

# NATS 1880 6.0 FW 2016-17 COURSE OUTLINE

## FACULTY OF SCIENCE DIVISION OF NATURAL SCIENCE (Department of Science and Technology Studies)

**Course:** SC/NATS 1880 6.0 – Life Beyond Earth

**Course Webpage:** <https://moodle.yorku.ca/moodle/course/view.php?id=72223>

**Term:** FW 2016-17

**Course Credit Exclusions:** SC/NATS 1570 3.00, SC/NATS 1740 6.00. NCR (No Credit Retained)

Note: Not open to any student in the Astronomy stream nor to any student who has passed or is taking SC/PHYS 1070 3.00, SC/BIOL 1010 6.00, SC/BIOL 1000 3.00, SC/BIOL 1001 3.00 or AP/ANTH 3270 3.00.

**Prerequisite / Co-requisite:** N/A

### Course Instructors

First Term (Fall): (Professor) Paul Delaney Ext. 77763 Petrie Science & Engineering Bldg. 329 <a href="mailto:nats1880@yorku.ca">nats1880@yorku.ca</a> Office Hours: Thursdays, 11 am - noon	Second Term (Winter): (Professor) Michael De Robertis Ext. 77761 Petrie Science & Engineering Bldg. 326 <a href="mailto:nats1880@yorku.ca">nats1880@yorku.ca</a> Office Hours: Wednesdays 10 – 11 am
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### Time and Location

NATS 1880 6.0 is a completely on-line course. While there are no face-to-face classes as such, there will be an opportunity for students to discuss critical course-related or personal matters during Office Hours with an Instructor. An Online Discussion Forum facilitated by a Teaching Assistant (TA) will always be available to ask course-content related questions. It should be noted that there will be a final exam, **in person, on campus** at the end of each term the details for which will be given below.

### Expanded Course Description

#### **Brief statement of the purpose:**

Natural Science (NATS) courses are designed to provide an opportunity for non-science students to gain familiarity with the nature of science, its practices, applications and social ramifications which are essential requirements for any fully literate individual of the 21st century. NATS courses also enhance important critical thinking skills, including those associated with basic numeracy and scientific literacy. In NATS 1880, Life Beyond Earth, students will be able to describe and explain the nature of and conditions for life on Earth, sites where life may be found in our solar system and in extrasolar systems, how best to detect intelligent life in our Galaxy and how humankind would react if an intelligent civilization were discovered.

#### **Specific Learning Outcomes of the course:**

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

1. Explain the scientific method, to communicate basic scientific ideas clearly and concisely both orally and in writing.
2. Discuss the microscopic (i.e., biochemical) and macroscopic (i.e., evolutionary and environmental) requirements for life on Earth and where these likely exist elsewhere in our universe.
3. Be familiar with the characteristics of intelligence, be able to estimate the probability that another intelligent species exists concurrently in our Galaxy, and to appreciate what its discovery would mean for humankind.

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4. Describe and assess the advantages and challenges associated with active searches for an extra-terrestrial intelligence (e.g., rocket technologies, search strategies, physical limitations), and passive searches (e.g., using radio technologies).
5. Argue the ethical implications for and against the colonization of other planets in the universe and to take an informed position on relevant societal issues such as climate change.
6. Demonstrate critical thinking and reasoning in developing ideas and in assessing reference sources, as well as to criticize constructively.

