

Space Environment

SPSM-5000

S1 2022 Section 36 3 Credits 01/10/2022 to 03/11/2022 Modified 12/06/2021

Meeting Times

Weekly

Tuesday, 17:30 to 21:30, Colorado Springs Campus (Via WebNet/Zoom)

Term: Spring 1; 10 Jan2022 - 11 March 2022

Tuesday Evenings; 5:30 PM - 9:30 PM, Mountain Standard Time (Denver)

First Class: Tuesday, 11 Jan 2022

Last Class: Tuesday, 8 March 2022

Location: This class will be presented primarily via the Zoom platform. However, on the first night (11 Jan '22) I plan to conduct Session #1 from campus, if COVID-19 restrictions permit.

As the Term progresses, we will evaluate the option of moving the class to campus, while maintaining the Zoom option for either remote students or students whom may be responding to local/individual circumstances driven by COVID-19. Plan on flexibility throughout the Term. Both local (Colorado Springs) and remote students should plan of having the capability of attending via Zoom, as circumstances warrant. Local students should have the capability of on-campus attendance, as required.

All classes will be interactive, with Video and Audio, Students will need a camera, microphone and speakers to take this class
*See Note on textbook below; we are shifting to the 4th edition (2015) of the textbook (Sellers, "Understanding Space").
4th edition ISBN 13: 978-0-9904299-4-4*

Zoom Sessions:

<https://webster-edu.zoom.us/>

Note: This is webster-DASH-edu.zoom.us; note the "DASH" is not a "DOT")

When Joining my meetings:

This Class will be @ <https://webster-edu.zoom.us/j/95232393453> (<https://webster-edu.zoom.us/j/95232393453>)

Meeting ID: 952 3239 3453

SPSM 5000 The Space Environment

Description: Weekly Sessions of SPSM 5000 for Webster University, Colorado Springs Metro Campus. Same link every week.

I will generally open the Zoom room ~15 mins before scheduled class start.

All Times Shown are US Mountain Time (Denver)

Contact Information

Professor

Ken Youden, 719-331-8673 (Cell)

kendrickyouden@webster.edu

ken.youden@gmail.com

719-552-1616(Daytimeoffice)

Description

Students will examine the concepts and terminology of the space environment, including the ionosphere, the magnetosphere, radiation, human factors and limitations, solar effects, near-Earth and deep space operations, propulsion systems, satellite communications systems, spacecraft design, ground control and supporting infrastructures, manning, technical support, outsourcing, and large-scale long-term space operations. The orbital elements within the space environment and the broad range of parameters and constraints of navigation and operations in space are explored. Students are introduced to the mathematics of orbital mechanics and determination techniques, and learn how to calculate orbital parameters.

Requisites

None

Outcomes

The student will:

- Develop an understanding and working knowledge of space terms and phraseology.
- Acquire a broad understanding of the space environment, space operating principles and general applications of space technology.
- Demonstrate a basic working knowledge of orbital mechanics and the associated math.
- Comprehend the roles, responsibilities, and tools of a space system manager.
- Acquire a basic knowledge of spacecraft subsystems and the survivability of the human element.
- Gain an understanding of the basics of the Department of Defense (DoD) Acquisition system.
- Assess their ability to handle the math, critical decision making and technical management skills.
- Conduct and produce graduate level research papers and practice oral presentation methods.
- Demonstrate their understanding and proper application of APA.
- Develop skills in the use of common graduate program technologies – PowerPoint, Internet, Passports, e-Reserves, Connections and Turnitin.
- Understand the challenges of the Space Systems Operations Management (MS) program and the importance of thinking about the capstone course in terms of research focus or projects that can demonstrate their ability to synthesize and integrate the learning experiences acquired in space operations and to evaluate current topics relative to this major.

