

**Faculty of Science**

**Department of Physics & Astronomy**

<https://www.physics.yorku.ca/>

**Course Outline**

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| PHYS 4270 4.0 / 5390 4.0 – Astronomical Techniques  FW 2020 – 21  Thurs: 14:30-16:00 [online/CB 120] |

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| Course Instructor(s) and Contact Information |
| **Course**: SC/PHYS 4270 / 5390 4.0 A – Astronomical Techniques 2020-21  **Course Webpage**: [https://moodle.yorku.ca/moodle/course/view.php?id=184071](https://moodle.yorku.ca/moodle/course/view.php?id=154364)  **Course Instructor:**   |  | | --- | | Fall and Winter Terms: | | Name: (Professor) Michael De Robertis | | Phone: (416-736-2100) ext. 77761 | | Office: Petrie Science & Engineering Bldg. 326 | | Email address: mmdr@yorku.ca | | Office hours: Thursdays, 2:30-4 pm |   **Time and Location:**  PHYS 4270 / 5390 4.0, a full year course, has 1.5 lecture hours per week. The lecture portion of the course will be online during the fall term and, will be held in CB 120 should in-person lectures return during the winter term.  **Contacts and Communications**   * Student success in any course depends critically on his/her level of engagement, which requires clear and consistent communications with the Instructor. * 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, including assignment deadlines. * The **first level of communications about curricular matters** 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 TAs 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) . It is **strongly recommended** you use your “my.yorku.ca” account when sending email. Experience has shown that email to/from an external email address may not always arrive successfully through no fault of the sender. Students should normally receive a response within 24-48 hours. 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 instructor will remind you about important dates, administrative aspects of the course and the occasional media-oriented story relevant to the course.   **Email Policies and Etiquette:**   * All members of the course – students, TAs and Instructor(s) – should adhere to “common sense” NETiquette guidelines to communicate effectively and courteously on-line, including:  1. A specific and relevant subject line 2. Addressing the instructor appropriately as “Dear Professor De Robertis” or “Dear Professor” or simply “Professor” 3. The use of appropriate language; avoiding rudeness, vulgarity or sarcasm 4. Being concise 5. Your full name and York student ID somewhere in the message  * Students who require face-to-face meetings with the Instructor for personal reasons should make use of the Instructors’ Office Hours or book a personal appointment via [nats1880@yorku.ca](mailto:nats1880@yorku.ca) . |

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| Expanded Course Description |
| 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 how science works, 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. |

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| Course Learning Outcomes |
| Upon successful completion of this 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 apprehend the probability that another intelligent species exists concurrently in our Galaxy, and to appreciate what its discovery would mean for humankind. 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. |

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| Evaluation |
| 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)1,5 | Total of 4: 2 per term | 10.0 | | Individual Assignments (IAs)2,5 | Total of 4: 2 per term | 10.0 | | In-Chapter Questions (ICQ)3,5 | During each chapter, mix of multiple choice, short answer | 12.5 | | Chapter Completion Assignments (CCAs)4,5 | After each chapter, mix of multiple choice, short answer | 12.5 | | The Scientific Method Assignment | Answers to questions from video | 5.0 | | End-of-term Examination (Fall)6  (Date arranged by Registrar’s Office) | December: Chapters 1-6, ~120 multiple choice; on campus | 25.0 | | End-of-term Examination (Winter) 6  (Date arranged by Registrar’s Office) | April: Chapters 7-13, ~120 multiple choice; on campus | 25.0 | | **Total** |  | 100.0 |   1The Group Assignments (GAs) will require each group of students to research a particular topic and collaborate on the writing of a final submission. Each GA will begin with an in-class discussion, though the assignment will be submitted on-line. The aim of each of the 4 assignments will be to further enhance the understanding of certain key topics in the course. The total weight of the GAs is 10%. (The instructor realizes that many students are wary of group work based on negative high-school experiences and has tailored the GAs so that the work is distributed more equitably.)  2The Individual Assignments (IAs) will require each student to research a topic and report their findings in their own words in their on-line submission. To assist in the preparation of the final submission, a “draft” submission normally will be (briefly) assessed by 2 anonymous student peers to provide feedback on the format, content, clarity and overall composition. Adequate time will be provided between the “draft” submission date and the final submission date. The aim of each of the 4 assignments will be to further enhance the understanding of certain key topics in the course. The total weight of all 4 assignments is 10%.  3TheIn Chapter Questions (ICQs) are a series of in-class multiple-choice questions that will be asked in each lecture session that can be answered on a variety of platforms including mobile devices, tablets or laptops. The total weight of the ICQs throughout the year is 12.5%.  4Chapter Completion Assignments (CCAs) are largely multiple-choice quizzes based on questions from the current or active chapter. The total weight of all CCAs is 12.5%.  5The GAs, IAs, ICQs and CCAs are all subject to the “80% Rule.” This means that only the best 80% of each of these assessments will count towards the overall grade. This allows students to miss one GA and/or IA, a few lectures in which there were ICQs, and up to two CCAs (e.g., due to illness, forgot to submit, internet issues, etc.) without suffering negative consequences and *without having to supply formal documentation*. *No make-up options for missing any GA, IA, ICQ or CCA will be available as a result*.  6Two End-of-term exams will be predominantly multiple-choice format using Scantron answer sheets whose 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 and may result in a mark of 0 being awarded.  Please note*: In order to be consistent and fair to the entire class, individual grades are not negotiable and “extra credit” assignments are not provided at any point during or after the course. Please contact the instructor about a grade only if there is a clear error (calculation, clerical, etc.) within two weeks of the grade being made available to you.* |

