

Division of Natural Science

<http://natsci.info.yorku.ca/>

Course Outline

NATS1945A Physics and Technology for Future World Leaders  
FW2017-18  
Blended format: Every other Thursday, 11:30am-2:30pm, LAS A

Course Instructor(s) and Contact Information

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**Course mailbox:** [ns1945a@yorku.ca](mailto:ns1945a@yorku.ca)  
**Course website:** <https://moodle.yorku.ca>  
**Office hours:** Thursdays 3-5pm  
**Course schedule:** On Moodle  
or <http://www.yorku.ca/rfinger/ns1945/fw17/ns1945-fw17-sched.pdf>

**Email Policies & Etiquette**

- Emails to the course mailbox should always be sent from a yorku.ca account. Emails from other accounts (hotmail, gmail, yahoo, etc.) may be marked as spam and may never reach the course mailbox.
- When composing emails to the course mailbox, always be sure to include your full name and student ID. Failure to include this information may result in a delayed reply.
- All emails are read and responded to by a Teaching Assistant (TA). If you need to contact the Course Instructor about a confidential matter, enter PERSONAL for the subject line. Your email will be forwarded to the Course Instructor's email address. If you prefer, you can wait until you receive a reply from the Course Instructor before providing any details.
- The course mailbox is monitored by the Course Instructor to ensure the accuracy of information as well as to ensure that respectful and courteous communication is being maintained between students and TAs.
- Emails will typically be responded to by the next business day. Emails marked as PERSONAL may occasionally take an additional business day, depending on when the email is forwarded to the Course Instructor.

**NOTE:** Before sending an email to the course mailbox, please take a moment to refer to the Course Outline, as the Course Outline contains the answers to most questions that students have. By checking the Course Outline first, you're likely to get a faster answer!

**ALSO NOTE:** Please refrain from using URGENT in email subject lines. All emails are responded to in the order of when they are received.

## Course Description

This course presents the most interesting and important topics in the far-reaching realm of physics, stressing conceptual understanding rather than emphasizing the math, and with applications to current events and technologies. Topics include:

- Energy and power
- Atoms and heat
- Gravity and space
- Nuclear fission, fusion & radioactivity
- Electricity and magnetism
- Sound waves
- Earthquakes and tsunamis
- Visible and invisible light
- Information transmission & digital technology
- Climate change
- Quantum physics
- Relativity
- Space Exploration
- Cosmology

No previous background in physics (or any science) is required in order to be successful in this course.

## Course Learning Outcomes

Upon successful completion of this course, students should be able to:

- Comprehend and formulate informed positions on issues pertaining to physics and technology which affect our daily lives as well as the future of our planet
- Critically analyze articles in popular science journals
- Understand the basic numerical analyses in the presentation of scientific research (such as graphical representations, statistics, and "order of magnitude" estimates)
- Appreciate the achievements of today's scientists
- Understand the inner workings of a number of common high-tech devices
- Identify opportunities to lead a healthier, more productive and more socially-conscious life via simple lifestyle changes and civic engagement in issues pertaining to physics and technology

## Evaluation

Final grades are calculating according to the weighting scheme below. The dates of all in-class exercises, end-of-term tests and the due dates for the Letters to World Leaders can be found on the course Moodle site at the **Course Schedule and Important Dates** link (or at <http://www.yorku.ca/rfinger/ns1945/fw17/ns1945-fw17-sched.pdf>).

### Weighting scheme:

- **20% - Letters to World Leaders (4 letters, 6.67% each, lowest mark is dropped):**  
Twice each term, students will find and read articles on physics or technology that have been in the recent media, then write a letter to a world leader or public figure of the student's choice for the purpose of summarizing the article and recommending

actions that the world leader should take. The letters are submitted online using our Moodle website.

- **40% - In-class quizzes (11 quizzes, 4% each, lowest mark is dropped):** A 20-minute quiz will be held at the start of each class. Each quiz will focus on the lesson due that week. The quiz format will be entirely multiple-choice. Study guides will be provided to help students prepare for each quiz.
- **40% - In-class assignments (11 assignments, 4% each, lowest mark is dropped):** Each class, students will complete learning exercises designed to provide hands-on experience with modern methods used to conduct research and development in physics and technology. Students can work on the activities in groups and obtain help from TAs as well as the Course Instructor.
- **16% - Optional end-of-term test (2 tests, 8% each):** All students can choose to write a 60-minute test during the last class of each term. Each test will cover the material covered in the preceding term. The test format will be entirely multiple-choice and the questions will be similar to the in-class quizzes. The Fall test can be used to replace the 2 lowest (or missed) in-class marks from the Fall term. The Winter test can be used to replace the 2 lowest (or missed) in-class marks from the Winter term.