Required Textbook

Understanding Space

Author: Sellers

Publisher: Learning Solutions

Edition: 3rd

ISBN: 978-0073407753

Evaluation

Deliverable	Description	Max Points	Max Points	When
Research Description	Brief paragraph describing research topic title and intent (thesis)	50	50 (5%)	Week 3 (25 Jan 2022)
Midterm Exam	Exam will cover Weeks 1 - 4, inclusive (see schedule below)	350	350 (35%)	Week 5 (8 Feb 2022)

Presentation	7 - 10 minute presentation to Instructor and fellow students on your research findings. Presentation may be either via Zoom or on campus, depending on Class Schedule (COVID-19 status will require flexibility throughout the Term)	150	150 (15%)	Weeks 7 & 8: (22 Feb & 1 March '22) ~50 % of students will be scheduled in Week in Week 8. Note: If Class is less than 10 or less, we may place all students in Week 8
Research Paper	Deliverable will be a Research Paper on a relevant topic from Space Operations and Management field. Paper will be formatted per current American Psychological Association (APA) standards, per Webster University practices. Paper may be connected with the student's professional experience or personal interest, as appropriate. Body of the paper will be 7 - 9 pages. Research will form the core of the student presentation (see above)	250	250 (25%)	Research papers are due at the beginning of March 22).
Final Exam	Exam will cover Weeks 5 - 8, inclusive (see schedule below)	150	150 (25%)	Week 9 (8 March 2022)
Participation	Williness to contribute to class discussions	50	50 (5%)	Weekly, Weeks 1 - 9
Total Potential Points:		1000		

Schedule

Spring 1 2022: SPSM 5000 SCHEDULE						
Week	Date	Broad Topic	Sub-Topics	Text Chapters	Supplemental Material	Specific Chapter Sections
1	11-Jan-22	Foundational Material	Why Study Space?	1, 2, 16	None	Full Chapters
			Space Mission Architecture			
			Brief History of Astronomy			
			The Space Enterprise			
			Newton's 3 Laws: A Review	Chapter 4		Section 4.2 Only
2	18-Jan-22	The Space Environment	A Cosmic Perspective Where is Space? The Solar System The Cosmos	3	None	Full Chapter
			Space Environment And Spacecraft			
			Living And Working In Space			

3	25-Jan-22	Fundamentals of Space Dynamics	Orbits and Orbital Motion Classical Orbital Elements (COEs) (Ch 5) Holman Transfers (Ch 6)	4, 5, 6	None	Chapter 4 (Full) Chapter 5: Sections 5.1 only Chapter 6: Sections 6.1; 6.2; 6.3
4	1-Feb-22	Propulsion Principles	Orbital Perturbations (Ch 8) Rocket Science (Ch 14) Jeopardy Round #1 Issue Mid-Term (After Class)	8, 14	None	Ch 8: 298 – 304 Ch 9: 317 – 326 Ch 14: 639 - 665
5	8-Feb-22	Weeks 1 - 4	Midterm		None	
6	15-Feb-22	Space Systems Management	Systems Engineering Project/Program Management	11		Sections 11.1 & 11.2 (pgs 387-452)
7	22-Feb-22	Spacecraft Control & Spacecraft Navigation Systems Midterm	Remote Sensing Control Systems Attitude Control	12	None	Ch 12: 481-512
8	1-Mar-22	Space Systems Survivability	Environmental Control And Life Support Subsystem (ECLSS) Structures And Mechanisms Student Presentations Jeopardy Review Issue Final (After Class)	13		Sections 13.4 and 13.5
9	8-Mar-22	Final Exam	None			Weeks 5 - 9

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* Course Policies

Institutional Policies

Academic Policies

Academic policies provide students with important rights and responsibilities. Students are expected to familiarize themselves with all academic policies that apply to them. Academic policies for undergraduate students can be found in the Undergraduate Studies Catalog; graduate students should review the Graduate Studies Catalog.