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| Course Materials |
| The course lectures will closely follow the textbook, “Life in the Universe,” by Bennett and Shostak (4th edition) which comes in a variety of formats (including electronic or hard-copy available at the York University Bookstore or on-line). Consulting the textbook in whatever format you choose is strongly recommended. Mastering Astronomy (MA) will be automatically packaged with the textbook (at no additional cost) or available “stand alone” at a cost to the student. MA can be a helpful resource but is *not required*. 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 on the course Moodle website. |

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| Laboratory/Tutorial |
| This course does *not* have a formal tutorial component. However, Group Assignments, GAs, (3 per term) will require groups of students to work together on assignments.  Students will be organized into groups, normally comprised of six students per group. The composition of a Group will be based upon a brief survey administered via Moodle at the beginning of the Fall term. Announcements regarding the timing of this process will be made shortly after the term commences.  Group work will take place both during regularly scheduled class times (normally on *some* Thursdays during each term), as well as on-line. Moodle allows communication between and among group members outside of class time. |

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| Course Content and Format |
| * Students who are registered in the course should automatically have access to the class (Moodle) website following Passport York authentication ([moodle.yorku.ca](https://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 curriculum consists of 13 chapters from the textbook *Life in the Universe* (4th edition) which will be covered over a time-span of 24 weeks. Thus, students can expect to cover approximately one chapter every 10-14 days. A reasonable approach to the materials provided for each Chapter is illustrated below. * Each of the 13 Chapters of the course has its own Moodle section and follows a Welcome and introductory section. Each Chapter section is structured similarly:      * + A list of Learning Outcomes for the Chapter   + The “Important Questions” that will be discussed in the Chapter   + The In-Class lecture for the Chapter   + The specific Activities that should be completed (e.g. individual and/or group assignments, IAs or GAs) for marks for the course (which sometimes straddle two chapters)   + “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. *None of this material counts toward the final grade, however.*   + The Chapter Completion Assignment (CCA), a predominantly multiple-choice assignment for marks * Students are encouraged to review the Learning Objectives for each Chapter and read the appropriate Chapter in the text before attending lectures. (Though the lectures will be captured and posted on the website, normally within a week, students are strongly advised to attend the lectures. Attending lectures not only allows students to get ICQ marks – worth 12.5% of the course grade – but allows students to make a better cognitive connection with the curriculum for a given amount of effort.) * A Chapter will be considered “open” for a well-advertised amount of time (see the Bulletin Board of the class Moodle website). While a Chapter is “open,” students may complete its CCA 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 the CCA for marks. All GAs and IAs also have well-advertised deadlines. * 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 for marks or is essential for doing well in this course… but it might help. Of particular note are the SCORM packages. |

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| Math Content |
| This course does not rely upon mathematical skills beyond those normally found in the Grade 10 curriculum: simple algebra and geometry. There is little emphasis placed upon mathematical manipulation. For example, the end-of-term exams will contain around 120 multiple-choice questions of which fewer than 5 will require the use of elementary mathematical concepts discussed in the course. Scientific notation, the use of power of 10 notation, is discussed as numbers in this course can be either extremely large (e.g., scale of the universe) or very small (e.g., size of a cell). |