**PLEASE NOTE:** University regulations require that course evaluation schemes are fixed at the start of the term. As a result, there are no opportunities for extra-credit assignments or for final grounds to be “bumped up”. This is to insure that all students are evaluated equally and given an equal opportunity to succeed.

### Course Materials

**Required Reading:** This course is based on the material covered in *Physics and Technology for Future Presidents: An Introduction to the Essential Physics Every World Leader Needs to Know*, by Richard Muller (2010). This book presents the most critical topics in 20<sup>th</sup> and 21<sup>st</sup> century physics and technology. It is written in a highly readable manner designed to engage students with no science background. We will be covering nearly all sections in the book and the reading material will be covered in the in-class quizzes. The book can be purchased or rented at the York University Bookstore (<http://bookstore.yorku.ca/>).

**Required Technology:** In-class quizzes and assignments will make use of electronic polling, which can be done using a smart phone, tablet or laptop. Students are required to bring one of these devices to each class. Students who cannot bring a device to class must inform the Course Instructor during the 1<sup>st</sup> week of the term so that extra devices can be made available during class time. There is no fee for borrowing polling devices.

### Laboratory/Tutorial

This course does not have a laboratory or tutorial component.

### Course Content and Format

This course is in the blended format, which means that approximately 50% of the course will be conducted online and 50% will be conducted in class. Specifically, every 2 weeks, students are required to watch a ~3-hour online lecture, complete the corresponding reading, and

attend a 3-hour class in which the online lecture and reading material will be reviewed and explored via in-class activities and quizzes.

The dates of classes can be found on the course Moodle site, at the **Course Schedule and Important Dates** link in the **General Information** section. The online lecture videos and assigned readings can be found in the **Lesson** sections on the Moodle site.

**NOTE:** At the start of each week, the Course Instructor will post a class-wide announcement in the **Course Announcements** forum on the course Moodle site. The weekly posts contain reminders of upcoming due dates and information on when marks will be posted as well as occasional news highlights on new discoveries in the areas of physics and technology. The posts may also occasionally contain changes to the class schedule. To ensure that you receive these weekly announcements and that you don't miss out on important information, be sure to view your Moodle profile and confirm that it contains a yorku email address that you check regularly.

## Math Content

The math in this course does not exceed a grade 9 level. Mathematical concepts are restricted to simple arithmetic, numerical comparisons, understanding graphs and basic statistical concepts. All math is done during in-class exercises only, where students can obtain help from the Course Instructor or TAs. There is no math on the quizzes or tests.

## Course Policies

### **Questions and Concerns**

Questions and concerns should be directed to the Course Instructor either during class time or weekly office hours. You can also email your questions to the course mailbox ([ns1945a@yorku.ca](mailto:ns1945a@yorku.ca)), where they will typically be responded to by a TA by the next business day, or forwarded to the Course Instructor if they are of a personal nature. Before sending an email, be sure to read the **Email Policies & Etiquette** section (above) to minimize delays in the reply.

### **Missed Deadlines**

All in-class quizzes and in-class assignments are turned in during class time. In-class work will not be accepted for marking outside of the class in which they are assigned. Late Letters to World Leaders are penalized 10% per day, including weekends. There are no extensions, but since only 3 of 4 letters are counted in your final grade, you can miss one without penalty.

### **Missed Classes**

Since the lowest quiz and in-class assignment mark are dropped, you can miss 1 class without penalty. If you miss 2 more classes, one in each term, then you can make up the missed marks by writing the term test (see **Term Test in lieu of In-class Components** below). Additional missed classes will result in a loss of 8% per class, regardless of the reason for the absence.

### **Term Test in lieu of In-Class Components**

During the last class of each term, all students have the option to write a 60-minute term test. Each test is worth 8% and is therefore equivalent to 2 missed in-class components from the term immediately preceding the test only. No medical documentation is required in order to write a term test. Students can choose to write the term test even if they haven't missed any

classes. If the student's mark on a term test is greater than the sum of the 2 lowest in-class marks from the term immediately preceding the test, the test mark will replace the 2 lowest in-class marks. Students must sign up for the term tests via Moodle no later than 2 business days before the test date.

