

**DEPARTMENT OF PHYSICS AND ASTRONOMY
TRENT UNIVERSITY**

**PHYS 2091H: PHYSICAL SCIENCE FOR TEACHER EDUCATION: LIGHT AND COLOUR
2017FA
PETERBOROUGH**

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Course Description: This is a hands-on, lab course designed to meet the needs of future elementary school teachers. We meet for a three-hour session each class. We cover selected topics taken from, or related to, the Ontario Curriculum for grades 1-8 where basic concepts are often misunderstood. Primary topics will include light, image formation, colour perception, reflection, refraction, shadows, and printing. Students will work with their classmates to investigate physical systems and develop their own models to explain how they work, and refine those models through guided activities and group and classroom discussions.

Course Pre-requisites: None. Students majoring in a physical science or maths are excluded. It is assumed that all students plan to become elementary school teachers.

Course Fees: \$ 20 printing and lab resources fee. Make cheques payable to “Trent University Department of Physics and Astronomy”. If you need a receipt, attach a note to your payment with your name, Trent email address, and student number.

Required Texts: (Provided in class upon payment of fee)

Title: *Powerful Ideas in Physical Science*
Author: American Association of Physics Teachers

myLearningSystem/Blackboard: Online resources are available including audio/video files, review exercises, class discussion forums, course calendar, and online assignment submissions. Access to this system is required for some aspects of the course. Links to *myLearningSystem/Blackboard* and other material is available at <http://www.trentu.ca/academic/physics/jbeda/PHYS209x/>

Course Format:

Please check <http://www.trentu.ca/timetable/> to confirm times and locations.

Type	Day	Time	Location
Lab Section: PHYS-2091H-A-F01	Thursday	13:00 -16:00	SC 305

Learning Outcomes/Objectives/Goals/Expectations:

Course activities have been developed to address several learning outcomes. By the end of the course a successful student should:

1. be familiar with the models of physical systems constructed and refined in the course.
2. be able to articulate the features of these physical models, and the evidence that supports their validity, as well as the evidence against other intuitive but less useful models.
3. be able to participate in group discussions to develop physical models through sharing ideas and experiences.
4. be able to analyze others' ideas/experiences and modify their own ideas in light of new evidence and/or understanding.
5. have increased confidence in their ability to learn, understand, and explain physics concepts at the primary school level.
6. be familiar with methods of discovery based learning, and have experiences that could serve as models for future classrooms that the student may be a part of.
7. be familiar with the models of physical systems constructed and refined through the course activities.
8. have enjoyed their time in the class and have felt it was a worthwhile experience.

Course Evaluation:

Course activities include: daily hands-on lab exercises done in small groups, worksheets to develop and record new knowledge; daily homework assignments to provide practice using newly explored ideas and skills; daily personal journal entries exploring ideas about science, education and society; two short written assignments/projects on topics relevant to the course; a mid-course quiz covering topics investigated in the first four labs of the course; and a comprehensive final exam covering all details of the course. See blackboard for detailed lab, assignment, quiz, and exam information.

In order to maximize student engagement in all aspects of the course, while remaining consistent with Trent's Undergraduate Calendar, the detailed weightings of the aspects of the course grades were decided by the class after the start of the course. The class decision was posted in this revised syllabus when finalized.

Type of activity	Weighting	Due Date
Labs (drop lowest score)	34 %	in class, that day
Homework (drop lowest score)	5 %	in class, next class
Journals + Participation	11 % + 4 %	in class, that day
Assignments (two)	22 %	approx weeks 4/5 & 10/11
Quiz	10 %	approx week 7/8
Final Exam	14 %	Fri. December 8, 9AM
Total	100 %	

Department and/or Course Policies:

Departmental policy requires that a minimum of 35% must be obtained on the quiz and final exam components to pass this course. If not, a course grade of 45% is the maximum that can be assigned.

Due to the nature of the course activities, group work, and equipment and space limitations, there are no simple ways to make up for missed in-class activities - attendance at and participation in all classes is required to complete the course material.

Assignments are submitted the initial time for peer editing, returned by the peer editor to the author the next class and then submitted a final time the following class for grading by the instructor. Late initial submissions may not be accepted since a peer editor may not be available and thus the author may lose the opportunity to do peer editing of someone else's work and thus the marks for that portion of the assignment (15% of the assignment total). Late or non return of the author's paper by the peer editor will result in the peer editor being penalized 200% of the grade for the editing portion of the assignment (2 x 15% = 30% of the assignment total). A penalty of 20% per day may be applied to a late Final Submission of the assignment.

A penalty of 20% per day may be applied to a late submission of any other graded component of the course.

University Policies

Academic Integrity:

Academic dishonesty, which includes plagiarism and cheating, is an extremely serious academic offence and carries penalties varying from failure 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: <https://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 documentation from a regulated health care practitioner and feels that he/she may need accommodations to succeed in a course, the student should contact the Student Accessibility Services Office (SAS) at the respective campus as soon as possible. (BH Suite 132 , 705-748-1281, sas@trentu.ca, <https://www.trentu.ca/wellness/sas>) as soon as possible.

Safe Assignment:

Assignments/Essays/Paper must be submitted electronically to the SafeAssign drop box in *myLearningSystem/Blackboard*. SafeAssign utilizes plagiarism-checking software. Further information about SafeAssign will be provided on the class *myLearningSystem/Blackboard* site.

Week-by-week schedule:

See the online calendar tool of *myLearningSystem/Blackboard* for up-to-date scheduling information. The general schedule we will follow, subject to modifications as the class progresses, will be:

Fall Semester:

Week 1 09/07	Introductory exercises Start Lab L1 - Light and Illumination
Week 2 09/14	Finish Lab L1 - Light and Illumination Start Lab L2 - Mirrors and Reflection
Week 3 09/21	Finish Lab L2 - Mirrors and Reflection Assignment 1 Initial Due Date
Week 4 09/28	Start Lab L3 - Refraction and Real Images Assignment 1 Peer Editing Due Date
Week 5 10/05	Finish Lab L3 - Refraction and Real Images Assignment 1 Final Due Date
Week 6 10/12	Start Lab L4 - The Eye
Week 7 10/19	Finish Lab L4 - The Eye Start Lab L5 - Seeing Images

Fall Reading Week

10/23 - 10/27

Week 8 11/02	Quiz - up to Lab L4 Finish Lab L5 - Seeing Images
Week 9 11/09	Start Lab L6 - Colour Addition, Colour Vision, Colour Technology Assignment 2 Initial Due Date
Week 10 11/16	Finish Lab L6 - Colour Addition, Colour Vision, Colour Technology Assignment 2 Peer Editing Due Date
Week 11 11/23	Start Lab L7 - Colour Absorption and Colour Filters Assignment 2 Final Due Date
Week 12 11/30	Finish Lab L7 - Colour Absorption and Colour Filters
Final Exam 12/08	Return of all graded materials SC 305, 9:00AM