Undergraduate Studies Catalog

The Undergraduate Studies Catalog contains academic policies that apply to all undergraduate students. The *academic policies and information* section of the catalog contains important information related to **attendance, conduct, academic honesty, grades, and more**. If you are an undergraduate student, please review the catalog each academic year. The current Undergraduate Studies Catalog is at:

<http://www.webster.edu/catalog/current/undergraduate-catalog/> (<http://www.webster.edu/catalog/current/undergraduate-catalog/>)

Graduate Studies Catalog

The Graduate Studies Catalog contains academic policies that apply to all graduate students. The *academic policies* section of the catalog contains important information related to **conduct, academic honesty, grades, and more**. If you are a graduate student, please review the catalog each academic year. The current Graduate Studies Catalog is at:

<http://www.webster.edu/catalog/current/graduate-catalog/> (<http://www.webster.edu/catalog/current/graduate-catalog/>)

Grading

The Grades section of the academic catalog outlines the various grading systems courses may use, including the information about the final grade reported for this class.

Undergraduate

<http://www.webster.edu/catalog/current/undergraduate-catalog/academic-policies.html#grading>
(<http://www.webster.edu/catalog/current/undergraduate-catalog/academic-policies.html#grading>)

Graduate

<https://webster.edu/catalog/current/graduate-catalog/academic-policies.html#gradingsystem>
(<https://webster.edu/catalog/current/graduate-catalog/academic-policies.html#gradingsystem>)

Incomplete

There are important policies that govern grades of Incomplete (I), including the circumstances under which Incomplete grades are granted, deadlines for completion, and consequences should the remaining course work not be completed. It is the responsibility of a student who requests an Incomplete to ensure that they understand and follow the policies.

Grade Appeals

Instructors are responsible for assigning grades, and student should discuss grade issues with the instructor. Policies and procedures for appealing grades are available in the appropriate catalog.

Academic Honesty Policy

Webster University is committed to academic excellence. As part of our Statement of Ethics, we strive to preserve academic honor and integrity by repudiating all forms of academic and intellectual dishonesty, including cheating, plagiarism and all other forms of academic dishonesty. Academic dishonesty is unacceptable and is subject to a disciplinary response. Students are

encouraged to talk to instructors about any questions they may have regarding how to properly credit others' work, including paraphrasing, quoting, and citation formatting. The university reserves the right to utilize electronic databases, such as Turnitin.com, to assist faculty and students with their academic work.

The university's Academic Honesty Policy is published in academic catalogs:

Undergraduate

<http://www.webster.edu/catalog/current/undergraduate-catalog/academic-policies.html>
(<http://www.webster.edu/catalog/current/undergraduate-catalog/academic-policies.html>)

Graduate

<http://www.webster.edu/catalog/current/graduate-catalog/academic-policies.html>
(<http://www.webster.edu/catalog/current/graduate-catalog/academic-policies.html>)

As a part of the university commitment to academic excellence, the Reeg Academic Resource Center provides student resources to become better acquainted with academic honesty and the tools to prevent plagiarism in its many forms:

<https://websteru.sharepoint.com/sites/AcademicIntegrityAtWebster>
(<https://websteru.sharepoint.com/sites/AcademicIntegrityAtWebster>)

Statement of Ethics

Webster University strives to be a center of academic excellence. The university makes every effort to ensure the following:

- The opportunity for students to learn and inquire freely
- The protection of intellectual freedom and the rights of professors to teach
- The advancement of knowledge through scholarly pursuits and relevant dialogue

To review Webster University's statement of ethics, see the Undergraduate Studies Catalog and the Graduate and Studies Catalog:

Undergraduate

<http://www.webster.edu/catalog/current/undergraduate-catalog/overview.html#ethics>
(<http://www.webster.edu/catalog/current/undergraduate-catalog/overview.html#ethics>)

Graduate

<http://www.webster.edu/catalog/current/graduate-catalog/ethics.html> (<http://www.webster.edu/catalog/current/graduate-catalog/ethics.html>)

Contact Hours for this Course

It is essential that all classes meet for the full instructional time as scheduled. A class cannot be shortened in length. If a class session is cancelled for any reason, the content must be covered at another time.