### **Contacts and Communications –**

- A student's success in any course, but particularly an on-line course depends critically on their level of engagement, which requires clear and consistent communications with the relevant Teaching Assistants (TAs) and Instructors.
- The primary vehicle for communications in this course is the Course (Moodle) Website to which a student should refer regularly. The course website will be updated frequently and will contain all pertinent administrative and curricular information; e.g., assignment deadlines.
- The first level of communications in this course is through the Discussion Forum on the course website. A Discussion Forum allows students to discuss course-related issues, primarily with other students, but also with TA(s) assigned to the Forum.
- The second level of communication is via email. Students who for whatever reason prefer not to use the Discussion Forums can contact their TAs and instructor via the email address: [nats1880@yorku.ca](mailto:nats1880@yorku.ca). Please note though that if a question is course-content related (no personal content), it should be posted to the Discussion Forum so both the question and its answer can be shared among the class as a whole.
- Regular Course Announcements from the course instructors will keep you informed on important dates, administrative aspects of the course and the occasional media-oriented story relevant to the course.
- All members of the course – students, TAs and instructors – should adhere to “common sense” NETiquette guidelines to communicate effectively and courteously online, including:
  1. Use of a reasonable ID; e.g., “D. Lee” and not “Joker47”
  2. Include a specific and relevant subject line
  3. Use appropriate language, avoiding rudeness, vulgarity and sarcasm
  4. Be concise
- Students who require face-to-face meetings with the Instructor should make use of the Instructors' Office Hours which are listed above.
- Students will be organized into groups comprised of six students per group. On-line group-work will count towards 15.0% of each student's final grade. Moodle allows members of a group to communicate between and among group members. More below regarding Group structures and group member roles.

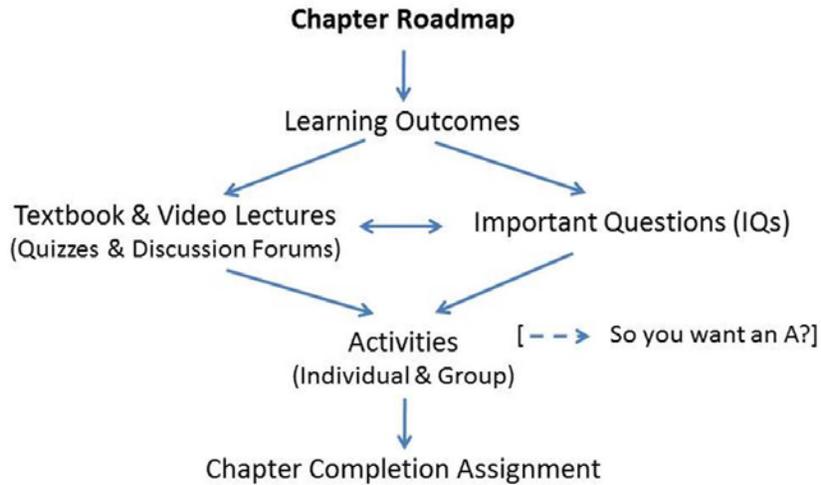
### **Organization of the Course –**

- Students who are registered in the course should have automatic access to the class (Moodle) website following Passport York authentication ([moodle.yorku.ca](http://moodle.yorku.ca)). The website will contain all important administrative and curricular information for this course and should be consulted frequently by the student; daily if possible.
- The course website is organized into a number of sections. Each of the 13 Chapters of the course has its own section which follow a welcome and introductory section, Each Chapter section is structured similarly (see diagram below);
  - A list of Learning Outcomes for the Chapter
  - The “Important Questions” that will be discussed in the Chapter
  - The Lecture and associated Quizzes for the Chapter
  - The specific Activities that should be completed (e.g. individual and/or group) for marks for the Chapter
  - “So you want an A” provides resources that help clarify some of the most important concepts in each Chapter, and material that will enrich the student learning experience
  - The Chapter Completion Assignment (CCA), a predominantly multiple-choice assignment for marks

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- The Chapter materials, including lecture materials, will remain open throughout the course, but the graded components for each Chapter – e.g., quizzes and assignments – must be completed in a specific period that will be clearly posted well in advance on the course website.



**Course Text / Readings**

The course “lectures” (i.e., instructor-narrated videos) will closely follow the textbook, “Life in the Universe,” by Bennett and Shostak (4th edition) which is available in hard-copy (available at the York University Bookstore or on-line) or electronic format (available on-line). Mastering Astronomy will be automatically packaged with the textbook (at no additional cost) or available “stand alone” at a cost. A Mastering Astronomy license will be needed to complete quiz questions and assignments in this course. Along with the textbook and lectures, a number of activities designed to enhance the student’s understanding of the more complex issues discussed in the course will be provided.

