Syllabus
SPACE/AEROSP 581:
Space Policy and Management
Fall 2024 (3 Credits)

An Introduction to Space Policy and Management for Future Space Professionals

Course Description:
This is a graduate course focusing on the policy environment and management considerations for the space industry. The first part of the course will provide detailed information on how space policy is developed in the United States and the international space community, and how these policies result in specific missions and decisions. The second part will provide detailed information on modern management techniques and processes. Policy professionals and project managers from government and industry will guest lecture on the specific policy considerations, management techniques, and current issues in the field.

By the completion of this course, students will:
- have basic understanding of policymaking and its application to space;
- familiarity with the legal, political, and economic perspectives of certain space activities;
- recognize the relationships between government, international, academic, and commercial stakeholders;
- identify and analyze a range of policy situations and solutions; and
- write appropriate policy recommendations to senior government decisionmakers.

Course Prerequisites:
None (Graduate Standing)

Instructors:
Dr. Mike Liemohn, Professor, Department of Climate and Space Sciences and Engineering
Room 1420, Climate and Space Research Building (on North Campus, 2455 Hayward St.)
Email: liemohn@umich.edu

Graduate Student Instructor:
Kathryn Wilbanks, PhD student, Department of Climate and Space Sciences and Engineering
Room 1435, Climate and Space Research Building
Email: kwilban@umich.edu

Class Sessions:
Monday and Wednesday, 4:30 – 6:00 pm, Chrysler Center, room 133 (basement level).

Remote/Hybrid Class:

Most days, there is a zoom option for remotely attending this class. *There are 4 days on which you are required in-class attendance: is the first class session and the 3 policy games days.* See the detailed schedule below for these exact dates.

Because a large part of the course learning experience is during-class activities, discussions, and content, attendance is required and will be monitored via iclicker participation.

Lecture Capture is set up and we will post the videos after each class session.

Attendance Policy:

Attendance is required and contributes to a significant portion of your grade. However, we understand that it's sometimes impossible to come to class due to illness, family emergency, job interviews, or some other reason.

Every class will feature an interactive component, such as a poll, quiz, or free-form response. Attendance data will be pulled from participants in these activities immediately after class and uploaded to Canvas.

You can miss up to FOUR (4) classes (for whatever reason, no questions asked) without it impacting your grade. We believe this is flexible and fair, and do not want to be in the business of managing which absences are excused and which are not (the exceptions are outlined in this syllabus). Please do not email us concerning attendance unless:

A. Your situation is such that you will likely miss more than four classes; or
B. We have incorrectly marked your attendance; or
C. Your absences are covered in the exemptions below.

1. **If you are sick:** *Please* do not come to class sick.
2. **Religious or school-function-related absences:** Please let us know if you expect to miss class due to religious observance or are traveling with a U-M sports team or organization.
3. **Job interviews:** We know that many of you are at or near the end of your schooling and might have job interviews during class time (although not many; we meet late in the day).

For any of these specific reasons, an excused absence may be requested that does not count against the 4 "no excuse" absences above. It is the obligation of students to provide the instructor with reasonable notice of the dates on which they will be absent (*before* they occur). If it is an emergency medical situation, then please seek help, of course, and email us later. We will determine a mutually agreeable alternative timeline within the boundaries of the class for any course deadlines during such absences (usually a shifted deadline).

Somewhat Flipped Class Structure:

You will have readings for each unit. We will have structured Q/A time about each topic, and every class will feature some interactive component designed to elicit discussion opportunities. You will determine a large component of the course sequence because we will poll you on space policy topics you wish to cover.

Office Hours:

Mike's Office Hours: Mondays, 10 AM - Noon, CSRB 1420 (Mike's Office)
Exceptions: canceled for September 23, October 21, and October 28

Kathryn's Office Hours: Mondays and Wednesdays, 1-2 PM, CSRB 2422 (Donahue Room)
Exceptions: room 2424 on September 18 and October 7; canceled on 9/23 and 10/21

iClicker:

This course will utilize iClicker for part of the interactive component. You should come to class with a wireless device such as a phone or laptop. If you do not have access to these, please contact the instructors at the beginning of class. To participate in iClicker polls, you can either use an iOS or Android app, or a web browser. Sign in to the class via https://join.iclicker.com/YWBT using your university email.

Textbook:

There is no textbook, but there are a number of readings that will be assigned. Readings feature two categories: mandatory (you need to read this by the class session) and optional (reading this will provide significant context, expertise, or consideration for the topic, but is not required for the course credit).

Useful Books:

These books will, without question, enhance your understanding of the political and historical environments for the space industry. They are not required for this class, but reading them would be beneficial to your career in this business. All are available through U-M libraries (most in digital format).

