

Astronomy 2022B: The Origin of the Universe

Winter 2019

An introduction to current ideas about the origin of the Universe. Topics to be discussed include: Why is the Universe the way it is? The Big Bang and why we think it happened. The beginning and eventual fate of the Universe. Dark matter and dark energy.

The course is largely non-mathematical and will focus on the simple geometrical, physical and philosophical arguments that lie behind modern theories of the origin of the Universe. This course is suitable for non-science students.

Prerequisites: none

Antirequisites: Earth Sciences 1086F/G, Physics 1028A/B, 1301A/B, 1401A/B, 1501A/B or the former Physics 1020, 1024, 1026.

This course may not be taken for credit by students in the Faculty of Science

Unless you have either the requisites for this course or written special permission from your Dean to enroll in it, you may be removed from this course and it will be deleted from your record. This decision may not be appealed. You will receive no adjustment to your fees in the event that you are dropped from a course for failing to have the necessary prerequisites.

Course Topics

- 1 The shores of light: an introduction to the Universe
- 2 The dynamic Universe
- 3 The shape of space
- 4 Blast from the past: the origin of matter
- 5 The riddle of Dark Matter
- 6 The large-scale structure of the Universe
- 8 Symmetry and imperfection
- 9 The speed of space
- 10 The origin of the Universe(s)
- 12 A place for us

* Note that chapters 7 and 11 will not be covered.

Instructor:

Dr. Maryam Tabeshian

You can reach me via e-mail at mtabeshi@uwo.ca. When contacting me by e-mail, please use your UWO e-mail account. Other accounts (such as gmail, yahoo, hotmail, etc.) are often tagged as spam and may not reach me.

Textbook The *required* textbook is "The Whole Shebang: a State of the Universe(s) Report" by Timothy Ferris, available at the UWO Bookstore.

Lecture times MW 2:30-3:30 pm in Western Science Centre 55 (WSC 55).

Instructor's Office Hours: Wednesdays, 3:30-4:30 at the Physics and Astronomy Building, room 237. If this time is not convenient, you can also send me an e-mail or talk to me after class if you would like to arrange a meeting. The TAs' office hours will be posted on the course OWL site during the first week of classes.

Tests and exams: There will be one midterm test plus a final exam. Each midterm or exam will generally test all the material taught up to that point. Questions will mostly be in multiple-choice format but may also involve drawing diagrams or figures. There may be short answer questions, questions requiring one or two sentence answers, or short paragraph answers. There will not be extended essay-style questions. Examination and assignment scores are posted on OWL. The midterm test will be held during class time in the same classroom.

Midterm exam time/date: tentatively scheduled for **Monday Feb 4 2019 2:30-3:30 pm** (the usual class time) in WSC 55 (the usual classroom). Time and location are subject to change.

Writing assignments: There will be two writing assignments. Each one should be 1000 to 1250 words long (you may use extra room for references if needed). The due date of each assignment will be announced in class. The anticipated due dates are:

- **Assignment 1: Wednesday Jan 23 2019 at 11:55 pm.**
- **Assignment 2: Wednesday March 6 2019 at 11:55 pm.**

Assignments should be submitted through the course website on OWL (<https://owl.uwo.ca/>).

There will be no deadline extensions for assignments: late assignments will receive a zero unless there is a valid reason discussed with me. Topics for the first assignment are already posted on the OWL website and the second assignment topics will be posted at least 3 weeks prior to the deadline for Assignment 2. The website will be open to receive assignments several days before each due date. Unlimited resubmission is allowed until each deadline.

Note that it is your responsibility to ensure that you submit your assignment sufficiently in advance of the deadline to avoid any potential problems with computers. Having the internet go out or your computer crash as you attempt to submit your assignment just before the deadline do NOT constitute a valid excuse.