### **Missed Term Test**

If a term test is missed due to illness, you must email a clear photo or scan of an APS (Attending Physician's Statement; available at <http://www.registrar.yorku.ca/pdf/attending-physicians-statement.pdf>) to the course mailbox ([ns1945@yorku.ca](mailto:ns1945@yorku.ca)). The APS must be sent to the course mailbox within 48 hours of the missed exam. A make-up test will be scheduled within a week of the original test date. If a student misses the original test date as well as the make-up test, the student must petition their home faculty for deferred standing, so that the test can be completed after the term is over. Information & deadlines for this petition can be found at <http://myacademicrecord.students.yorku.ca/deferred-standing>. The missed test cannot be made up until the petition is granted.

### **Conduct during Assessments**

- **In-class quizzes:** In-class quizzes will start promptly at 11:35am. During in-class quizzes, all notes, aids and electronic devices must be placed under your chair, and all electronic devices must be turned off (with the exception of a polling device, if allowed by the Course Instructor). Leaving the classroom is not permitted during this time unless absolutely necessary.
- **In-class assignments:** While completing in-class activities, students are allowed to work in groups and to access their notes or any other resources (unless otherwise indicated by the Course Instructor). Discussion is encouraged and students are welcome to ask for help from the TAs or the Course Instructor.

**NOTE:** Activities such as gaming, texting or social networking have no place in our classroom – they are disruptive and disrespectful to the Course Instructor as well as to other students. To help you to fully engage in the in-class activities (which is likely to result in a higher grade), you should turn off all sources of distracting notifications.

- **Term tests (optional):** Each term test will start promptly at 11:35am. During term tests, all notes, aids and electronic devices must be placed under your chair, and all electronic devices must be turned off.

**NOTE:** Students who arrive late for a quiz, term test or in-class assignment will not be given additional time to complete the work.

### **Classroom Etiquette**

In order to maintain a comfortable, non-disruptive and enjoyable learning environment, it is imperative that students adhere to the following simple rules:

- Cell phones, pagers, and other noise-making devices must be disabled in volume.
- There should be no talking among students when the Course Instructor is giving class-wide instructions.
- While in-class activities are meant to be fun and informal, discussion should always be conducted using "inside voices". When working in groups, students are required to be courteous of each other at all times.

### **Grade Reappraisals**

At the end of the course, students will have the opportunity to request a reassessment of any assignments which they feel were marked in error and are preventing them from achieving the next highest letter grade. Details about this process will be provided in the **Course Announcements** forum at the end of the academic year.

### **Copyright and Intellectual Property**

Most of the images shown during class or in the online lectures are protected by copyright law, which allows educators to share short excerpts of copyright material for educational purposes. However, it is illegal for students to share or distribute copyright materials. Students who violate copyright law are at risk of being sued by the owners of the material. Some examples of illegal distribution include:

- Sharing photographs of slide presentations, either online or in the classroom.
- Copying the lecture videos and posting them on a web site
- Posting photographs or screen captures of the lecture videos on a web site
- Printing out photographs or screen captures of the lecture videos and making the printouts available for distribution

The best way to ensure that you are not in violation of copyright law is to use the course material as it was intended – namely, watch the videos at their existing locations and do not download or copy them. If you come across an image or diagram that you'd like to share with someone outside of the class, you can access the image from its original location, which is provided on the slide containing the image.

### **University Policies**

#### **Important Sessional Dates**

Sessional start and end dates, drop deadlines, withdrawal dates and holidays are listed at the Office of the Registrar's website at <http://www.registrar.yorku.ca/enrol/dates/>.

#### **Academic Honesty and Integrity**

Academic honesty requires that persons do not falsely claim credit for the ideas, writing or other intellectual property of others, either by presenting such works as their own or through impersonation. Similarly, academic honesty requires that persons do not cheat (attempt to gain an improper advantage in an academic evaluation), nor attempt or actually alter, suppress, falsify or fabricate any research data or results, official academic record, application or document. Finally, academic honesty requires that persons do not aid or abet others to commit an offence of academic dishonesty, including intentional acts to disrupt academic activities. Suspected breaches of academic honesty will be investigated and charges shall be laid if reasonable and probable grounds exist.

During assessments (eg, quizzes and tests), all unauthorized technology and materials must be placed under the student's chair and should not be accessed at any point during the assessment. Failure to comply with this directive may be considered a break of academic honesty.