1. Whitman Cobb, Wendy N., and Derrick V. Frazier (2024). *Space Policy for the Twenty-First Century*. University of Florida Press, Gainesville, FL.
2. Beattie, Donald A. (2001). *Taking Science to the Moon : Lunar Experiments and the Apollo Program.* Johns Hopkins University Press.
3. Borowitz, Mariel (2017). *Open Space: The Global Effort for Open Access to Environmental Satellite Data*. Cambridge: MIT Press, doi:10.7551/mitpress/10659.001.0001.
4. Bowen, Bleddyn E. (2023). *Original Sin: Power, Technology and War in Outer Space*. Oxford: Oxford University Press, doi:10.1093/oso/9780197677315.001.0001.
5. McDougall, Walter A. (1985). *The Heavens and the Earth : A Political History of the Space Age*. Basic Books.
6. Siddiqi, Asif A. (2000). *Challenge to Apollo : The Soviet Union and the Space Race, 1945-1974*. National Aeronautics and Space Administration, NASA History Division.

Student Learning Assessment Grading Apportionment:

A large component of space policy is convincing others of your position on a topic. Assessing this will be conducted through writing assignments and monitoring in-class activity.

Participation:	40%	(recorded via iclicker cloud)
Policy Memo 1:	10%	(includes draft and peer grading)
Policy Memo 2:	15%	(includes draft and peer grading)
Policy Memo 3:	15%	(includes draft and peer grading)
Management Plan:	20%	(group project at end of the term, includes check-in)

Participation Grade: Every class will feature some interactive component which will be used as the basis for attendance. Full credit will be given for students who have four (4) or fewer unexcused absences. Because attendance and participation is a graded component, any deliberate attempt to circumvent or deceive our attendance procedures will be considered an Honor Code violation.

Writing Assignments: There will be 4 writing assignments in this class. The first 3 are individual, 1-to-2-page-long memos on specific policy prompts. The final assignment will be a small-group project writing a 6-page proposal section on spaceflight hardware management.

Student Collaboration Policy:

We encourage collaboration and peer tutoring, as is expected in a typical workplace. Please help each other learn the material and get through the work. Periodically, you will be expected to formally review your peers. You are encouraged to incorporate both peer feedback and insights derived from your own reviews into your revised products. You will be required to track and list all reviewers to any work product you submit. You will also be required to provide all versions (original submission, any subsequent edits or comments) of deliverables upon final submission. Depending on the circumstance, you may be allowed to use generative large language model (AI/ML/LLM) prompts (such as ChatGPT) to produce work product, but only under specific conditions as permitted by the instructions in which you maintain a log of all inputs and outputs to the text generation engine. You are personally responsible for ensuring that every artifact you turn in clearly represents authorship. You may not claim others' work as your own, including direct quotes and/or ideas.

Failure to abide by the conditions in this policy is taken as an Honor Code violation, and will be reported to the Dean's office. If you have any questions about this policy, please do not hesitate to contact me.

Course Performance to Grade Translation:

This class will not be curved. The grades will be assigned as follows:

A+	97%	B	83%	C-	70%
A	93%	B-	80%	D+	67%
A-	90%	C+	77%	D	63%
B+	87%	C	73%	D-	60%

Normal rounding will apply, so a 96.50 is an A+ and a 96.49 is an A.

Accessibility Requests:

If you think you may need an accommodation for this class, then please contact the Services for Students with Disabilities (SSD) office (https://ssd.umich.edu/) to be issued a Verified Individual Services Accommodation (VISA) form, which should be given to Prof. Liemohn (done electronically now). We will fully accommodate all such requests.

Late Policy:

Assignments are expected to be **submitted by 11:59 pm** on the listed due date.

Because we will be peer reviewing, any late submission may impact our ability to assign reviewers. ***If we do not have your submission in time for peer review assignments, this component will not be graded.***

For due dates other than peer-review or questionnaire deadlines, **late assignments are automatically reduced by 10% per 24-hour period**. There is no grace period.

Except for very rare cases, excused late submissions **must** be requested ***before*** the due date and time. We are still in a pandemic; we will be generous with extensions, but note that your peer review activities are not extendable.

Extra Credit:

There will be one opportunity for optional extra credit near the end of the course: turning in the receipt acknowledging that you filled out the course evaluation. If you upload a screen shot/pic/PDF of the page showing that you submitted it, then you will receive **2%** extra towards your overall course grade. This will not be reflected in Canvas but will be added afterwards.

I highly value your feedback about the course and look forward to reading your comments on what went well and what could be done differently. I strive to improve my teaching skills every term.

Student Mental Health and Wellbeing

If you or someone you know is feeling overwhelmed, depressed, and/or in need of support, then services are available. The first option is talking to a trusted friend or relative. You can also come to us. Our instructional team has an open-door policy. Mike is CLaSP's Rackham Diversity Ally and is ready and willing to listen to your story.

