reports will be considered only if, they are issued by the University Health Services of AUB or the AUB Medical Center. A make-up for a missed final exam will be given only after the Administrative Committee of the Faculty of Arts and Sciences approves the request for such a make-up. Additional information about make up examinations can be found on pages 115 and 116 of the 2002-03 AUB catalogue.
- iv. *Cheating:* Any student caught cheating or attempting to cheat during an exam will be dismissed on the spot and will receive a grade of zero on the corresponding exam. The case will also be reported to the Students Affairs Committee for further action to be taken. Such action could include the student being awarded a failing grade in the course and a Dean’s warning as well as the possibility of being dismissed from the University.
- v. *Class discipline:* No eating, drinking, smoking or use of mobile phones is permitted during class time. The instructor reserves the right to dismiss from class, any student acting in a manner that is considered disruptive or counter productive to the teaching/learning process in the classroom.
- vi. *Office Hours:* The coordinator of the course and the recitation instructors will hold regular weekly office hours that will be announced at the beginning of the semester. The students are urged to make use of the availability of the teaching staff, during these office hours for any questions or comments they have about the course and the material covered. If you cannot attend any of the posted office hours, call or e-mail the person you would like to see.