Students must write their essays and assignments in their own words. Whenever students take an idea or a passage from another author, they must acknowledge the source by proper in-text citation as well as listing all the references at the end of the essay using APA style. The assignments should not include lengthy quotes from other authors even if properly referenced. Plagiarism or excessive quotation may result in a zero on the assignment. More information and a description of what plagiarism can be found at www.plagiarism.org.

Note that the use of material written by you but submitted as work for credit to two or more different university courses may still constitute plagiarism. Please contact your instructor if you think this may apply to you.

Shortly after you submit your assignment on OWL, a report will be generated by a plagiarism detection software called TurnItIn (see below under “plagiarism” for more). Please review the TurnItIn report and consider rephrasing statements marked as “plagiarised” before the deadline to submit the final version of your assignment. Please note that TurnItIn can be quite aggressive in detecting similar sentences. So if you are in doubt about whether a statement marked in the TurnItIn report is really plagiarism or not, please contact your TA directly.

Maximum length: 1250 words. The assignment may be single-spaced. A cover page is not necessary as long as you ensure your name and student number are listed. Use a 12 point font size. You may use extra words in order to include a bibliography or list of references. References should be in APA format, described at the two sites below:

<http://www.writing.utoronto.ca/advice/using-sources/documentation>

http://www.sciencebuddies.org/science-fair-projects/project_apo_format_examples.shtml

Please put your name, student number, course number and assignment number on your sheet. Marks will be deducted if you do not follow these guidelines.

Once marked, your grade will be posted on OWL. You will be able to consult with your Teaching Assistant regarding your mark during the TA's office hours. Writing assignments are marked out of 40 each. The rubric for the writing assignments is on the course website.

Teaching Assistants: There are three TAs for this course, all of whom are graduate students in astronomy:

Collin Knight cknigh24@uwo.ca

Klay Kulik kkulik2@uwo.ca

Keegan Marr kmarr4@uwo.ca

TAs will have office hours which will be posted shortly on the course website. TA assignments are based on student last names which will also be posted on OWL along with their office hours and contact info. You will be notified via OWL announcement before the end of next week when that information is up so you will know who your TA is. If you wish to speak to the TA before the deadline for the assignments, you may do so. They may briefly review your draft and provide some initial comments. However, they will **not** completely mark a draft for you before the deadline, due to time restrictions. The last day of classes is also the last day of TA office hours.

Mark distribution: The final mark will be weighted as follows:

Assignments = 12.5% each = 25%

Midterm = 25%

Final = 50%

Please note: The Department of Physics and Astronomy may in exceptional cases adjust the final course marks in order to conform to departmental policy.

Final exam time/date: *To be announced*

Course Policies

- **Electronic Devices:** No electronic devices will be allowed during tests and examinations.
- **Missed assignments:** There is no grace period. You will receive a mark of zero. Only a serious medical or family excuse can override this. If this is the case, you should speak to your academic counsellor, who will confirm your excuse. No accommodations can be made without the approval of your academic counsellor.
- **Missed midterm test:** Documentation must be provided to the instructor in order for you to receive permission to write a make-up. This process should be begun by your bringing the documentation to your student counselling office. If you miss the make-up, again documentation must be provided, and your mark will be pro-rated.
- **Missed final exam:** Documentation must be provided to the academic counselors in your faculty in order for you to receive permission to write a make-up (usually scheduled the day following the end of the exam period: plan your travel accordingly!). If you miss the make-up, again documentation must be provided, and you will then write the exam at the next sitting of this course's final exam (typically one year later).
- **Illness or other serious circumstances:** If you are unable to meet a course requirement due to illness or other serious circumstances, you must provide valid medical or other supporting documentation to the Dean's office as soon as possible and contact your instructor immediately. It is the student's responsibility to make alternative arrangements with their instructor once the accommodation has been approved and the instructor has been informed. In the event of a missed final exam, a "Recommendation of Special Examination" form must be obtained from the Dean's Office immediately. For further information please see the medical section of the Academic Handbook:
http://www.uwo.ca/univsec/handbook/appeals/accommodation_medical.pdf

