

EMBRY-RIDDLE

Aeronautical University

WW-MSPO 512

Space Mission and Launch Operations

Online Course Syllabus

Worldwide 2022-05 May

Course Information

Credit Hours: 3

Delivery Method: Online (Internet/Canvas)

Instructor Information

Name

[REDACTED]

Email

[REDACTED]

Required Course Materials

Title: Publication Manual of the American Psychological Association - (APA)

ISBN: 978-1433832161 Paperback

ISBN2: 978-1433832185 eBook

Authors: American Psychological Association

Publisher: American Psychological Association

Publication Date: 2019

Edition: 7th

Format: Manual

Catalog Course Description

This course introduces the student to launch, mission operations, and facilities for manned and unmanned missions at U.S. and foreign sites. Satellite and spacecraft launch facility system discussion covers safety, meteorology, communications, and tracking, as well as navigation and control systems. Examples of mission control, operations, and systems include spacecraft project descriptions and control site operations. U.S. mission operations will include NASA, DoD, and commercial space operations and launch sites. Legacy spacecraft operations including the Space Shuttle (STS) and Russian Soyuz are examined along with future commercial space transportation programs.

Prerequisite(s): None

Course Goals

Provide an introduction to basic astronautics theory and mission scenarios. The topics covered will include: the space environment; spacecraft launch, mission, and entry operations; orbital mechanics; spacecraft systems and design; emerging commercial spaceflight development in the U.S.; past and future space exploration efforts. Special emphasis is placed on International Space Station and STS operations to illustrate mission elements and spacecraft systems. NASA's strategic planning process is examined along with future programs such as the Orion Crew Vehicle and the Space Launch System which will replace or enhance legacy programs such as the Space Shuttle and International Space Station. The emerging commercial launch market supporting NASA and DoD missions, such as United Launch Alliance (ULA) and Orbital Sciences, is examined along with the rapid development of an emerging space tourist industry initiated by the winning of the X-Prize by Scaled Composites and Virgin Galactic.

Student Learning Outcomes

1. Compare the providers of mission planning, launch services, and spacecraft used for commercial, civilian (NASA), and DoD missions conducted from U.S. and foreign launch sites.
2. Analyze how the space environment and orbital mechanics affect mission type and definition.
3. Evaluate the mission scenarios including suborbital, orbital, interplanetary and how near Earth and deep space missions are affected by funding sources from civilian, governmental, and international sources.
4. Analyze the mission design requirements for human spaceflight.
5. Apply the necessary international and U.S. regulatory procedures for mission planning including from the United Nations (USOOSA) and the FAA's office of Commercial Space Flight.
6. Evaluate how unmanned Mars missions have contributed towards the goal of a manned mission to Mars.
7. Compare the operations and organization of world mission control and launch operations, including the U.S., Russia, China, N. Korea, India.
8. Evaluate the elements of a space mission including regulatory issues, launch control, range safety, mission operation functions, and the process for developing a mission operations plan.
9. Case studies of launch systems, satellites, and mission control for commercial, NASA, and DoD missions - SpaceX Dragon and Falcon; Virgin Galactic, Bigelow, and Boeing's Orion.
10. Apply the necessary planning steps for mission planning, launch integration, launch and flight elements for a current mission.
11. Demonstrate appropriate selection and application of a research method and statistical analysis (where required), specific to the course subject matter.

Grading

Scale	Grade
90 - 100	A (Excellent)
80 - 89	B (Satisfactory)
70 - 79	C (Passing)
Below 70	F (Failure)

Evaluation Items & Weights

Percentages

Executive Summary	30%
Research Project: Deliverables	30%
Research Project: Final Submission	30%
Research Project: Presentation	10%
Total	100%

Executive Summary

The Executive Summary Presentation is a quick-reaction, small project that examines a specific topic in detail, often related to a technical, financial, or safety issue in space operations. This activity is a fast turnaround presentation similar to an executive summary given to public, private, and government decision-makers. In this course, you will pick one of the three focus areas Commercial Space Operations, Public Space Operations, or Military Space Operations and compose a short video presentation focusing on a specific issue within the focus area.

