

Basic Course Information

Semester:	Spring 2021	Instructor Name:	Dr. Alejandro Cozzani
Course Title & #:	Physics 204	Email:	alex.cozzani@imperial.edu
CRN #:	21675	Webpage (optional):	Refer to Canvas
Classroom:	Online	Office #:	2767
Class Dates:	February 16-June 11, 2021; Last Day to Add: February 27, 2021; Drop Deadline: May 15, 2021.	Office Hours:	Monday and Wednesday: 10:00 AM-11:00 AM, Tuesday and Thursday 3:00 PM-4:00 PM or by appointment
Class Days:	Asynchronous Class (no Zoom meetings)	Office Phone #:	760-355-5720
Class Times:	N/A	Emergency Contact:	Silvia Murray 760-355-6201
Units:	4.0 (3.0 Lecture/1.0 Lab)	Class Format:	Online Asynchronous Class (no Zoom meetings)

Course Description

This course is designed to give an understanding of the fundamental principles of physics in the area of optics, thermodynamics, and modern physics.

Course Prerequisite(s) and/or Corequisite(s)

Physics 200 with a grade of "C" or better and concurrent enrollment in Math 194.

Student Learning Outcomes

1. Solve problems involving mirrors, lenses, polarization, reflection, refraction, interference, and diffraction. (ILO 1, ILO 2).
2. Solve temperature, heat, and First Law of Thermodynamics problems. (ILO 1, ILO 2).
3. Solve problems involving the Kinetic Theory of Gases, entropy, and the Second Law of Thermodynamics. (ILO 1, ILO 2).

Course Objectives

1. The student will solve problems involving interference, reflection, and transmission of transverse waves.
2. The student will solve problems involving velocity, frequency, energy, intensity, and the Doppler effect of sound waves.
3. The student will solve problems involving resonance, superposition and interference of standing waves in air, strings, rods and plates.
4. The student will solve problems involving temperature, thermometric properties, and temperature scales.
5. The student will solve problems involving thermal energy, heat capacity, latent heat, heat transfer, and the first law of thermodynamics.
6. The student will solve problems involving the kinetic theory of gases and the concepts of ideal gases.
7. The student will solve problems involving heat engines, refrigeration, entropy, and the second law of thermodynamics.
8. The student will solve problems involving Huygens' Principle, reflection, and refraction.
9. The student will solve problems involving images formed by plane mirrors, spherical mirrors, and thin lenses.
10. The student will solve problems involving interference of light waves, Young's Double Slit Experiment, and interference in thin films.
11. The student will solve problems involving single slit diffraction, resolution, diffraction gratings, and polarization.
12. The student will solve problems involving Einstein's Theory of special relativity.

13. The student will solve problems involving the hypothesis of Planck, Einstein's photoelectric effect, atomic spectra, and the Bohr Theory of the atom.
14. The student will solve problems involving the wave properties of particles, the uncertainty principle, and the Schrodinger wave equation.
15. The student will solve problems involving the hydrogen atom, quantum numbers, electron spin, and the exclusion principle.

Textbooks & Other Resources or Links

1. Textbooks (either one):

- a. Fundamental of Physics, 10th edition, ISBN: 978-1-118-23072-5 (Wiley).
 - i. Halliday/Resnick/Walker.
- b. Physics for Scientists and Engineers, 4th edition, ISBN: 978-13-149508-1 (Pearson).
 - i. Giancoli, Douglas C.
- c. University Physics, Volumes II and III (Openstax.org). FREE OER
 - i. William Moebs, Samuel J. Ling, and Jeff Sanny.

Course Requirements and Instructional Methods

1. **Homework:** The purpose of homework is to provide the student with sufficient practice to master all topics studied in class and to do well on tests. Homework is done online at: <https://www.pearsonmylabandmastering.com/northamerica/>
 - Course ID: cozzani07844.

Please refer to webpage as HW assignments but deadline to complete the work is June 04, 2021. The dynamic study modules are part of the HW and will be graded!

