

Division of Natural Science
<http://natsci.info.yorku.ca/>
Course Outline (Tentative)

NATS 1720, Section A, *Light and Sound*
FW, 2017-18
Tuesday & Thursday, 10:00-11:30, LAS B

Course Instructor(s) and Contact Information

Name: **Dr. C. Wolfe (Course Director)**
Office: 227 Petrie Science & Eng. Bldg.
Office Hours: TBA, or by appointment.
Phone: (416) 736-2100 ext. 20882
Email: **nats1720@yorku.ca**

Students are encouraged to make use of the weekly office hours for personal consultation, or to speak with the Professor immediately after class. For urgent matters, such as missing a test, students can try phoning. But for most matters email is the preferred method of contact. (Students are also asked to refrain from using the Moodle messenger feature.) Replies can usually be expected within three to four business days for routine matters. (Responses may take a bit longer during ‘peak’ times, such as just before tests and assignment due dates.)

It is highly recommended that students use their York University email account when contacting the professor, since the behaviour of the York spam filter is otherwise unpredictable. Messages from Hotmail or Gmail, for example, have been known to vanish without a trace. Every student at York is entitled to a York email account and to Moodle access; all students are strongly urged to make use of these.

Email Policies and Etiquette

When composing email messages, students should try to project a certain professionalism. That means addressing the recipient(s) of the message respectfully and thinking ahead about what they will need to know in order to act on the message (if action is needed).

In the context of this course, that means including the phrase ‘NATS 1720’ in the subject line of your message so that I know which course you are in. The subject line should also include a brief statement of the main purpose of your message (eg. NATS 1720: Help needed for Assignment #2). Professionalism also means including your name and lab section number (if the question is lab-related), and using a respectful tone. I prefer to be addressed as “Dr. Wolfe” or “Professor”.

Expanded Course Description

Science is a part of everyday life. It is therefore important to be familiar, to some extent, with the scientific method and outlook, and to be cognizant of some of the achievements of scientific thought. The Natural Science courses at York University are designed to promote the scientific literacy of students in non-science programmes.

NATS 1720, Light and Sound, aims to introduce students to the modern understanding of two physical phenomena which most enable us, through our senses of sight and hearing, to experience the world around us. Light and sound are also major media for the visual and performing arts, as well as vital tools for communication, medicine, and industry. The course is divided into two parts: one focussing on sound (fall term) and the other on light (winter

term). The fundamental nature and behaviour of light and sound, as well as selected applications, are presented in as intuitive a manner as possible (but see the comment below for math expectations). Our senses of hearing and sight are also extensively discussed, with a focus on the detection and processing abilities of the ears and eyes.

No specific prior knowledge of physics is required or expected, but familiarity with some basic ideas will certainly be an asset.

Course Learning Outcomes

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

- Compare and contrast the nature of sound and light waves;
- Explain how selected aspects of sound and light might be investigated;
- Apply the basic properties of sound and light waves to selected practical situations;
- Compare and contrast human perception mechanisms for sound and light, and explain the nature of some common disorders;
- Describe the significance of the study of light for the development of modern physics and illustrate some of the key findings;
- Interpret data presented in tabular and graphical form, and apply rules and formulae provided to solve simple problems.

Evaluation

In **each term**, students will be required to complete four laboratory sessions, four take-home assignments, one mid-term test, and one end-of-term examination. Final grades will be calculated using the weights shown in the table below.

Item	Weight	Date
Assignments (8 total)	20%	Roughly every two weeks
Laboratories (8 total)	20%	Roughly every two weeks
Fall midterm test	10%	Mid October (TBA)
Fall examination	20%	December exam period
Winter midterm test	10%	Mid-February (TBA)
Winter examination	20%	April exam period

At the end of the course, the lowest assignment mark and the lowest lab mark will be dropped.

The midterm tests will consist of both multiple-choice and short-answer questions. The end-of-term exams will involve only multiple-choice questions.

