

**Division of Natural Science**<http://natsci.info.yorku.ca/>**Course Outline (version: Aug 1 2017)**

SC/NATS 1745.06 A History of Astronomy  
F/W 2017-18  
Friday 11:30-2:30, SLH D

**Course Instructor(s) and Contact Information****Professor:** Dr. Robin Kingsburgh**Email:** [robin@yorku.ca](mailto:robin@yorku.ca)

- Please include 'NATS 1745' in the subject line
- Use your full name, including student number, in all correspondence
- Replies generally returned within 48 hours

**Office:** 217B Bethune**Office hours:** by appointment (please email)**Webpage:** all course content managed on **moodle****Term Dates:** Sept 8 2017- Apr 6 2018**Drop Date:** Feb 9 2018**Course Description**

Welcome to SC/NATS 1745.06 "History of Astronomy". This course follows the evolution of discoveries and theories about Astronomy from pre-historic times up to the present. We begin by looking at sites like Stonehenge and Newgrange, where we find evidence that the motions of the Sun and stars were understood in prehistoric times. We then look at the astronomical knowledge amassed by ancient civilizations such as the Maya, Babylonians and Egyptians, followed by the Greek explanations for the cosmos and the beginnings of astronomy as a science. The first half of the course concludes with the early history of modern astronomy and covers figures like Copernicus, Brahe, Kepler, Galileo and Newton. The 2<sup>nd</sup> half of the course covers discoveries about our Solar System, stars, galaxies and the Universe from the 19<sup>th</sup> century up to the present day. This includes the history of our missions to space, recent discoveries about the birth and evolution of the universe, discoveries of new planets beyond our solar system, and theories about black holes, dark matter and dark energy.

**Course Learning Outcomes**

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

- compare how ancient cultures (including those of Neolithic Britain, Egypt, Mesopotamia and Mesoamerica) used the sky as a calendar, and constructed monuments aligned with celestial events
- describe how the nightly and yearly motions of the Sun, Moon, stars and planets differ, and why they differ
- recognize the significance of the change in cosmic worldview of the ancient Greeks: including their use of mathematical models to describe and predict celestial motions, and how their process laid the foundation for the modern scientific method

- explain key moments in the early modern period contributing to the Scientific Revolution, including the heliocentric model of Copernicus, observations of Brahe, mathematics of Kepler
- describe how Galileo's early observations with the telescope provided observational support for heliocentrism
- describe Newton's contributions to physics including how he discovered the Law of Universal Gravitation, and why Newton's *Principia* is regarded as one of the most important texts in human history
- recognize how advances in technology underpin significant astronomical discoveries
- describe the microscopic processes that give rise to the absorption and emission spectra in stars and nebulae
- recognize the importance of spectroscopy in laying the foundations of astrophysics
- describe how the Doppler shift is used to detect a variety of astronomical objects, including exoplanets, black holes and dark matter
- explain how astronomers derive distances to astronomical objects
- describe important historical observations which led to Shapley discovering the size and scale of the Milky Way galaxy and Hubble discovering the expanding Universe
- compare the role of observation and theory in advancing astronomical knowledge

## Evaluation

### 2 TERM EXAMS: (dates To Be Confirmed)

20% Term Exam 1 - Dec 1 (2 hours, Short answer + Mult. choice)

20% Term Exam 2 – Apr 6 (2 hours, Short answer + Mult. choice)

### 2 MIDTERM EXAMS: (dates To Be Confirmed)

7.5% Midterm Exam 1 – Oct 20 (1 hour, Short answer + Mult. choice)

7.5% Midterm Exam 2 - Feb 16 (1 hour, Short answer + Mult. choice)

### 3 ASSIGNMENTS: (dates To Be Confirmed)

20% Assignment 1 – Moon project, due Nov 17

10% Assignment 2 – Astronomical Data, due Feb 2

15% Assignment 3 – Exoplanets, due Mar 16

In order to be fair and consistent 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.

All grades will be posted on **moodle** as soon as they are available. Please notify the Professor immediately if there is a discrepancy in any grade.

## Course Materials

- There is no textbook for this course.
- Required readings will be posted as links to websites or ebooks available in the YorkU Library system.
- Links for course ebooks available under ‘Course Reserves’ on top moodle module

## Laboratory/Tutorial

This course does not have a laboratory or tutorial component.

## Course Content and Format

All course material can be found on moodle, and is divided into weekly components which include:

- outlines for content covered each lecture
- pdfs for each lecture
- required readings – links to websites or e-books available through York University Library
- required videos
- supplementary notes and worksheets
- review questions for you to do to make sure you have understood the material
  - answers will not be posted, but can be discussed with your classmates using moodle's online forum

Additional information:

- Links to course reserve ebooks are posted under 'Course Reserves' in top moodle module.
- **Check your email regularly.**

## Math Content

- This course emphasizes the physical and conceptual bases of important equations (like Newton's Law of gravity), rather than requiring calculations using the equations.
- Simple calculations (with basic arithmetic, exponents, basic geometry) may be discussed and demonstrated in class, or needed for an assignment (examples will be provided).
- Graphs commonly used by astronomers, including spectra and light curves, are discussed.
- Students should be familiar with scientific notation.
- Calculations will not be on tests or exams.

## Course Policies

### Questions and Concerns should be directed to the Professor

- by email: [robin@yorku.ca](mailto:robin@yorku.ca)
- put 'NATS 1745' in the header (so I know it isn't spam)
- include your full name and student number in the email
- please use proper email etiquette: start with Dear Professor; don't use slang or text abbreviations

### Assignment Policies

- Make sure your full name and student number are on a cover page or at the top of the assignment.
- The assignments have multiple components – all components must be handed in together.
- **Proper references and citations must be given in all assignments.** For information on style guides, see <http://www.yorku.ca/caitlin/wstudies/style.htm>
- Please familiarize yourself with the Academic Honesty Policy (described below) and note that **plagiarism of any sort (direct copying of websites, presenting another's material as your own) is not tolerated**, and will be dealt with according to York University's Senate Policy (link below). Penalties for academic misconduct can range from 0 for an assignment, to expulsion from the University in the case of a second offense.
- **LATE ASSIGNMENTS NOT ACCEPTED**

### Exam Policies

- All students must show valid student card during exams.
- Dictionaries, cell phones and other electronic items are not allowed in exam. (Cell phones must be turned off and stored in students' bags during exams.)
- Only pens, pencils, erasers and a student card are permitted on the desk during an exam.

### Policy for Missed Exams

- If due to illness or unforeseen emergency, a student must miss a scheduled exam, the Professor (robin@yorku.ca) must be notified by the day the exam is to be written in order to arrange a make-up.
- If sufficient notice is not given, the student will receive a mark of 0 for the test.
- If exam is missed due to illness, please use the York University Attending Physician's statement form.

### Re-Grading Policy

- Coursework is marked by markers/TAs. Work may be re-submitted for consideration to the Professor, provided a student has a clear reason for the request (not just an attempt at extra marks). **The Professor may re-grade the entire test or assignment, and the overall grade may go up or down accordingly.**

### Student Conduct: in class and online

- Students are required to maintain courteous and respectful communication with all members of our course at all times. Please see the University's Student Code of Conduct (<http://oscr.students.yorku.ca/csrr/standards>) continues to apply.

## Copyright and Intellectual Property

### **COPYRIGHT LAWS:**

Most of the material shown in the lecture videos is protected by copyright law, which states that 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:

- posting videos of a lecture on a web site, either your own or someone else's
- posting photographs or screen captures of lecture slides on a web site
- posting notes, assignments and other intellectual property to web sites

## 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://cde.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](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