The technology that enables the internet in its current form is the result of the efforts of tens of thousands of physicists, engineers, and computer scientists over more than a hundred years. The development of the Internet is an amazing story of the transformation of fundamental physics discoveries into practical systems. This course is a one-term, non-science major's introduction to the physical concepts that explain how information is stored, transmitted, processed, and retrieved. Fundamental issues in physics will be discussed using only elementary math and simple algebra. By providing an overview over selected topics with particular relevance to technologies that pervade every aspect of our lives, the course also serves the broader purpose of highlighting the significance of basic science in modern society.

**Administrative details**

**Instructor:** Prof. Jens Noeckel (noeckel@uoregon.edu)

**Room:** Willamette 112

**TA:** Kahli Burke (kahli@uoregon.edu)

**Website:** All course materials will be on Canvas

**Meeting times:** Classes are Mondays, Wednesdays and Fridays from 12:00 noon to 12:50 pm.

**Office hours:**

Kahli Burke: Mondays 10-11 am in Willamette 463, and 11-12 noon in the Physics Drop-In Center.

Jens Noeckel: Wednesdays 1-2 pm in Willamette 147

**Grading:** Grades for the course will be based on quizzes, homework, two midterm exams, and a final exam. The relative weights will be as follows:

- Quizzes: 10%
- Homework: 35%
- Midterm 1: 15%
- Midterm 2: 15%
- Final exam: 25%
**Quizzes:** To test your retention of the assigned reading, short quizzes will be posted on Canvas, due at noon on the day of the next class. Additional quizzes will be given randomly in class, but they are scored only based on participation, not accuracy of the response. The point of the quizzes is to add incentive to do your assigned reading before class, and the questions are designed to be easy if you've done the reading. I will drop your lowest 3 reading quiz scores (but not the in-class quiz scores) in computing your final grade (missed quizzes count as zero scores). In-class quizzes will be conducted using Plickers; for this, you need to make sure to always bring the Plickers card with your number that will be handed out in class. If you lose the card, it's easy to print a new one by going to [https://help.plickers.com/hc/en-us/articles/360008948034-Get-Plickers-Cards](https://help.plickers.com/hc/en-us/articles/360008948034-Get-Plickers-Cards) and downloading the "Standard" card set.

**Homework:** weekly homework sets will be assigned on the course web site. Homework is due Wednesdays (except in midterm weeks) at 4:30 pm. Submissions must be made online through Canvas. If you're not done by the deadline then upload what you have. If late (up to 24 hrs maximum), turn in to Canvas for a maximum of 80% credit. To upload your homework, you may take photos or create PDFs of your written responses.

Each problem set will be assigned at least one week before it is due. Your lowest homework score will be dropped in computing your final grade, so you can bomb or miss one assignment without affecting your grade.

**Midterm exams:** there are two one-hour midterm exams, to be held in class:

Midterm 1: Oct 19, 12 pm - 12:50pm,

Midterm 2: Nov 16, 12 pm - 12:50pm

**Makeup exams:** the exams are scheduled during class time. Thus, there will be no makeup exams for this course. If you have a serious and documented reason for missing an exam (death in the family, serious illness), your final exam score will count in place of the exam score. That is, your final exam score will account for almost double what it would be otherwise. Otherwise, you'll receive a zero score for a missed exam.

**Final exam:** the final exam will be held from 10:15 pm to 12:00 pm, Tuesday, December 4.

**Pass/fail grading option:** a passing grade requires the equivalent of a C grade on all course work (quizzes, homework, midterms, and final).

**Grading scale:** the nominal grading scale for this course is below. If the final class average is excessively low, I may apply a curve for a higher average final grade. However, you are guaranteed at least the grade listed below based on your final average; you are not competing with others in the class for your grade.

97-100=A+, 93-96.9=A, 90-93.9=A-, 87-89.9=B+, 83-86.9=B, 80-82.9=B-, 77-79.9=C+, 73-76.9=C, 70-72.9=C-, 67-69.9=D+, 63-66.7=D, 60-62.9=D-, <60=F

**Required materials**
The required text for the course is *The Silicon Web* by Michael Raymer (available at the Duck Store). You'll also need a scientific calculator to be used in homework and exams.

**Your Responsibilities**

You need to **read** the assigned material **before** each class. This is **crucial** to your getting the most out of attending class. Note that in class, we won't necessarily cover **everything** that's in the assigned reading—while the exams will concentrate mostly on topics I emphasize in class, **anything** from the assigned reading is fair game for an exam question. In class, I will **review** the more difficult and important concepts in class, answer any **questions** you have, show you **demonstrations** to illustrate the concepts and help you build a mental model for understanding physics, and elaborate on additional aspects of the material (examples, applications, etc.). **Attendance** is not required, but you will receive no points for the in-class quiz if you're absent.

**Academic Honesty**

Students are expected to abide by university policies on academic honesty, avoiding plagiarism, fabrication, cheating, and academic misconduct. The Student Conduct Code ([conduct.uoregon.edu](http://conduct.uoregon.edu)) provides definitions of these terms and explanations of the university policy on the subject. You are responsible for understanding these regulations and abiding by them. Academic dishonesty will be dealt with severely, as it is disrespectful to your fellow students and your instructor, as well as being against both university regulations and state laws.

**Physics Drop-In Help Center, other resources**

Free help with any standard math or physics question can be obtained in 147 Willamette Hall. The Drop-In Help Center is staffed 5 days a week and most of the day (hours are posted on the door).

If you have questions about lectures, assignments, readings, or other matters, please visit office hours, or communicate via Canvas or by email. Individual appointments can readily be arranged to accommodate schedule conflicts with the regular office hours. The University's Academic Learning Services (ALS) center provides a variety of workshops, individual consultations, writing assistance labs, and more to assist UO students. For more information see als.uoregon.edu, or call (541) 346 3226. The University's Teaching and Learning Center also provides workshops and courses – see [tlc.uoregon.edu](http://tlc.uoregon.edu).

**Students with disabilities**
If there are aspects of the instruction or course design that result in barriers to your inclusion, please notify Prof. Noeckel (noeckel@uoregon.edu) as soon as possible. You are also welcome to contact Disability Services in 164 Oregon Hall, 346-1155.

**Chapters**

1. Introduction
2. Mathematics
3. Mechanics
4. Heat, thermodynamics
5. Electricity and magnetism
6. Waves: Sound, Radio, and Light
7. Quantum Physics of Atoms and Materials
8. Analog and Digital Communication
9. Semiconductor Physics: Transistors and Circuits
11. Light and Optical Fibers for the Internet
12. Light Amplification and Lasers

**Course Summary:**

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<th>Date</th>
<th>Details</th>
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<tr>
<td>Mon Sep 24, 2018</td>
<td><a href="https://canvas.uoregon.edu/calendar?event_id=97295&amp;include_contexts=course_120379">Intro</a></td>
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<td>Wed Sep 26, 2018</td>
<td><a href="https://canvas.uoregon.edu/calendar?event_id=95293&amp;include_contexts=course_120379">Acceleration and Force</a></td>
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<td><a href="https://canvas.uoregon.edu/courses/120379/assignments/627813">Reading: pages 21 to 37</a></td>
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<td>Fri Sep 28, 2018</td>
<td><a href="https://canvas.uoregon.edu/calendar?event_id=95286&amp;include_contexts=course_120379">Energy and Power</a></td>
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<td><a href="https://canvas.uoregon.edu/courses/120379/assignments/627775">Reading Quiz (p. 78)</a></td>
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