Please familiarize yourself with the full [Senate Policy on Academic Honesty](http://secretariat-policies.info.yorku.ca/policies/academic-honesty-senate-policy-on/), found at <http://secretariat-policies.info.yorku.ca/policies/academic-honesty-senate-policy-on/>.

Please also familiarize yourself with the SPARK Academic Honesty tutorial found at <https://spark.library.yorku.ca/academic-integrity-what-is-academic-integrity/>.

### **Academic Accommodation for Students with Disabilities**

York University shall make reasonable and appropriate accommodations and adaptations in order to promote the ability of students with disabilities to fulfill the academic requirements of their programs.

The nature and extent of accommodations shall be consistent with and supportive of the integrity of the curriculum and of the academic standards of programs or courses.

Please familiarize yourself with the full Senate Policy on Academic Accommodations for Students with Disabilities, found at <http://secretariat-policies.info.yorku.ca/policies/academic-accommodation-for-students-with-disabilities-policy/>.

**NOTE:** Students should submit accommodation letters from Counseling and Disability Services (CDS) to the course instructor within the first two weeks of the course or as soon as issued.

Counseling and Disability Services - <http://cds.info.yorku.ca/>

York Accessibility Hub - <http://accessibilityhub.info.yorku.ca/>

**NOTE:** A student registered with CDS, and choosing to write their tests/quizzes in the Alternate Exam Centre, is responsible for making the appropriate writing arrangements within the timeframes outlined by the Alternate Exam Centre.

Alternate Exam Centre - <http://altexams.students.yorku.ca/>

### **Religious Observance Accommodation**

York University is committed to respecting the religious beliefs and practices of all members of the community, and making accommodations for observances of special significance to adherents. Information on religious observance accommodations can be found at <https://w2prod.sis.yorku.ca/Apps/WebObjects/cdm.woa/wa/regobs>.

**NOTE:** Students who have an academic conflict as a result of a religious observance, at any point in the term, should make the instructor aware of the conflict at least three weeks prior to the date of the conflict.

### **Student Conduct in Academic Situations**

Students and instructors are expected to maintain a professional relationship characterized by courtesy and mutual respect and to refrain from actions disruptive to such a relationship. Moreover, it is the responsibility of the instructor to maintain an appropriate academic atmosphere in the classroom and the responsibility of the student to cooperate in that endeavour. Further, the instructor is the best person to decide, in the first instance, whether such an atmosphere is present in the class. York's policy and procedures regarding disruptive and/or harassing behaviour by students in academic situations can be found at (<http://secretariat-policies.info.yorku.ca/policies/disruptive-andor-harassing-behaviour-in-academic-situations-senate-policy/> ).

### **Student Conduct in Online Forums**

When making use of a course's online forums, students are required to maintain courteous and respectful communication. Keep in mind that Moodle is simply an electronic version of a regular classroom. As such, the University's Student Code of Conduct continues to apply (<http://www.yorku.ca/oscr/codeofrr.html>). Violation of the Student Code of Conduct will result in immediate loss of access to Moodle, and any further applicable consequences in accordance with the Code.

## Division of Natural Science Resources

### **NATS-AID** (<http://natsci.info.yorku.ca/nats-aid/>)

Free peer tutoring for students enrolled in Natural Science Courses.

### **M-AID in NATS (Math Aid)** (<http://natsci.info.yorku.ca/m-aid-in-nats/>)

Free one-on-one math help for students enrolled in Natural Science Courses (TA tutors)

## Other Resources

### **Learning Commons** (<http://www.library.yorku.ca/cms/learning-commons/>)

The Learning Commons brings together key supports for your learning, including writing, research, learning skills and career services.

### **goSAFE** (<http://www.yorku.ca/goSAFE/>)

goSAFE is a complimentary service provided to the York Community. At the Keele campus, goSAFE has two routes: North Route & South Route which will safely transport community members by vehicle from one specified hub to another on campus. goSAFE operates seven days a week, all year round, including University closures (with the exception at Glendon during the Christmas holiday closure).

Call the goSAFE office at 416-736-5454 or extension 55454 during hours of operation. Please give your name, location and destination.

### **Mental Health & Wellness at York University**

(<http://mhw.info.yorku.ca/resources/resources-at-york/students/>)

This service provides a variety of resources available to support mental health and wellness

### **Good2Talk** (<http://www.good2talk.ca/>)

24 hour Helpline for post-secondary students

1-866-925-5454