You need to satisfactorily complete at least an overall 80% to get full credit, otherwise your earned percentage will be converted to points (i.e., 80%=100 points, 72%=72 points).

It is extremely important that you use the same first and last name as in the IVC roster otherwise you may not get credit for HW. You cannot share/use other's person's account to do the HW. No exceptions!
2. **Out of Class Assignments:** The Department of Education policy states that one (1) credit hour is the amount of student work that reasonably approximates not less than one hour of class time and two (2) hours of out-of-class time per week over the span of a semester. WASC has adopted a similar requirement.
3. **Lab Experiments and Reports:** they have been replaced by computer simulations done via Canvas (pay attention to deadlines).
4. **Lecture:** You need to read the modules because there are assignments aligned to your readings (you can use any textbook of your choice).
5. **Online Discussions:** As part of the course requirements, you need to answer the online discussions found in Canvas, under the "Discussions" tab.
6. **Online Quizzes:** At the end of each chapter you will take a quiz to check your knowledge. Please refer to specific instructions under the "Quizzes" tab in Canvas.
7. **Tests or Exams:** They may be T/F, multiple choice, open-ended, and free response questions (also, done in Canvas). No makeup exams!
8. **Questions:** will be submitted via Canvas under "Assignments." Please pay attention to deadlines.

9. **Problems:** will be submitted via Canvas under “Assignments.” Please pay attention to deadlines.
10. **Mid-term:** It may include questions from the tests (recycled questions) and new questions (you have not seen them before but with similar level of difficulty). No makeup! (also, done in Canvas).
11. **Final Exam:** It may include questions from the tests (recycled questions) and new questions (you have not seen them before but with similar level of difficulty). The MC section will include ALL chapters. No makeup! (also, done in Canvas).
12. Students will not be allowed to make up any exam unless they have a powerful reason to miss a test (e.g. hospitalization) and send the corresponding paperwork as evidence; it is students’ responsibility to notify the instructor via e-mail to make arrangements. Since I can’t retrieve phone calls, all communication has to be done via e-mail only.
13. All exams have been set up to 2 hours and 2 attempts. However, DSPS students who may need additional time need to contact the instructor in advance (time allowances depend on individual DSPS test proctoring notice).

Special Project: The following are suggested case studies involving an application of physics and a related practical that you can use for the project. Alternatively, you can choose one of your own as it relates to any topic of modern physics, optics, or thermodynamics. **THESE ARE JUST SOME IDEAS BUT BE CREATIVE AND COME UP WITH YOUR OWN TOPIC!**

➤ **Idea # 1: Investigate quantum tunneling composite materials**

Case study brief

Find out what sort of material a quantum tunneling composite is. Why is its behavior interesting and what is the significance of the phrase ‘quantum tunneling’? What uses could it be put to and what are its current limitations?

Suggestions for practical work

Candidates could do experiments such as investigating the relationship between the applied stress to a strip of material and its electrical resistance/resistivity. Specimens of QTC material can be purchased online. Usually, the material comes with a booklet with a number of interesting possibilities for experiments.

➤ **Idea # 2: Investigate electroplaques and suggest why an electric eel can kill its prey without injuring itself**

Case study brief

Electroplaques are cells within animals like the electric eel. They are stacked in series and parallel and this arrangement can generate large voltages and currents that can be used to kill or stun prey. Candidates can find out about the chemical processes which lead to the generation of an emf in these biological cells, revise ideas on parallel and series, consolidate ideas about internal resistance and explain why the electric eel doesn’t injure itself.

Suggestions for practical work

Determine the internal resistance of a biological ‘lemon’ cell. What happens if you connect three lemon cells in series then in parallel? The electric eel has many electroplaques in series to produce a large voltage - why does it have many chains of electroplaques in parallel?

Students can create a lemon cell from a lemon, copper coin and zinc-coated screw. Three of these in series will create a battery with a reasonable emf. They should connect the battery to a variable load resistor and measure the terminal potential difference and current for an appropriate number of load resistor values. The load resistors need to be chosen so that their range reflects the internal resistance of the battery.

