

**DEPARTMENT OF PHYSICS & ASTRONOMY
TRENT UNIVERSITY**

PHYS 2610H : INTRODUCTORY QUANTUM PHYSICS 2014 FA
Peterborough

Instructor: Dave Patton	Email: dpatton@trentu.ca	Telephone: (705) 748-1011 ext. 7462
Campus: Peterborough	Office Location: SC 320	Office Hours: Wed. 1-3 p.m or by appointment

Lab Demonstrator: Dave Marshall	Email: dmarshall@trentu.ca
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Physics & Astronomy Office: Gina Collins	Email: physics@trentu.ca
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Course Description:

Special relativity, particle-like aspects of radiation, atomic structure, wave-like properties of matter, Schrödinger equation and applications to one-dimensional systems. See course outline below for more details.

Course Pre-requisites:

Prerequisites: PHYS 1001H and 1002H (Introductory Physics I and II)
 MATH 1100Y or 1101Y (Calculus I – Functions Calculus)

Pre- or co-requisite: PHYS-MATH 2150H (Ordinary Differential Equations)

Course Format:

Type	Day	Time	Location
Lecture	Wednesday	15:00 – 15:50	SC 317
Lecture	Friday	13:00 – 14:50	SC 317
Seminar	Friday	15:00 – 15:50	SC 317
Lab	Monday	13:00 – 15:50	SC 312

The one hour seminar scheduled on Fridays will provide an additional opportunity for you to ask questions about problem sets that have been assigned, and will sometimes also include demonstrations related to the numerical problems on your assignments (e.g., using Excel or MATLAB).

The labs on Mondays will be led by Dave Marshall.

Assignments:

There will be regular assignments consisting of problems, some of which will be from the textbook.

Quizzes:

There will be 10-minute in-class quizzes roughly every other week, which will test you on material covered during the lectures.

Midterm Test:

The midterm test is scheduled to take place on Friday Oct. 17 from 13:00-14:50.

Final Exam:

There will be a three hour final exam in the December exam period.

Course Evaluation:

Type of Assignment	Weighting
Assignments	20%
Quizzes	5%
Midterm Test	15%
Final Examination	35%
Laboratory	25%

Note: A minimum average of 35% must be obtained on the quizzes, tests, and final examination in order to pass this course. If not, a course grade of 45% is the maximum that can be assigned.

Required Text:

R. Harris, *Modern Physics*, 2nd Edition, Pearson, 2007

Recommended Texts:

An introductory text:

Randall D. Knight, *Physics for Scientists and Engineers: A Strategic Approach*, Addison Wesley, 2008

An advanced text:

R. Eisberg and R. Resnick, *Quantum Physics of Atoms, Molecules, Solids, Nuclei and Particles*, 2nd Edition, Wiley, 2006

LearningSystem:

The course website is available through myTrent, and provides access to online content such as assignments, grades, web links, and textbook media.

Course Outline:

By the end of the course we will have covered material from chapters 1 – 6 of Harris.

1. Introductory concepts in relativity
2. Historical evidence for relativity
3. Transformations between moving frames: Galilean (approximate) and Lorentz (exact)
4. Relativistic mechanics
5. Introductory concepts in quantum mechanics
6. Historical evidence for quantum mechanics
7. The Bohr model: a simple approach
8. The Schrödinger equation for 1-particle in 1-dimension
9. Frequently occurring solutions of the 1-particle, 1-dimensional, Schrödinger equation

Late Policy:

Marks will be deducted for late assignments at a rate of 10% per day (including weekends).

Assignments will normally be accepted up to one week beyond the due date, after which a mark of zero will be assigned. Assignments may be submitted electronically in order to avoid late penalties, but in that case an identical paper copy must still be submitted for grading within 2 business days.

University Policies

Academic Integrity:

Academic dishonesty, which includes plagiarism and cheating, is an extremely serious academic offence and carries penalties varying from a 0 grade on an assignment to expulsion from the University. Definitions, penalties, and procedures for dealing with plagiarism and cheating are set out in Trent University's *Academic Integrity Policy*. You have a responsibility to educate yourself – unfamiliarity with the policy is not an excuse. You are strongly encouraged to visit Trent's Academic Integrity website to learn more: www.trentu.ca/academicintegrity.

Access to Instruction:

It is Trent University's intent to create an inclusive learning environment. If a student has a disability and/or health consideration and feels that he/she may need accommodations to succeed in this course, the student should contact Student Accessibility Services (BH Suite 132, 748-1281, accessibilityservices@trentu.ca) as soon as possible. Complete text can be found under Access to Instruction in the Academic Calendar.