In order to be consistent and fair to the entire class “extra credit” assignments are not provided at any point during or after the course. If you have concerns about an assignment or test grade please contact the course director with specific information (eg. question number and why you think your answer was correct), and **only** after you have consulted the published solutions.

You are strongly encouraged to do all the work asked of you. In the past, many a student has failed simply because work during the term was neglected (it all adds up). Note that the end-of-term examinations will be scheduled by the University. **It is your responsibility to be available to write the exams at any time during the official examination periods.** So it is recommended that students delay making any travel plans until after the examination schedule has been published (usually in early November & March).

Course Materials

The textbooks for the course are **Physics in the Arts** (Revised Ed.) by P. Gilbert and W. Haeberli, and **Let There Be Light** (Second Ed.) by A. Montwill and A. Breslin. Both texts are available from the campus bookstore. Copies of the textbooks will be placed on reserve in the Steacie Science Library. The third required text is the laboratory manual, which should be available from the campus bookstore shortly after the beginning of the course (if not before).

Readings relevant to each lecture will be announced on Moodle in advance. Additional resources may be placed on reserve and will be announced in class and on Moodle.

Laboratory/Tutorial

The laboratory component of the NATS 1720 is intended to reinforce some of the fundamental concepts encountered, but in a hands-on manner. The laboratory activities have been designed to deepen students' understanding of the scientific approach and to illustrate selected principles and topics.

Which day/time you attend the lab is determined by the lab section for which you registered. Lab groups meet very roughly once every two weeks for a total of 8 meetings (4 per term). The detailed laboratory schedule will be posted on Moodle shortly after the start of the course. All laboratory sessions will take place in PSE 208. Note that lab sessions will not begin until roughly the third week of September.

Students should refer to the lab manual (available from the York bookstore) for further information about the laboratories themselves. Please note that all lab work, including the write-up and submission of a report, must be completed within the two hour lab period.

Course Content and Format

The course is mainly lecture-based, with two 90-minute lectures each week. Students will be expected to have completed assigned readings prior to each lecture.

The first half of the course is concerned with sound while the second half covers light. The table below provides a rough outline of the topics to be covered in the first and second term. (This list is preliminary and subject to later adjustment.)

Fall Term	Winter Term
The Nature of Sound & Waves	The Wave Nature of Light
Sound Propagation, Loudness	Mirrors, Lenses, & Photography
Acoustics	The Quantum Nature of Light
Musical Instruments, Timbre	The Speed of Light
Pitch Perception	Light Perception - Sight
Sound Recording & Reproduction	Colour Mixing

Attendance at lectures is highly recommended because the professor greatly enhances the material covered in the text book, and often covers material which is not in the text book. Also, notes are provided in class only. Neither the textbook nor notes alone substitute for the learning enabled by the interplay between professor and students in the classroom.

Students may be asked to use the REEF classroom response system for in-class polling and quizzes. This will be confirmed and details provided during the first lecture.

Math Content

(Please Read Carefully!) Mathematics has been the language of the physical sciences since at least the time of Isaac Newton. Therefore, students taking NATS 1720 should be aware from the start that, because of the nature of the subject, some use of basic mathematics and geometry - at the grade 11 level - is unavoidable. Specifically, it is recommended that students be familiar with basic algebra, geometry, simple graphs, and trigonometry. (Calculus is not required.) Note that some calculations are expected of students but at a relatively modest level, and all necessary mathematical concepts beyond simple arithmetic will be briefly reviewed in class as they arise. Students can also avail themselves of the M-AID-in-NATS drop-in mathematics tutoring service that is freely available to students registered in a NATS course (see below).

Course Policies

Questions and Concerns

- Questions about lab marks should be directed first to the relevant TA. All other questions or concerns arising from the course (including about marked assignments and tests) should be directed to the course director. If you are uncomfortable approaching the course director with your concern, then consider going through your class representative. (See NATS-AID below.)