➤ **Idea # 3: Investigate the viscosity of materials**

Case study brief

Viscosity is an important property of some ingredients in sweets, considering that fluids that are used to make sweets need to be pumped around the factory. These fluids are often kept at relatively high temperatures (you may want to find out why).

Sugar content may need to be measured. Two different techniques can be used to do this. The first technique, refractometry, uses the concept of critical angle. The second technique, polarimetry, uses the rotation of polarized light. You may concentrate in relating what you have learned in class about the principles behind these techniques and why they are important for a factory.

Suggestions for practical work

Determine viscosity of a liquid such as golden syrup. A straightforward method uses the falling ball technique with a measuring cylinder of liquid. A 3mm-diameter ball bearing should suffice. Elastic bands make useful markers over which to determine terminal velocity.

How does the refractive index of a sugared water solution/Perspex vary with sugar content? Prepare sugar solutions of different known concentrations. Students soak strips of sugar paper in these solutions to coat them and then stick each of the coated papers in turn onto the flat back of a semicircular Perspex prism. Students can find the critical angle for each sugar concentration by tracing rays of light through the prism from a light box (a good blackout will be essential). The refractive index for each of the different sugar concentrations can be calculated. How does the concentration of sugared water solution affect the angle of rotation of the plane of polarization? Students can make a simple polarimeter from a LED source, polarizing filters and a plastic cell to contain the liquid which can be placed above the polarized light source.

- **Requirements:**
 - **The project is worth 100 points.**
 - **The project is individual or in pairs.**
 - **A minimum of three (3) full typed pages, double space, size 12 Times Roman or similar.**
 - **Include a bibliography page with at least five (5) sources.**
 - **If you decide to the practical portion for extra credit (50 points), you have to record it using a phone, camera, computer, etc. Make sure the video has good audio and you may include an introduction describing its purpose, materials, steps, etc. You can do it in a PPT as well.**
 - **It will be submitted during the week # 15 of the semester (no exceptions).**

Course Grading Based on Course Objectives

The student's grade will depend on the following areas (not on total points):

➤ Homework MP / Online discussions	20%
➤ Tests / Special Project	20%
➤ Simulations / Quizzes	20%
➤ Mid-term	20%
➤ Final Exam	20%
➤ TOTAL	100%

All grades are calculated by using the standard scale of:

A = 100-90% **B = 89-80%** **C = 79-70%** D = 69-60% F = 59% and below

Grades will be displayed in Canvas and you need to earn at least a "C."

Course Policies

ATTENDANCE

- A student who fails to attend the first meeting of a class or does not complete the first mandatory activity of an online class will be dropped by the instructor as of the first official meeting of that class. Should readmission be desired, the student's status will be the same as that of any other student who desires to add a class. It is the student's responsibility to drop or officially withdraw from the class. See [General Catalog](#) for details.



Course Syllabus Physics 204 Spring 2021

- Regular attendance in all classes is expected of all students. A student whose continuous, unexcused absence exceed the number of hours the class is scheduled to meet per week may be dropped. For online courses, students who fail to complete required activities for two consecutive weeks may be considered to have excessive absences and may be dropped.
- Absences attributed to the representation of the college at officially approved events (conferences, contests, and field trips) will be counted as 'excused' absences.

CLASSROOM ETIQUETTE

- Electronic Devices: Cell phones and electronic devices must be turned off and put away during class, unless otherwise directed by the instructor.
- Food and Drink are prohibited in all classrooms. Water bottles with lids/caps are the only exception. Additional restrictions will apply in labs. Please comply as directed by the instructor.
- Disruptive Students: Students who disrupt or interfere with a class may be sent out of the room and told to meet with the Campus Disciplinary Officer before returning to continue with coursework. Disciplinary procedures will be followed as outlined in the [General Catalog](#).
- Children in the classroom: Due to college rules and state laws, no one who is not enrolled in the class may attend, including children.

