

Division of Natural Science

natsci.info.yorku.ca/

Course Outline

**NATS1945A Physics and Technology for Future World Leaders
FW2018-19**

Course Instructor(s) and Contact Information

Robin Metcalfe
305 Norman Bethune College
416-736-2100 x30302

Course mailbox: ns1945a@yorku.ca

Course website: moodle.yorku.ca

Office hours: Refer to top section of Moodle site

Course schedule: At the **Course Schedule** link in the **General Information** section of the course Moodle site or at
www.yorku.ca/rfinger/ns1945/fw18/ns1945-fw18-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.
- Emails will typically be responded to by the next business day. Emails sent on Friday will typically be responded to the following Monday.
- Please refrain from using URGENT in email subject lines. All emails are responded to in the order of when they are received.

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!

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:

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|---------------------|---|
| • Energy and power | • Visible and invisible light |
| • Atoms and heat | • Information transmission & digital technology |
| • Gravity and space | • Climate change |

- Nuclear fission, fusion & radioactivity
- Electricity and magnetism
- Sound waves
- Earthquakes and tsunamis
- 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. Test dates and assignment due dates can be found at the **Course Schedule** link in the **General Information** section of our Moodle site (or at www.yorku.ca/rfinger/ns1945/fw18/ns1945-fw18-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.
- **45% - In-class tests (6 tests, 9% each, lowest mark is dropped):** A 90-minute test will be held approximately monthly. Each test will cover the material completed after the preceding test. The test format is entirely multiple-choice. Study guides will be provided to help students prepare for each test.
- **15% - In-class assignments (4 assignments, 5% each, lowest mark is dropped):**
During selected classes, 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.

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 grades 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 20th and 21st century physics and technology. It is written in a highly readable manner designed to engage students with no science background. The book can be purchased or rented at the York University Bookstore (bookstore.yorku.ca/). We will be covering nearly all sections in the book and the reading material will be covered on the tests. A reading schedule is provided in the **Course Schedule** in the **General Information** section of our Moodle site, and the Study Guides provided for each lesson will help students prepare for the reading-related questions on the tests.

Required Technology: Lectures and in-class assignments will occasionally 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 can borrow a device from Learning Technology Services (lts.info.yorku.ca/polling/polling-faq/) at no charge.

Laboratory/Tutorial

This course does not have a laboratory or tutorial component.

Course Content and Format

This course meets weekly for a 3-hour period. The course schedule can be found on the course Moodle site, at the **Course Schedule** link in the **General Information** section.

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 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), where they will typically be responded to by the next business day. Before sending an email, be sure to read the **Email Policies & Etiquette** section (above) to minimize delays in the reply.

Missed Deadlines

All tests 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 In-Class Assignments

Since the lowest in-class assignment mark is dropped, you can miss one in-class assignment without penalty.

Missed Tests

Since the lowest test is dropped, you can miss one test without penalty. In addition, there will be an opportunity at the end of each term to make up one missed test from the preceding term. No medical documentation is required in order to write the make-up test. However, students must sign up for the make-up test via Moodle no later than 2 business days before the date of the make-up test.

Missed Make-Up Test

If the make-up test is missed due to illness, you must email a clear photo or scan of an APS (Attending Physician's Statement; available at www.registrar.yorku.ca/pdf/attending-physicians-statement.pdf) to the course mailbox (ns1945a@yorku.ca). The APS must be sent to the course mailbox within 48 hours of the missed test. An alternate make-up test will be scheduled during the exam period. If a student misses the alternate 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 myacademicrecord.students.yorku.ca/deferred-standing. The missed test cannot be made up until the petition is granted.

Note: If a test is missed due to a critical incident other than illness, students must be seen by a critical incident counselor at the Office of Student Conflict Resolution (www.yorku.ca/oscr/criticalincidentmanagement.html). The counselor will inform the Course Instructor if a deferred test is justified. The incident details will be kept confidential between the student and the counselor.

Conduct during Assessments

- **Tests:** During tests, all notes, aids and electronic devices must be placed under your chair, and all electronic devices must be turned off. 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: Students who arrive late for a 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 during a lecture.
- 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.
- Activities such as gaming, texting or social networking have no place in our classroom – they are disruptive to your engagement in the course and disrespectful to the Course Instructor as well as to other students. To help you to fully engage in the course (which is likely to result in a higher grade), you should turn off all sources of distracting notifications.

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

Many of the images and animations shown during class 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 or videos of slide presentations, either by posting them on a web site or sending them to one or more recipients
- Printing out photographs of slide presentations and making the printouts available for distribution

If there are images or animations that you'd like to share with someone outside of the class, you can contact the Course Instructor to obtain a link to the original source.

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 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.

Please familiarize yourself with the full Senate Policy on Academic Honesty, found at 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 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 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/pdfs/CodeofRightsandResponsibilities.pdf>). 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