Important Academic Resources

Academic Accommodations and Support

At Webster University, we understand that all students learn differently and may have specific, often differing, learning needs. Some examples are doing rather than watching, being active instead of sitting still, and taking frequent breaks. For others, the professor needs to speak louder, give more clear instructions, and be understanding with health issues. Regardless of what makes learning easier for you, our goal is to provide the most accessible learning environment possible for each student. If there are any specific needs you'd like to make your instructors personally aware of, including any academic accommodations, please reach out to them directly.

Webster University supports students in several ways. Students with academic/learning, health, physical, and psychological disabilities and students who have accessibility concerns can reach out to Webster's Academic ADA Coordinator at disability@webster.edu. You can also reach out if you have any questions relating to accessibility.

Online resources through WorldClassRoom (Canvas) have a variety of accessibility tools, provided through a program called Ally, for both students and faculty. Ally is free and already incorporated into WorldClassRoom. It helps students who have visibility and

attention challenges; who need easier access to course materials from mobile phones, tablets, electronic readers, etc.; or who need or prefer file types different from the format uploaded by the instructor. You can find more information about Ally at <https://webster.edu/online/ally.php> (<https://webster.edu/online/ally.php>).

Life circumstances can make focusing on education, or anything else, difficult. For this reason, several additional resources and services are available to students at no cost:

1. Reeg Academic Resource Center (<https://websteru.sharepoint.com/sites/ReegARC> (<https://websteru.sharepoint.com/sites/ReegARC>))
 - Academic Counseling: academiccounseling@webster.edu
 - Assistive Technology: atacr@webster.edu
 - Disability Accommodations: disabilty@webster.edu
 - Testing Center: arc@webster.edu
 - Tutoring: tutoring@webster.edu
 - Writing services: writing@webster.edu
2. Counseling and Life Development (<https://www.webster.edu/student-counseling.php> (<https://www.webster.edu/student-counseling.php>)): 314-968-7030 or counselingld@webster.edu (these contact methods are non-confidential, but appointments are confidential)

Lastly, circumstances change. If, at any point throughout your education, you find that something is making learning difficult for you, please reach out to your instructor directly and/or to Webster's ADA team. It is never too late to ask for accommodations. We entirely support you and want you to have the best and most accessible education possible.

Student Success Portal

Webster University's Student Success Portal, powered by Starfish, is a communications tool to connect students with faculty members and campus support services. It allows faculty and staff members to communicate with you regarding academic achievements as well as areas where support may be helpful. You may use the portal to contact faculty and staff members for assistance and to arrange meetings. Activity in the portal will be communicated to your Webster University email account. The Student Success Portal is available via your course home page in WorldClassRoom or via Connections. Learn more about the Student Success Portal at <https://www.legacy.webster.edu/success/students.html>. (<https://www.legacy.webster.edu/success/students.html>)

University Library

Webster University Library is dedicated to supporting the research needs and intellectual pursuits of students throughout the university's worldwide network. Resources include print and electronic books, journal articles, online databases, DVDs and streaming video, CDs and streaming music, datasets, and other specialized information. Services include providing materials at no cost and research help for basic questions to in-depth exploration of resources. The gateway to all of these resources and services is <http://library.webster.edu> (<http://library.webster.edu>). For support navigating the library's resources, see <http://libanswers.webster.edu/> (<http://libanswers.webster.edu/>) for the many ways to contact library staff.