**Grading Information**

The final grade for NATS 1880 6.0 will be based on the following items weighted as indicated:

Assessment tasks	Details	Weighting (%)
Group Assignments (GAs) <sup>1</sup>	Total of 4: 2 per term	15.0
Individual Assignments (IAs) <sup>2</sup>	Total of 4: 2 per term	10.0
In-chapter Quizzes <sup>3</sup>	During each chapter, mix of multiple choice, short answer	5.0
Chapter Completion Assignments (CCAs) <sup>3</sup>	After each chapter, mix of multiple choice, short answer	15.0
End-of-term Examination (Fall) <sup>4</sup>	December: Chapters 1-6, ~120 multiple choice; on campus	27.5
End-of-term Examination (Winter) <sup>4</sup>	April: Chapters 7-13, ~120 multiple choice; on campus	27.5
<b>Total</b>		<b>100.0</b>

<sup>1</sup>The Group Assignments (GAs) will require each group of students to research a particular topic and collaborate on the writing of a final submission. The aim of each of the 4 assignments will be to further enhance the understanding of certain key topics in the course. While the total weight of all 4 assignments is 15%, the poorest of the 4 submissions will be weighted half of the other three assignments.

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<sup>2</sup>The Individual Assignments (IAs) will require each student to research a topic and report their findings in their own words in their submission. The aim of each of the 4 assignments will be to further enhance the understanding of certain key topics in the course. While the total weight of all 4 assignments is 10%, the poorest of the 4 submissions will be weighted half of the other three assignments.

<sup>3</sup>Chapter Completion Assignments (CCAs) and In-chapter Quizzes are all subject to the “85% Rule.” This means that only the best 85% of each of these assessments will count towards the overall grade. This allows students to miss one or possibly more Assignments/Quizzes (e.g., due to illness, forgot to submit, etc.) without suffering negative consequences and without having to supply formal documentation.

<sup>4</sup>Two End-of-term exams will be predominantly multiple-choice format using Scantron answer sheets and their dates will be set by the University. It is a student’s responsibility to be available for these examinations. The exams will be written on campus. It is a serious matter to miss an exam.

### **Grading:**

The grading scheme for the course conforms to the 9-point grading system used in undergraduate programs at York (e.g., A+ = 9, A = 8, B+ = 7, C+ = 5, etc.). Assignments and tests will bear either a letter grade designation or a corresponding number grade (e.g. A+ = 90 to 100, A = 80 to 90, B+ = 75 to 79, etc.) All grades will be posted on the Moodle course gradebook. Students will have access to all of their grades – but only their grades – at any point in the course via the gradebook. (For a full description of York grading system see the York University Undergraduate Calendar - <http://calendars.registrar.yorku.ca/2015-2016/academic/index.htm> ) NB: Students are ultimately responsible for the accuracy of their marks on the Moodle website and so should report any discrepancies to the TAs/Instructor at once. Students are also advised to keep all their work until a final grade has been awarded.

## **Grading, Assignment Submission, Lateness Penalties and Missed Tests**

### **Assignment Submission:**

Students must not only perform academically to the best of their ability, but submit their work on time. Accordingly, assignments for this course must be received on or before the due date and time specified. Assignments done on-line such as Quizzes and Chapter Completion Assignments will be automatically graded by Moodle (or Mastering Astronomy) and the grade will appear in the gradebook in a timely manner once the assignment or quiz has closed. Assignments that require a written component – individual and group – will be uploaded to the course website in either PDF or WORD format while the assignment is “open.” Please note that ONLY these two formats will be marked.

### **Lateness Penalty:**

Because assignments are handled entirely on-line with a precise due date and time, there will be **no opportunity for late submission**. Thus plan accordingly and do not leave submissions to the last minute.

- ❖ The “85% rule” is in effect for some of the homework, e.g., quizzes and chapter assignments, so it is not necessary to provide documentation for a single missing assignment even if there were valid extenuating circumstances. If, however, there is a chronic problem that may cause a student to miss a few quizzes or assignments, this should be discussed with an Instructor during office hours at the earliest opportunity.
- ❖ In the case of the Group and Individual Assignments, deadlines are set many weeks in advance to allow adequate time for submission. Do not leave submission to the last minute! All GA and IA’s will count towards your assessment but as noted above the poorest of each assignment type will be weighted at half the value of the other assignments.