ONLINE NETIQUETTE

- What is netiquette? Netiquette is internet manners, online etiquette, and digital etiquette all rolled into one word. Basically, netiquette is a set of rules for behaving properly online.
- Students are to comply with the following rules of netiquette: (1) identify yourself, (2) include a subject line, (3) avoid sarcasm, (4) respect others' opinions and privacy, (5) acknowledge and return messages promptly, (6) copy with caution, (7) do not spam or junk mail, (8) be concise, (9) use appropriate language, (10) use appropriate emoticons (emotional icons) to help convey meaning, and (11) use appropriate intensifiers to help convey meaning [do not use ALL CAPS or multiple exclamation marks (!!!!)].

ACADEMIC HONESTY

Academic honesty in the advancement of knowledge requires that all students and instructors respect the integrity of one another's work and recognize the important of acknowledging and safeguarding intellectual property.

There are many different forms of academic dishonesty. The following kinds of honesty violations and their definitions are not meant to be exhaustive. Rather, they are intended to serve as examples of unacceptable academic conduct.

PLAGIARISM

- Plagiarism is taking and presenting as one's own the writings or ideas of others, without citing the source. You should understand the concept of plagiarism and keep it in mind when taking exams and preparing written materials. If you do not understand how to "cite a source" correctly, you must ask for help.
- Cheating is defined as fraud, deceit, or dishonesty in an academic assignment, or using or attempting to use materials, or assisting others in using materials that are prohibited or inappropriate in the context of the academic assignment in question.

Anyone caught cheating or plagiarizing will receive a zero (0) on the exam or assignment, and the instructor may report the incident to the Campus Disciplinary Officer, who may place related documentation in a file. Repeated acts of cheating may result in an F in the course and/or disciplinary action. Please refer to the [General Catalog](#) for more information on academic dishonesty or other misconduct. Acts of cheating include, but are not limited to, the following: (a) plagiarism; (b) copying or attempting to copy from others during an examination or on an assignment; (c) communicating test information with another person during an examination; (d) allowing others to do an assignment or portion of an assignment; (e) using a commercial term paper service.

Other Course Information

Imperial Valley College offers various services in support of student success. The following are some of the services available for students. Please speak to your instructor about additional services which may be available.



Course Syllabus Physics 204 Spring 2021

- CANVAS LMS. Canvas is Imperial Valley College’s main Learning Management System. To log onto Canvas, use this link: [Canvas Student Login](#). The [Canvas Student Guides Site](#) provides a variety of support available to students 24 hours per day. Additionally, a 24/7 Canvas Support Hotline is available for students to use: 877-893-9853.
- [Learning Services](#). There are several learning labs on campus to assist students through the use of computers and tutors. Please consult your [Campus Map](#) for the [Math Lab](#); [Reading, Writing & Language Labs](#); and the [Study Skills Center](#).
- [Library Services](#). There is more to our library than just books. You have access to tutors in the [Study Skills Center](#), study rooms for small groups, and online access to a wealth of resources.
- CANVAS LMS. Canvas is Imperial Valley College’s Learning Management System. To log onto Canvas, use this link: [Canvas Student Login](#). The [Canvas Student Guides Site](#) provides a variety of support available to students 24 hours per day. Additionally, a 24/7 Canvas Support Hotline is available for students to use: 877-893-9853.
- Any student with a documented disability who may need educational accommodations should notify the instructor or the [Disabled Student Programs and Services](#) (DSP&S) office as soon as possible. The DSP&S office is located in Building 2100, telephone 760-355-6313. Please contact them if you feel you need to be evaluated for educational accommodations.

IVC Student Resources

IVC wants you to be successful in all aspects of your education. For help, resources, services, and an explanation of policies, visit <http://www.imperial.edu/studentresources> or click the heart icon in Canvas.