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| Course Policies |
| **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 Chapter Completion Assignments will be automatically graded by Moodle 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 assignments – must 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 accepted for grading.  **Lateness Penalty:**  Because assignments are submitted 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 “80% rule” is in effect for the homework, e.g., GAs, IAs, ICQs and CCAs, so it is **not necessary to provide documentation for a single missing assessment** even if there were valid extenuating circumstances. If, however, there is a chronic problem that may cause a student to miss a few assessments, this should be discussed with the Instructor during office hours at the earliest opportunity. * In the case of the Group and Individual Assignments, deadlines are set well in advance to allow adequate time for completion and submission. Do not leave submission to the last minute! GA and IA’s will count towards your assessment but as noted above, the poorest of each assignment type will be ignored.   **Missed Tests:**  Students with a legitimate reason for missing an 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. Flying home early is *not* considered a legitimate reason for missing an exam. A student who has missed an exam for a legitimate/documentable reason **must** contact the course Instructor by email ([nats1880@yorku.ca](mailto:nats1880@yorku.ca)) as soon as he/she is able, and estimate when she/he will provide the appropriate hardcopy documentation. The hardcopy documentation should be scanned and emailed to the course email address within 5 business days of the missed exam. If the documentation is on time and deemed acceptable by the course director, the student may be given permission to write a deferred Exam. (A hardcopy of the original documentation should be submitted when the deferred exam is written.) If a student misses a deferred Exam, then the student will be required to submit a formal Petition to the Faculty of Science. **Students missing an end-of-term exam will receive a grade of 0 for the exam without acceptable documentation.**  **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 another without attribution. Cheating and plagiarism – the attempt to gain unfair academic advantage – will not be tolerated at this institution. This includes allowing another student to submit original work – whole or in part – that you yourself have done. Penalties for all such offences range from a failing grade on the submitted material to expulsion from the University  **Paraphrasing**:  To avoid plagiarism, it is common for authors to paraphrase the idea(s) of another; that is, to express in their own words the words of someone else. While this is a legitimate form of expression, the author should still attribute the original source of the idea(s). Moreover, paraphrasing involves a substantial rephrasing of the original author’s words, and not merely to changing a word or phrase. Students may photograph slides during a lecture only for their own personal use. Students may record lectures for their own personal use. Videos (containing audio) of all lectures will be posted to the course website, however, and a copy of all the slides will be available for each chapter. Moreover, each student will receive a copy of all the ICQs they attempted for study purposes.  **Citation**:  Citations are part of scholarly work. It is important to adopt a consistent citation style (i.e., footnotes, bibliographies, etc.). There are many such styles some of which can be found at: <http://researchguides.library.yorku.ca/styleguides> . We expect students to use the APA style in this course which is described in detail at links on this URL. |

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| Copyright and Intellectual Property |
| Numerous students in Faculty of Science courses have been charged with academic misconduct when materials they uploaded to third party repository sites (e.g. Course Hero, One Class, etc.) were taken and used by unknown students in later offerings of the course. The Faculty’s Committee on Examinations and Academic Standards (CEAS) found in these cases that the burden of proof in a charge of aiding and abetting had been met, since the uploading students had been found in all cases to be wilfully blind to the reasonable likelihood of supporting plagiarism in this manner. Accordingly, to avoid this risk, students are urged not to upload their work to these sites. Whenever a student submits work obtained through Course Hero or One Class, the submitting student will be charged with plagiarism and the uploading student will be charged with aiding and abetting.  Note also that exams, tests, and other assignments are the copyrighted works of the professor assigning them, whether copyright is overtly claimed or not (i.e. whether the © is used or not). Scanning these documents constitutes copying, which is a breach of Canadian copyright law, and the breach is aggravated when scans are shared or uploaded to third party repository sites. The class (Moodle) website is a proprietary repository of materials produced explicitly for the use of students registered in this class. Moreover, the (digital) material on the class website is the intellectual property of the instructors and much of it is under copyright by the textbook vendor. This means that it is unethical and illegal to share this material directly with students not registered in this class or to external websites. |

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| 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/>  **Important Sessional Dates**  Includes sessional start and end dates, drop deadlines, and withdrawal dates.   |  |  | | --- | --- | | **Event** | **Date** | | First class (Fall Term) | Sep 05, 2019 | | Last day to enrol *without permission* of Course Director\* | Sep 17, 2019 | | Fall Reading Week (no classes) | Oct 12-18, 2019 | | Last class (Fall Term) | Dec 03, 2019 | | Examination period (Fall) | Between Dec 05-20, 2019 | | Last day to drop without receiving a grade | Feb 03, 2020 | | Winter Reading Week | Feb 15-21, 2020 | | Last class (Winter Term) | Apr 02, 2020 | | Course Withdrawal Period (withdraw from a course and receive a “W” on the transcript | Between Feb 04 and Apr 05, 2020 | | Examination period (Winter) | Between Apr 07-25, 2020 |   \* No permission to enter the course will be given after this date  **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 Student Accessibility Services (SAS) to the course instructor within the first two weeks of the course or as soon as issued.**  Student Accessibility Services- <https://accessibility.students.yorku.ca/>  York Accessibility Hub - <http://accessibilityhub.info.yorku.ca/>  **Note: A student registered with SAS, 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.  **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/>). |

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| 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/>  **Math Aid**  Free math help for students enrolled in Natural Science Courses (TA tutors)  See <http://natsci.info.yorku.ca/m-aid-in-nats/> |

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| 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  **York University Astronomical Observatory**  This facility offers free public viewing opportunities to the community on Wednesday evenings (in person) and Mondays (online). Group tours by arrangement are also possible. For more information feel free to visit <http://observatory.info.yorku.ca> |