Drops and Withdrawals

Drop and withdrawal policies dictate processes for students who wish to unenroll from a course. Students must take proactive steps to unenroll; informing the instructor is not sufficient, nor is failing to attend. In the early days of the term or semester, students may DROP a course with no notation on their student record. After the DROP deadline, students may WITHDRAW from a course; in the case of a WITHDRAW, a grade of W appears on the student record. After the WITHDRAW deadline, students may not unenroll from a course. Policies and a calendar of deadlines for DROP and WITHDRAW are at:

Undergraduate

<http://www.webster.edu/catalog/current/undergraduate-catalog/enrollment.html>
(<http://www.webster.edu/catalog/current/undergraduate-catalog/enrollment.html>)

Graduate

<http://www.webster.edu/catalog/current/graduate-catalog/enrollment.html>
(<http://www.webster.edu/catalog/current/graduate-catalog/enrollment.html>)

Academic Calendar - <http://www.webster.edu/academics/academic-calendar/>
(<http://www.webster.edu/academics/academic-calendar/>)

Current tuition rates, policies, and procedures, including details of pro-rated tuition refunds, are available in the "Tuition, Fees, and Refunds" section of Webster's Academic Catalogs:

Undergraduate

<http://www.webster.edu/catalog/current/undergraduate-catalog/tuition.html>
(<http://www.webster.edu/catalog/current/undergraduate-catalog/tuition.html>)

Graduate

<http://www.webster.edu/catalog/current/graduate-catalog/tuition.html> (<http://www.webster.edu/catalog/current/graduate-catalog/tuition.html>)

Student Handbook and Other Important Policies

Student handbook and other non-academic policies may apply to you and may impact your experience in this class. Such policies include the student code of conduct, privacy, technology and communications, and more. Please review the handbook each year and be aware of policies that apply to you. The handbook is available at:

<http://www.webster.edu/student-handbook/> (<http://www.webster.edu/student-handbook/>)

Sexual Assault, Harassment, and Other Sexual Offenses

Webster University makes every effort to educate the community to prevent sexual assault, harassment, and other sexual offenses from occurring, and is committed to providing support to those affected when this behavior does occur. To access information and resources or to review the Policy on Sexual Assault, Harassment, and Other Sexual Offenses, visit:

<https://webster.edu/titleix/policy.php> (<https://webster.edu/titleix/policy.php>)

Research on Human Subjects

The Webster University Institutional Review Committee (IRB) is responsible for the review of all research on human subjects. The IRB process applies to all Webster University faculty, staff, and students and must be completed prior to any contact with human subjects. For more information on the IRB, visit:

<https://www.legacy.webster.edu/irb/> (<https://www.legacy.webster.edu/irb/>)

Course Evaluations

At the end of this course, you will have the opportunity to provide feedback about your experience. Your input is extremely valuable to the university, your instructor, and the department that offers this course. Please provide your honest and thoughtful evaluation, as it helps the university to provide the best experience possible for all of its students.

Important Technology Information

Connections Accounts

Webster University provides all students, faculty, and staff with a University email account through Connections. Students are expected to activate their Connections account and regularly check incoming university email. Students may choose to have their University email forwarded to an alternate email address. Connections account holders can call the Help Desk (314-246-5995 or toll free at 1-866-435-7270) for assistance with this setup. Instructions are also provided on the Information Technology website at:

<https://www.webster.edu/technology/service-desk/> (<http://www.webster.edu/technology/service-desk/>)

WorldClassRoom

WorldClassRoom is Webster's Learning Content Management System (LMS). Your instructor may use WorldClassRoom to deliver important information, to hold class activities, to communicate grades and feedback, and more. WorldClassRoom is available using your Connections ID at:

<https://worldclassroom.webster.edu/> (<https://worldclassroom.webster.edu/>)

Webster Alerts

Webster Alerts is the university's preferred emergency mass notification service, available free to current students, faculty and staff at all US campuses. By registering a valid cell phone number and email address, you will receive urgent campus text, voice mail and email communications. Valuable information concerning a range of incidents affecting you - from weather-related campus closures, class delays and cancellations, to more serious or life-threatening events - are immediately and simultaneously delivered through multiple communication channels. To register for Webster Alerts, visit ([sign with your university-provided email and password](#)):

<https://www.getrave.com/login/webster> (<https://www.getrave.com/login/webster>)

Campus Information
