

# PHYS2332-Modern Physics II

## Winter 2020

**Instructor:** Apichart Linhananta

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**Lecture Hours:** M/W 11:30 AM – 1:00 AM, AT 2003

**Office Hours:** M/W 1:30 AM to 4 PM; T/TH 2 - 5 PM

### Textbook

Thornton and Rex, *Modern Physics for Scientists and Engineers*, 4<sup>th</sup> edition (available in the bookstore)

**Syllabus** This is a survey course on the application of quantum mechanics to atoms, molecules and condensed matter. Quantum Mechanics will be used to quantitatively explain experiments that reveal the quantized properties of nature.

1. Principle of Quantum Mechanics (QM): Review of the interpretation of QM
2. Molecules: chemical bonds, rotation, vibration, molecular spectra, Franck-Condon Principle, Laser.
3. Statistical Physics: classical and quantum statistics, blackbody radiation, fermions, bosons.
4. The Solid State: crystal structure, bonds in solids, band theory.
5. Nuclear and Elementary Particle Physics and possibly Gravitation

**NOTE:** About 90% of the course follows the textbook, and about 10% will be from the class notes. Students are encouraged to attend as many lectures as possible.

### Marking Scheme

Problem sets (about 8) : 15%

Labs (3 experiments) : 20%

2 Midterms :  $2 \times 15\% = 30\%$

Final exam : 35%

Alternative scheme

Problem sets : 15%

Labs (2 or 3 experiments) : 20%

The better of two midterms : 15%

Final exam : 50%

### Online Resources

Solutions to problem sets in PDF format will be posted on my webpage:

<http://physics.lakeheadu.ca/facNstaff/api/P2332.htm>

Other useful materials and information will also be posted on this webpage.

**Accommodations:** Lakehead University is committed to achieving full accessibility for persons with disabilities. Part of this commitment includes arranging academic accommodations for students with disabilities to ensure they have an equitable opportunity to participate in all of their academic activities. If you think you may need accommodations, you are strongly encouraged to contact Student Accessibility Services (SAS) and register as early as possible. For more information, please visit: <http://studentaccessibility.lakeheadu.ca>