Anticipated Class Schedule/Calendar

*****Subject to change without prior notice*****

WEEK OF	ACTIVITY, ASSIGNMENT, AND/OR TOPIC	READING	ASSIGNMENT DUE
1-February 16	Syllabus / HW/Canvas Module 0: Meet and Greet	Read Content Module 0	
2- February 22	Module 1: Waves I	Read Content Modules 1	<i>Refer to Course Syllabus, Canvas, and Mastering Physics for due dates</i>
3 – March 01	Module 2: Waves II	Read Content Module 2	
4- March 08	Module 3: EM and Light Waves	Read Content Module 3	<i>Refer to Course Syllabus, Canvas, and Mastering Physics for due dates</i>
5- March 15	Exam # 1 (Modules 1-2-3)		<i>Done in Canvas</i>
6- March 22	Module 4: Images	Read Content Module 4	
7- March 29	Module 5: Interference	Read Content Module 5	<i>Refer to Course Syllabus, Canvas, and Mastering Physics for due dates</i>



Course Syllabus Physics 204 Spring 2021

April 05	Spring Break	No Class	
8- April 12	Module 6: Diffraction	Read Content Module 6	<i>Refer to Course Syllabus, Canvas, and Mastering Physics for due dates</i>
9- April 19	Midterm Exam (Modules 1 through 6)		Done in Canvas
10- April 26	Module 7: First Law of Thermodynamics	Read Content Module 7	<i>Refer to Course Syllabus, Canvas, and Mastering Physics for due dates</i>
11- May 03	Module 8: Kinetic Theory of Gases	Read Content Module 8	
12- May 10	Module 9: Second Law of Thermodynamics	Read Content Module 9	<i>Refer to Course Syllabus, Canvas, and Mastering Physics for due dates</i>
13- May 17	Module 10: Relativity	Read Content Module 10	
14- May 24	Exam # 3 (Modules 7-8-9)		Done in Canvas
15- May 31	Work on Research Paper		<i>Refer to Course Syllabus, Canvas, and Mastering Physics for due dates</i>
16-June 07	Final Exam (Modules 1-10)		Done in Canvas

Mastering Physics (Online Homework)

System Requirements

Please make sure that your computer meets all of the requirements detailed below.

Note that you may need administrative access to be able to install applications or make other changes to your computer. If the computer you are using is not your own personal property, you may need to contact your organization's IT department to make such updates.

- **Operating Systems and Browsers**
 - [Browser Settings](#)
 - [Players and Plug-ins](#)
 - [Browser and Operating System Check](#)
- **Mobile Devices**
 - [Mobile Browser Requirements](#)
 - [Mobile Apps](#)
- **Other Requirements**

- o [Requirements for Editing and Creating Content \(for Educators only\)](#)

Operating Systems and Browsers

You are currently using the web browser Safari version 13.

You are currently using the operating system OS X 10.14.6.

This combination of browser and operating system is Not Supported.

To download the latest versions of these browsers, visit their websites:

[Chrome](#) [Edge](#) [Firefox](#) [Internet Explorer](#) [Safari](#)

	OPERATING SYSTEMS	BROWSERS
Windows	Windows 10	Chrome 49 or newer Firefox 45 or newer Microsoft Edge IE 11
	Windows 7	Chrome 49 or newer Firefox 45 or newer IE 11
OS X	OS X 10.12	Safari 12 Safari 11 Chrome 49 or newer Firefox 45 or newer
	OS X 10.13	Safari 12 Safari 11 Chrome 49 or newer Firefox 45 or newer
	OS X 10.14	Safari 12 Chrome 49 or newer Firefox 45 or newer
	OS X 10.15	Chrome 49 or newer
Chrome OS	Chrome OS	Chrome 49 or newer
Android	Android 6	Chrome Mobile 46 or newer
	Android 7	Chrome Mobile 46 or newer
	Android 8	Chrome Mobile 46 or newer
	Android 9	Chrome Mobile 46 or newer
iOS	iOS 10	Safari 10 Chrome Mobile 46 or newer
	iOS 10.1	Safari 10 Chrome Mobile 46 or newer

OPERATING SYSTEMS	BROWSERS
iOS 10.2	Safari 10 Chrome Mobile 46 or newer
iOS 10.3	Safari 10 Chrome Mobile 46 or newer
iOS 11	Safari 11 Chrome Mobile 46 or newer
iOS 11.4	Safari 11 Chrome Mobile 46 or newer
iOS 12	Safari 12 Chrome Mobile 46 or newer
iOS 12.2	Safari 12 Chrome Mobile 46 or newer
iOS 12.4	Safari 12 Chrome Mobile 46 or newer
iOS 13	Chrome Mobile 46 or newer