A student requiring academic accommodation due to illness should use the Student Medical Certificate when visiting an off-campus medical facility or request a Record's Release Form (located in the Dean's Office) for visits to Student Health Services. The form can be found at: <http://www.uwo.ca/univsec/handbook/appeals/medicalform.pdf>

Students seeking academic accommodation on medical grounds for any missed tests, exams, participation components and/or assignments must apply to the Academic Counselling office of their home Faculty and provide documentation. Academic accommodation cannot be granted by the instructor or department.

- **Religious holidays:** A student who, due to unavoidable conflicts with religious holidays which (a) require an absence from the University or (b) prohibit or require certain activities (i.e., activities that would make it impossible for the student to satisfy the academic requirements scheduled on the day(s) involved), is unable to write examinations and term tests on a Sabbath or Holy Day in a particular term shall give notice of this fact in writing to his or her Dean as early as possible but not later than November 15th for mid-year examinations and March 1st for final

examinations, i.e., approximately two weeks after the posting of the mid-year and final examination schedule respectively. In the case of mid-term tests, such notification is to be given in writing to the instructor within 48 hours of the announcement of the date of the mid-term test. The instructor(s) in the case of mid-term tests and the dean in the case of mid-year and spring final examinations will arrange for special examination(s) to be written at another time. In the case of mid-year and spring final examinations, the accommodation must occur no later than one month after the end of the examination period involved. It is mandatory that students seeking accommodations under this policy give notification before the deadlines, and that the Faculty accommodate these requests. The list of approved dates is given in the UWO calendar.

- **Accessibility Statement** Please contact the course instructor if you require material in an alternate format or if you require any other arrangements to make this course more accessible to you. You may also wish to contact Services for Students with Disabilities (SSD) at 661-2111 x 82147 for any specific question regarding an accommodation.

- **Registrarial and Support Services** Student Support Services, Student Development Services and the Registrar are available online at <http://www.registrar.uwo.ca/> and/or at <http://westernusc.ca/services/>. Students who are in emotional/mental distress should refer to Mental Health@Western <http://www.uwo.ca/uwocom/mentalhealth/> for a complete list of options about how to obtain help.

- **Other Advice for successful performance** The class notes are provided on the course OWL site but do not necessarily include everything which might be tested. Some explanations given in class might not appear in the class notes but are testable material. To do well in this course, you must do the weekly readings. Some of the midterm and exam questions will come from the textbook but will not have been addressed in class.

Academic misconduct

- **Cheating** University policy states that cheating is a scholastic offence which can result in an academic penalty (which may include expulsion from the program). If you are caught cheating, there will be no second warning. Cheating includes having available any electronic devices other than a watch. You may not have a cell phone accessible during tests or exams, even to use it as a watch. Complete information on the University policies on academic offenses can be found in the Undergraduate section of this document: <http://www.uwo.ca/univsec/handbook/appeals/schloff.pdf>

Computer-marked multiple-choice tests and/or exams may be subject to submission for similarity review by software that will check for unusual coincidences in answer patterns that may indicate cheating.

- **Plagiarism** Students must write their essays and assignments in their own words. Whenever students take an idea or a passage from another author, they must acknowledge their debt both by using quotation marks where appropriate and by proper referencing (such as footnotes or citations). Plagiarism is a major academic offence. For more details, see <http://www.uwo.ca/univsec/handbook/appeals/schloff.pdf>

All required papers may be subject to submission for textual similarity review to the commercial plagiarism detection software under license to the University for the detection of plagiarism. All papers submitted will be included as source documents in the reference database for the purpose of detecting plagiarism of papers subsequently submitted to the system. Use of the service is subject to the licensing agreement, currently between The University of Western Ontario and Turnitin.com (<http://www.turnitin.com>).

Last updated Wednesday, January-02-19