

Western University

Space Exploration 2090
Intersession (Spring) 2016

Instructor: Danny Bednar
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Office: SSC 2410
Office Hours: Thursday 1-4

Location: SSC 3028
Days: Monday, Tuesday, & Wednesday
Hours: 2:00 PM – 4:00 PM

Important Dates

Monday May 16th:	First day of class
Monday May 23rd:	No Class (Victoria Day)
Tuesday June 8th:	Mid-Term Test
Monday June 20 th :	Assignment Due
Wednesday June 22nd:	Last day of class
June 27-28:	Exam period

Course Description

This course is designed to introduce students to the importance of Space as a place of endeavor for all humans, and as a reality in their daily lives. Space in this course is explored from the perspective of a geographer, with the goal of understanding it historically, physically, politically and socially. The course is not an astronomy or planetary science course; though, these fields are central to basic understanding of space exploration concepts and will be addressed as necessary. The objectives of the course are for students to: gain requisite knowledge of the history of human interaction with non-Earth places, to understand the physical geography of our solar system, and to recognize the political, scientific and cultural importance of space in daily life.

Course Materials

There is no textbook for the course, mandatory readings and videos will be posted on OWL. There is also a website for the course (instruct.uwo.ca/geog/2090/)

Lecture Schedule

Week	Day	Topic	Hour 1	Hour 2	Readings	Videos
1	16-May	<i>History of Space Exploration</i>	Course Introduction & Why Space Matters	Early Cartography, Rockets & Sputnik	Moltz (2014) Getting into Orbit Lane (2006) : Mapping the Mars Canal Mania Harland (2008) : Magnificent Desolation	NASA : Journeys of Apollo
	17-May		The Apollo Program & The Space Race			
	18-May		Debunking Lunar Conspiracies	Guest Presentations: Lunar Science		
2	23-May	<i>Major Space Technologies</i>	No Class			ESA : The Russian Soyuz Capsule National Geographic : - Big, Bigger, Biggest - Space Station Challenger : A Rush to Launch
	24-May		The Russian Soyuz	Space Stations		
	25-May		The U.S. Space Shuttle			
3	30-May	<i>The Solar System</i>	Formation, Physics, and Geography of the Solar System		Rothery (2010) : The Solar System Rothery (2015) : The Discovery and Significance of Moons Dymock (2014) : Small (and not so small) Solar System Bodies	The Universe : The Formation of the Solar System
	31-May		TNOs, Asteroids, & Comets	Assignment Tips		
	01-Jun		Guest Presentations: Planetary Processes and Analysis			
4	06-Jun	<i>Robotic Exploration of the Solar System: Past & Present</i>	Exploring the Inner Planets	Exploring the Gas Giants & Their Moons	Van Pelt (2007) : Anatomy of a Spacecraft	National Geographic : The Curious Life of a Mars Rover Voyager : Journey to the Stars
	07-Jun		Exploring TNOs, Comets & Asteroids	Guest Presentations: Space Robotics and Imaging		
	08-Jun		Mid-Term Test			
5	13-Jun	<i>Space Law & Politics</i>	Why Space is Political	The Outer Space Treaty & Other International Conventions	Tronchetti (2013) : The Legal Framework Regulating International Outer Space Activities Allison (2014) : The Basics of Satellites and the ITU Weeden (2011) : Overview of the Legal and Policy Challenges of Orbital Debris Removal	
	14-Jun		National Space Agencies	Militarization of Space		
	15-Jun		Space Politics: The Case of Orbital Debris	Class Exercise - How Should Orbital Debris Be Solved?		
6	20-Jun	<i>Space Business</i>	Commercialization of Space		Gurtana (2013) : Understanding the Nature of Space Business Catling (2013) : What is Astrobiology Dator (2012) : If They Are, Where Are They?	Science Vs. Cinema : The Martian Cosmos : Who Speaks for Earth
	21-Jun	<i>Life in Space</i>	Physiology, Contamination, & Contact			
	22-Jun	<i>Popular Space</i>	Space in Popular Culture	Exam Review		

Readings

Through OWL, readings and/or videos are assigned every week. Most weeks have three (relatively short) readings and one or two videos. Videos (hosted online) are assigned the same as readings and will not be shown in class. Both readings and videos contain content for the mid-term and final exams (so make notes!). If you do not have access to videos/internet away from campus, use an on-campus library or contact me to access computer space in the Geography Department.

Evaluation

Mid-Term Test – 20%

Final Exam – 30%

Assignment – 40%

Speaker Notes – 10%

Mid-Term Test: June 8th

The mid-term will be held in class. It will test material from all lectures, readings, videos, and guest presentations from weeks 1 through 3.