Missed Tests

- In the event that a student misses a test they are expected to notify the course director in writing (by email) within 48 hours of the original test time. Notification in advance (if possible) is preferred.
- Students may be allowed to make-up a test missed because of illness of self or of a family member, funeral attendance, or other similar legitimate circumstances. Employment conflicts, family vacations, and other personal endeavours are not considered legitimate reasons for missing a test.
- Legitimate reasons must be backed up with suitable documentation in the form of a completed Attending Physician Statement, a letter from the funeral director, boarding passes with plane tickets, etc. Contact the Professor if you are unsure of the kind of documents needed.
- All documentation is to be provided within one week of the missed test unless otherwise requested by the Professor.

Late Assignments

- Students who miss an assignment deadline for legitimate reasons may submit their assignment late with the professor's approval; all other late assignments will be subject to a late penalty of 10% per day.
- No late assignments will be accepted after the solutions have been posted.
- All late assignment should be submitted to the course director personally or left in the course drop box outside the NATS office. If a late assignment is left in the drop box it is the student's responsibility to notify the Professor that it is there.

Missed Labs

- Students are not permitted to attend a lab in which they are not registered unless they have approval from the Professor in advance. There will be no excuse for missing a lab because a student 'forgot' his/her group was meeting during a given week.
- Students who miss their lab section's meeting for a legitimate reason, or who arrive to the lab more than 30 minutes late, should contact the Professor as soon as possible to make alternate arrangements.
- In some cases students will have to wait until the end of the term when a special "make-up" lab session will be held. There will be only one such session per term and the date will be chosen by the Course Director.

Requests for Reappraisal

- Students who, upon review of the posted solutions, disagree with the mark they receive on a test or assignment must submit their request to the Course Director along with a written statement that explains exactly what aspect they disagree with and why.
- This request must be based on academic merit and can make reference to the posted solutions, to the textbook, or to other legitimate sources to justify the request for reappraisal. But "I worked really hard" will not be considered valid grounds for reappraisal.

Copyright and Intellectual Property

Any lecture notes, slides, exercises, assignments, and recordings distributed in class are for students' personal use only and are not to be redistributed. In particular, students are not to upload intellectual property they do not own to "course note" websites. Such uploading could constitute a violation of copyright.

University Policies

Important Sessional Dates

Includes sessional start and end dates, drop deadlines, and withdrawal dates.

See the Office of the Registrar 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.

Academic Honesty and electronic devices during assessments (e.g. exams)

- Internet capable and personal storage devices of all kinds must be turned off, including vibrate. These and any other unauthorized material must be placed under the student's chair and should not be accessed at any point during the exam. Failure to comply with directive may be considered a break of academic honesty.
- See <http://registrar.yorku.ca/exams/tipsheet>

Please familiarize yourself with the full Senate Policy on Academic Honesty, 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 with Alternate Exams, is responsible for making the appropriate writing arrangements within the timeframes outlined by Alternate

Exams.

Alternate Exams - <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.

<https://w2prod.sis.yorku.ca/Apps/WebObjects/cdm.woa/15/wo/kmHGekTpzKLX6XYKBXYc8M/0.3.4.62.0>

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

For conflicts occurring during an official examination period, please complete the Examination Accommodation Form available at http://www.registrar.yorku.ca/pdf/exam_accommodation.pdf and submit to your instructor at least three weeks prior to the final exam.

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. A statement of the policy and procedures regarding disruptive and/or harassing behaviour by students in academic situations is available on the website of the University Secretariat (<http://secretariat.info.yorku.ca/>).

Division of Natural Science Resources

NATS-AID

Free peer tutoring for students enrolled in Natural Science Courses.

See <http://natsci.info.yorku.ca/nats-aid/>

M-AID in NATS (Math Aid)

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

See <http://natsci.info.yorku.ca/m-aid-in-nats/>

Other Resources

Learning Commons

The Learning Commons brings together key supports for your learning: writing, research, learning skills and career services. <http://www.library.yorku.ca/cms/learning-commons/>

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. <http://www.yorku.ca/goSAFE/>

Mental Health and Wellness at York University

Outlines a variety of resources available to support mental health and wellness

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

Good2Talk

Post-Secondary Student 24 hour Helpline

<http://www.good2talk.ca/> 1-866-925-5454