Browser Settings

- **Pop-ups must be enabled.** [How to enable pop-ups](#) for Mastering [features that require pop-ups](#).
- **Cookies must be enabled.** How to enable Mastering cookies for [Chrome](#), [Firefox](#), [Safari](#), [Internet Explorer](#), [Edge](#). Use the appropriate Mastering website (domain) name.
- **JavaScript must be enabled.** Some Mastering assignment content may also require Java. [How to enable Java and JavaScript](#) for your browser.

Players and Plug-ins

You may receive a message that some Mastering assignment content cannot be displayed because it requires a browser player or plug-in. Click the player or plug-in name below to download the latest version. If the browser you're using no longer supports such players or plug-ins (like recent versions of Chrome or Firefox), please use another supported browser for this content.

- [Flash Player](#), version 20 or higher
- [Shockwave Player](#)
- [Adobe Reader](#)
- [Java](#) (Recent versions of Chrome, Firefox, & Edge do not support the Java plugin.)
- [QuickTime Player](#)
- [PowerPoint Viewer \(Windows only\)](#)
- [OpenOffice \(Mac OS only\)](#)

These players and plug-ins may have their own system requirements, which can be found on their websites. In some cases, you may need to register for the player or plug-in, and you may need to restart your computer when you finish the download and installation.

Browser and Operating System Check

To make your product experience as smooth as possible, our system checks that your device uses a supported web browser and operating system for the product you are accessing. [More about browser settings and this compatibility check.](#)

Mobile Devices

Mobile Browser Requirements

After you sign in to your Mastering course on a computer at least once, you have the option to use a smartphone or tablet to work on Mastering assignments, Learning Catalytic sessions, and Dynamic Study Modules. (Educators, a student account is needed to work in Mastering standard's Mobile view.) Note that you may need to return to your computer to complete some assignments or assignment items. Supported browsers are listed above. The Kindle is not supported.

Mobile Apps

The following optional, free mobile apps are available for your convenience.

- **Pearson eText app (for smartphones and tablets)**
 - [Learn how to get the Pearson eText mobile app](#), and sign in with your user account for Mastering.
 - [Find out about app features](#), including the ability to use your eText with or without Wi-Fi.
- **App to work on Dynamic Study Modules on smartphones and iPod touch**

This app optimizes your Dynamic Study Modules experience on a mobile device. If your Mastering course has the Dynamic Study Modules link on its Course Home page and you have clicked this link at least once on your computer to open a module, you can use the [Dynamic Study Modules app](#) on your iOS or Android smartphone. (This app is not supported on tablets or for MasteringPlus users.)

Tablet users: You can work on any available Dynamic Study Modules after you sign in to your course.

Other Requirements

Requirements for Editing and Creating Content (for Educators only)

The Simple Editor and the Advanced Editor (also known as the Authoring Tool) enable you to produce custom assignable items.

SIMPLE EDITOR

Requirements for the Simple Editor match the latest operating systems and browsers for Mastering (above). To access all features of the Simple Editor, [set your browser security to allow pop-ups.](#)

ADVANCED EDITOR

The requirements for the Advanced Editor are more restrictive than for either Mastering or the Simple Editor.

	OPERATING SYSTEMS	BROWSERS
Windows	Windows 7	Internet Explorer 9.x
Mac OS	You need a Windows emulator.	Internet Explorer 9.x

Important information about working with Internet Explorer 9: Regardless of your operating system, you should use Internet Explorer 9 to work with the Advanced Editor. (Internet 10 Desktop is not yet fully supported for authoring.) When downloading Internet Explorer 9, be sure to choose the 32-bit version (rather than the 64-bit version). After you have opened the Advanced Editor in 32-bit mode, it will automatically open in this mode every time after that.