

Course Syllabus

PC142/162 Thermodynamics and Waves

Department of Physics and Computer Science, Faculty of Science, Waterloo Campus

Winter | Year 2021

Instructor Information

Marek S. Wartak | Office N 2076 D

Contact Information (x. 2436/mwartak@wlu.ca)

Weekly Office Hours (M 2:30 pm -3:30 pm) or by appointment

I plan to have Office Hours on Zoom

Course Information

Algebra-based course, which introduces basic principles of physics. Detailed topics covered: solids and fluids, temperature, heat, thermodynamics, vibrations and waves, sound, basic electricity and magnetism.

Credit: 0.50

Prerequisites: PC141 or PC131

Exclusions: PC100*, PC110*, PC132, PC152, PC162, SC100

Course location: MWF 9:30 am -10:20 am

Course Overview and Approach

The goal of PC142/162 is to provide students with the basic concepts of physics. We concentrate on waves, thermodynamics and some elements of electricity and magnetism. We not only tell students how physics works, we show them, and we give them the opportunity to show us what they have learned by testing their understanding of the concepts and applying them to real-world scenarios. The course is structured in terms of thematic units. The course is lecture based. During each class students will be able to ask questions if they need more clarification. After the lecture I would expect students to have at least basic understanding of the most important parts of the topics discussed.

Course Goals and Learning Outcomes

After taking this course you will, among other things, be able to

- understand basic concepts of waves, thermodynamics and electricity
- be able to solve some of real-life problems

Course Tools and Learning Materials

Course Textbook

James S. Walker
Physics, 5th Edition

Publisher: Pearson 2017

(OR equivalently a digital version of the text book with Mastering Physics when you register in the course)

Tools and Learning Materials

You will use Mastering Physics to submit the assignments and conduct Midterm.

Student Evaluation for PC142

| Assessment | Weighting |
|-------------------|------------------|
| 10 Assignments | 60% |
| Labs + Tutorials | 25% |
| Midterm (1x) | 15% |
| Total | 100% |

Student Evaluation for PC162

| Assessment | Weighting |
|-------------------|------------------|
| 10 Assignments | 60% |
| Tutorials | 25% |
| Midterm (1x) | 15% |
| Total | 100% |

Tentative Weekly Schedule

| Week # and Dates | Chapter # | Topic |
|------------------------------|------------|---|
| Week 1. Jan.11-Jan.15 | Chapter 13 | Oscillations about equilibrium. |
| Week 2. Jan.18-Jan.22 | Chapter 14 | Waves and sound. |
| Week 3. Jan.25-Jan.29 | Chapter 15 | Fluids. |
| Week 4. Feb.1-Feb.5 | Chapter 16 | Temperature and heat. |
| Week 5, Feb. 8 -Feb.12 | Chapter 17 | Phases and phase changes. |
| Week Feb.15-Feb.19 | ----- | Reading week (no classes) |
| Feb. 24 , 2021 | ----- | Midterm |
| Week 6. Feb.22-Feb.26 | Chapter 18 | The laws of thermodynamics. |
| Week 7. March 1- March 5 | Chapter 19 | Electric charges, forces and fields. |
| Week 8. March 8 - March 12 | Chapter 20 | Electric potential and electric potential energy. |
| Week 9. March 15 - March 19 | Chapter 21 | Electric current and direct-current circuits. |
| Week 10. March 22 - March 26 | Chapter 22 | Magnetism. |
| Week 11. March 29 - April 2 | Chapter 23 | Magnetic flux and Faraday's law of induction. |
| Week 12. April 5 - April 9 | Chapter 24 | Alternating-current circuits. |

University and Course Policies (proposed and required text)

Laurier has several senate approved policy statements it requires instructors to include in their syllabus. Those with specific wording approved by senate are indicated specifically below.