Final Exam: TBA

The final Exam will be held on the 27th or 28th of June. It will test all lectures, readings, videos and guest presentations from Weeks 4 through 6.

Guest Session Notes

In Weeks 1, 3 & 4, guest presentation sessions highlighting current space-related research will take place. Students are required to take notes during the sessions. Students must submit their notes from 2 guest lecture sessions. Each session's notes will be worth 5% of the final grade. Students must hand in the notes when they have completed the mandatory 2 sessions.

Notes on each presenter should cover the following:

- 1) Who is the speaker, what field are they in? (Geography, engineering, geology).
- 2) Summarize the topic/research they presented?
- 3) Note 2 facts (things you learned) from the presentation.
- 4) What did, or would, you ask them?

Assignment: June 20th:

There are two options for the assignment, one focused on the engineering and scientific component of space exploration, the other on political and legal components. Both options require a 10-12 page report, plus a references section.

OPTION 1

Prepare a 'Scientific History' of an object in our solar system. The options are as follows.

- | | |
|-------------|-----------|
| 1) Venus | 5) Saturn |
| 2) The Moon | 6) Titan |
| 3) Mars | 7) Pluto |
| 4) Jupiter | |

The assignment should take the form of a scientific report/atlas that highlights the following:

- 1) What was 'known' about the object(s) before the space age, how? By who? (This may include things that turned out to be wrong!)
- 2) A (brief) history of the programs with spacecraft that have visited, or observed, the object(s). This can take the form of a timeline.
- 3) A list of 5 important scientific (geology, chemistry, climatology, astrobiology, etc...) findings from exploration of the object(s). Why did you choose these 5? Which spacecraft/missions made these findings, were these their original science goals?
- 4) A list of 5 questions scientists still have about the object/are trying to answer (hint...RSL...). And discussion of future missions planned for exploration of the object.

The assignment should contain necessary images and proper academic referencing. Sources for the project will be presented throughout class lectures, but will most likely entail the official websites of the spacecraft/missions, links found on the course website (Space 2090), academic papers and texts found at Western Library, and even guest presentations. This project is very much about identifying original sources of information for these objects. A news article, or popular book, talking about discoveries is not the original source of the information...but they might lead you to them!

OPTION 2

The Outer Space Treaty is the core of international governance relating to space issues. The treaty has 17 articles which lay out the ideal principles of space operations for all humankind. Since the beginning of the space age, some of these principles have been, or were planned to be, violated by various space faring nations and entities. Prepare a report of 3 instances in which principles within the Outer Space Treaty were, were planned to be, or claimed to be violated by a government or private entity. These can include events that actually occurred before the OST was created, thus anytime between the launch of Sputnik 1 and now (hint...big booms...). The report should cover:

- 1) What was the event/plan, who was responsible, and what were the driving interests?
- 2) Which article of the OST was (perhaps arguably) violated?
- 3) What was the response/aftermath of the event/plan? (Condemnation, new treaties, etc...)
- 4) What are current scholars of international space law and politics saying about these events and other challenges to the OST?

Sources for this project would include academic papers related to the Outer Space Treaty, information from the UNOOSA and other space related organizations, as well as official government documents.

It would be wise to begin the project in the first week or two of the class. Remember, because this is a condensed course, the project is due only 5 weeks after the start of class!

Mental Health

If you or someone you know is experiencing distress, there are several resources here at Western to assist you. Please visit the site below for more information on mental health resources:

<http://www.uwo.ca/uwocom/mentalhealth/>.

Western's commitment to accessibility

The University of Western Ontario is committed to achieving barrier free accessibility for persons studying, visiting and working at Western.

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 Ext. 82147 for any specific question regarding an accommodation.

Support Services

Registration Services: <http://www.registrar.uwo.ca/>

Student Development Services: <http://www.sdc.uwo.ca/>

Accommodation and Medical Absence

For UWO Policy on Accommodation for Medical Illness and a downloadable SMC see:

http://www.uwo.ca/univsec/pdf/academic_policies/appeals/accommodation_medical.pdf

Students seeking academic accommodation on medical grounds for any missed tests, exams, participation components and/or assignments worth 10% or more of their final grade must apply to the Academic Counselling office of their home Faculty and provide documentation.

Academic accommodation cannot be granted by the instructor or department.

Academic Offences (Plagiarism)

Scholastic offences are taken seriously and students are directed to read the appropriate policy, specifically, the definition of what constitutes a Scholastic Offence, at the following Web site:

http://www.uwo.ca/univsec/pdf/academic_policies/appeals/scholastic_discipline_undergrad.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 for such checking 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.