### **Missed Tests:**

Students with a legitimate reason for missing a course end-of-term exam, such as illness, compassionate grounds, etc., which is confirmed by supporting documentation (e.g., an Attending Physician’s Statement and not simply a physician’s letter) may request accommodation from a Course Instructor. A student who has missed an exam for a legitimate/documentable reason **must** contact the course Instructor by email ([nats1880@yopru.ca](mailto:nats1880@yopru.ca)) as soon as he/she is able, and estimate when she/he will provide the appropriate hardcopy documentation. The hardcopy documentation should be received by the Natural Science office, Bethune College 218, within 5 business days of the missed exam. In the case of a missed exam with acceptable, on-time documentation, the

student may write a deferred Exam. If a student misses a deferred Exam, then a student may be required to submit a formal Petition to the Faculty of Science.

**Plagiarism:**

Any material submitted by a student for any graded component of this course must be original to that student unless otherwise explicitly acknowledged. Collaboration with colleagues on sharpening critical skills is strongly encouraged in this class, but it is both unethical and unacceptable to claim credit for work performed by others. Plagiarism and cheating will not be tolerated at this institution. This includes allowing another student to submit original work that you yourself have done. Penalties for all such offences range from a failing grade on the submitted material to expulsion from the University.

**Detailed Schedule**

The curriculum consists of 13 chapters which will be covered over a time-span of 24 weeks. Thus, students can expect to cover approximately one chapter every two weeks. (Clearly some chapters, e.g., Chapter 1, will require fewer than two weeks, while some chapters, e.g., Chapter 3, may require slightly more.) A reasonable approach to the materials provided for each Chapter is illustrated above.

Students are encouraged to consider the Learning Objectives for each Chapter before (re)viewing the Lecture videos. At various points during each video, students are encouraged to pause the video and take an on-line Quiz on the course website which consists of one or more (usually multiple-choice) questions. Students who answer a question correctly on the first pass will receive 3 marks; students who answer the question correctly on the second pass will receive 2 marks, while students who attempt the quiz but do not answer correctly on two attempts will receive 1 mark for participation. Further attempts, if needed, to answer the question will result in no marks being awarded.

A Chapter will be considered “open” for a well-advertized amount of time. While a Chapter is “open,” students may attempt its quizzes and activities for marks. Once a Chapter is closed, while all the files remain accessible for study and review purposes, it will no longer be possible to complete a quiz or activity for marks.

The section, “So you want an ‘A’?” contains enriched material that the most motivated students may wish to review to enhance their comprehension of the curriculum. None of this material is essential for doing well in this course... but it might help.

**Additional Information**

If you decide to utilize a used textbook for this course, a copy and license for Mastering Astronomy will be required. Mastering Astronomy comes packaged at no extra charge with the course’s required textbook.

**IMPORTANT COURSE INFORMATION FOR STUDENTS**

All students are expected to familiarize themselves with the following information, available on the Senate Committee on Academic Standards, Curriculum & Pedagogy webpage (see Reports, Initiatives, Documents) - <http://www.yorku.ca/secretariat/senate/committees/ascp/documents/CourseInformationForStudentsAugust2012.pdf>

- Senate Policy on Academic Honesty and the Academic Integrity Website
- Ethics Review Process for research involving human participants
- Course requirement accommodation for students with disabilities, including physical, medical, systemic, learning and psychiatric disabilities
- Student Conduct Standards
- Religious Observance Accommodation

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### **IMPORTANT DATES**

<b>Event</b>	<b>Date</b>
Classes begin	Sep 8, 2016
Last day to enrol without permission of Course Director	Sep 21, 2016
Last day to enrol with permission of Course Director	Oct 19, 2016
Co-curricular week	Oct 27 – 30, 2016
Last day of Fall Term	Dec 5, 2016
Examination period (Fall)	Between Dec 7-22, 2016
Last day to drop without a grade submitted	Feb 10, 2017
Reading Week	Feb 18-24, 2017
Last day of Winter Term	Apr 05, 2017
Course Withdrawal Period (withdraw from a course and receive a "W" on the transcript)	Between Feb 11 and Apr 5 2017
Examination period (Winter)	Between Apr 07-24, 2017