An excellent place to go for help is the College of Engineering CARE Center, https://care.engin.umich.edu/. They are located right next to our classroom, in room 129 of the Chrysler Center. They specialize in talking with engineering students, and if they cannot address your need, they will know how to get you the help you need. For even higher level professional help, please contact Counseling and Psychological Services (CAPS) at 734-764-8312 or online at https://caps.umich.edu. For a listing of University Health Services (UHS) stress and mental health resources, visit https://uhs.umich.edu/stressresources. We are *still* dealing with its repercussions for a long time; please take care of yourself. We are *still* dealing with the repercussions of Covid-19, and will be for a long time, so please take care of yourself.

Student Sexual Misconduct Policy

Title IX prohibits discrimination on the basis of sex, which includes sexual misconduct – including harassment, domestic and dating violence, sexual assault, and stalking. Sexual violence can undermine students' academic success and we encourage anyone dealing with sexual misconduct to talk to someone about their experience, so that they can get the support they need. Confidential support and academic advocacy can be found with the Sexual Assault Prevention and Awareness Center (SAPAC) on their 24-hour crisis line 734-936-3333 and at https://sapac.umich.edu. Alleged violations can be reported to the Office for Institutional Equity (OIE) at insitutional.equity@umich.edu

SPACE 581 Course Outline (Fall 2024)

Date	Topic	Due: @ 11:59 pm
M Aug 26	Introduction to the class	
W Aug 28	A brief history of space exploration	
M Sep 2	**No class**, Labor Day	
W Sep 4	Policy memo basics; introduction to the US government	*Memo #1 assigned*
M Sep 9	The US budget process	
W Sep 11	Policy memo examples	
M Sep 16	**Required in-class attendance:** budget negotiation RPG	Policy Memo #1 - Draft
W Sep 18	In-class peer grading of Policy Memo #1	
M Sep 23	Overview of the NASA ecosystem	Peer grading of Memo #1
W Sep 25	NASA Policy Directives; the intraoffice memo	*Memo #2 assigned*
M Sep 30	NASA Policy Advisory Structure	Policy Memo #1 - Final
W Oct 2	NASA Decadal Survey process	
M Oct 7	**Required in-class attendance:** decadal survey RPG	
W Oct 9	Introduction to international space, space conflicts	Policy Memo #2 - Draft
M Oct 14	**No class**, Fall Term Break	
W Oct 16	The Outer Space Treaty and historical international space	Peer gr' #2, *#3 assigned*
M Oct 21	**No class**, both Liemohn and Wilbanks are busy	
W Oct 23	The ISS treaty and modern international space relations	Policy Memo #2 - Final
M Oct 28	Don Moore, U-M Law School: space law	
W Oct 30	ARTEMIS Accords and spaceflight to the Moon	
M Nov 4	**In-class only (no zoom):** international treaty RPG	Policy Memo #3 - Draft
W Nov 6	Introduction to spaceflight project management	*Group Project Assigned*
M Nov 11	Key elements of a project management proposal section	Peer grading of Memo #3
W Nov 13	Spaceflight-specific NPRs; Pat McNally, SPRL: management	
M Nov 18	Stephanie Gowell, Airbus US: commercial space	Policy Memo #3 - Final
W Nov 20	Peter Tchoryk, Michigan Aerospace: comm. space. manag.	
M Nov 25	Genene Fisher, NASA OIIR: international relations	Group Project Check-In
W Nov 27	**No class**, Thanksgiving break	
M Dec 2	Nathan Boll, NASA SMD: insider policy analyst Cole Heckathorn, SPRL: space project management	
W Dec 4	Charles Powell, US Space Force: military space policy	
M Dec 9	**No class** (instructors at the AGU Meeting)	Group Project Reports

SPACE 581: Space Policy and Management
Course Conduct Statement

Prof. Mike Liemohn liemohn@umich.edu

The College of Engineering has an honor code. This is taken seriously.
See the website: http://www.engin.umich.edu/students/honorcode/code/

Policy on Writing Assignments

You are encouraged to form study groups to work on writing assignments and to study in other ways. You are allowed to consult with other students during the conceptualization of a problem. However, all written work, whether in scrap or final form, is to be generated by you alone. You are not allowed to possess, look at, use, or in any way derive advantage from the existence of solutions prepared in prior years, whether these solutions were former students' work product or copies of solutions that had been made available by others.

For those needing special accommodations, please provide me with the proper form so that arrangements can be made.

Policy on In-Class Participation

Every class will feature some interactive component which will be used as the basis for attendance. Because attendance and participation is a graded component, any deliberate attempt to circumvent or deceive our attendance procedures will be considered an Honor Code violation.

Violations

Violation of this policy is grounds for the initiation of a report filed with the Dean's office and the case would come before the Honor Council of the College of Engineering. If you have any questions about this policy, please do not hesitate to contact me.