- 1. Academic Calendars:** Students are encouraged to review the [Academic Calendar](#) for information regarding all important dates, deadlines, and services available on campus.
- 2. Special Needs:** Students with disabilities or special needs are advised to contact Laurier's Accessible Learning Centre for information regarding its services and resources.
- 3. Plagiarism:** The University has approved the following wording for inclusion on all course syllabi about the use of the institutionally supported plagiarism software tool. "Wilfrid Laurier University uses software that can check for plagiarism. If requested to do so by the instructor,

students are required to submit their written work in electronic form and have it checked for plagiarism." (Approved by Senate May 14, 2002) .

In addition to the statement above you may wish to add the following text about academic integrity.

4. **Academic Integrity:** Laurier is committed to a culture of integrity within and beyond the classroom. This culture values trustworthiness (i.e., honesty, integrity, reliability), fairness, caring, respect, responsibility and citizenship. Together, we have a shared responsibility to uphold this culture in our academic and nonacademic behaviour. The University has a defined policy with respect to academic misconduct. As a Laurier student you are responsible for familiarizing yourself with this policy and the accompanying penalty guidelines, some of which may appear on your transcript if there is a finding of misconduct. The relevant policy can be found at Laurier's [academic integrity](#) website along with resources to educate and support you in upholding a culture of integrity. Ignorance is not a defense.
5. **Classroom Use of Electronic Devices:** State your classroom practice and any consequences for student failure to comply – see [Policy 9.3](#) (Approved by Senate March 8, 2012).
6. **Late Assignment Policy:** Specify any penalties that will be assessed when deadlines for the completion of course components are not met (Approved by Senate May 23, 2012). Refer to the Handbook on Undergraduate Course Management for more information.
7. **Final Examinations:** Students are strongly urged not to make any commitments (i.e., vacation) during the examination period. Students are required to be available for examinations during the examination periods of all terms in which they register. Refer to the Handbook on Undergraduate Course Management for more information.
8. **Foot Patrol, the Wellness Centre, and the Student Food Bank:** The University approved the inclusion of information about select wellness and safety services and supports on campus in the course information provided to students. (Approved by Senate November 28, 2011.) Specific language (by campus) is provided below.

Multi-campus Resource:

- Good2Talk is a postsecondary school helpline that provides free, professional and confidential counselling support for students in Ontario. Call 1-866-925-5454 or through 2-1-1. Available 24-7.

Kitchener/Waterloo Resources:

- [Waterloo Student Food Bank](#): All students are eligible to use this service to ensure they're eating healthy when overwhelmed, stressed or financially strained. Anonymously request a package online 24-7. All dietary restrictions accommodated.
- [Waterloo Foot Patrol](#): 519.886.FOOT (3668). A volunteer operated safe-walk program, available Fall and Winter daily from 6:30 pm to 3 am. Teams of two are assigned to escort students to and from campus by foot or by van.

- [Waterloo Student Wellness Centre](#): 519-884-0710, x3146. The Centre supports the physical, emotional, and mental health needs of students. Located on the 2nd floor of the Student Services Building, booked and same-day appointments are available Mondays and Wednesdays from 8:30 am to 7:30 pm, and Tuesdays, Thursdays and Fridays from 8:30 am to 4:15 pm. Contact the Centre at x3146, wellness@wlu.ca or @LaurierWellness. After hours crisis support available 24/7. Call 1-844-437-3247 (HERE247).

Brantford Resources:

- [Brantford Student Food Bank](#): All students are eligible to use this service to ensure they're eating healthy when overwhelmed, stressed or financially strained. Anonymously request a package online 24-7. All dietary restrictions accommodated.
- [Brantford Foot Patrol](#): 519-751-PTRL (7875). A volunteer operated safe-walk program, available Fall and Winter, Monday through Thursday from 6:30 pm to 1 am; Friday through Sunday 6:30 pm to 11 pm. Teams of two are assigned to escort students to and from campus by foot or by van.
- [Brantford Wellness Centre](#): 519-756-8228, x5803. Students have access to support for all their physical, emotional, and mental health needs at the Wellness Centre. Location: Student Centre, 2nd floor. Hours: 8:30 am to 4:15 pm Monday through Friday. After hours crisis support available 24/7. Call 1-884-437-3247 (HERE247).