Research Project

During the course, you will develop a research project based on a real-world scenario. The research project is more than a simple report; it is an in-depth analysis and evaluation of current literature culminating in the creation of an original and authentic space mission. The research project mimics an actual scenario where students, recently hired by a think tank, are tasked with developing a space mission for a new commercial start-up. The project will culminate in the form of a research paper and presentation.

Disability and Special Needs

ERAU-WW is committed to the success of all students. It is a University policy to provide reasonable accommodations to students with disabilities, who qualify for services. If you would like to request accommodations due to a physical, mental or learning disability, please contact the Disability Services Support Office at 386-226-7334 or via email at wwdss@erau.edu. ALL DISCUSSIONS ARE CONFIDENTIAL.

Additional Information

APA Format

It is required for all submitted papers (research, case studies, essays, etc.) that students follow the **most current** APA format according to the [*American Psychological Association Publication Manual*](#).

For all graded activities *other than papers* that require APA elements, students must include APA-formatted in-text citations and associated reference sources according to the [APA Manual](#).

For more information regarding the *American Psychological Association Publication Manual* formatting, reference the [APA website](#).

Library

Embry-Riddle Aeronautical University has one of the most complete library collections of aviation-related resources in the world. The Hunt Library is the library for all Worldwide students regardless of location. For help finding resources for your assignment, project, or topic, or to learn more about the library services available to you, please contact our librarians using the following information:

- [Hunt Library Worldwide: Information, Services, Help](#)
 - [Library Basic Training](#)
 - [Ask-a-Librarian](#)
 - [Library Hours](#)
- Contact Information
 - Email: library@erau.edu

Title IX

[Title IX of the Education Amendments of 1972](#) ("Title IX") is a Federal civil rights law that prohibits discrimination on the basis of sex in education programs and activities. All public and private elementary and secondary schools, school districts, colleges, and universities receiving any Federal funds must comply with Title IX.

The Title IX Office oversees compliance of Title IX Sexual Harassment in accordance with Federal Regulations as well as incidents falling under the University Sexual Misconduct policy. Policy violations can include sexual harassment or sexual violence, such as rape, sexual assault, sexual misconduct, sexual battery, sexual coercion, and stalking.

Anyone **may** report suspected or known violations directly to the Title IX Office. However, there are certain persons / offices who **must** report incidents to the Title IX Office (mandatory). Those are Campus Safety & Security, Dean of Students (or designee), Vice President of Human Resources (or designee). Please refer to the policy and/or contact the Title IX Office for more specifics related to filing a report.

Phone: 386/226-6677; 386/481-9131; 386/241-1881

Email: wwtitle9@erau.edu or meyerspa@erau.edu

Website: <https://worldwide.erau.edu/administration/diversity>

Form: [Online Complaint Form](#)

Course Policies

Academic Integrity

Embry-Riddle is committed to maintaining and upholding intellectual integrity. All students, faculty, and staff have obligations to prevent violations of academic integrity and take corrective action when they occur. The adjudication process will involve imposing sanctions which may include, but are not limited to, a failing grade on the assignment, a failing grade in a course, suspension, or dismissal from the University, upon students who commit the following academic violations:

1. **Plagiarism:** Presenting the ideas, words, or products of another as one's own. Plagiarism includes use of any source to complete academic assignments without proper acknowledgment of the source. Reuse or resubmission of a student's own coursework if previously used or submitted in another course, is considered self-plagiarism, and is also not allowed under University policy.
2. **Cheating:** A broad term that includes, but is not limited to, the following:
 1. Giving or receiving help from unauthorized persons or materials during examinations.
 2. The unauthorized communication of examination questions prior to, during, or following administration of the examination.
 3. Collaboration on examinations or assignments expected to be, or presented as, individual work.
 4. Fraud and deceit, that include knowingly furnishing false or misleading information or failing to furnish appropriate information when requested, such as when applying for admission to the University.

Note: The Instructor reserves the right to use any form of digital method for checking plagiarism. Several electronic systems are available and other methods may be used at the Instructor's discretion.

Online Learning

This course is offered through Embry-Riddle Online (Canvas) and runs nine (9) weeks. The first week begins the first day of the term and ends at midnight EDT/EST (as applicable) seven days later. Please note that all assignments, unless otherwise indicated, are due by 11:59p.m. EDT/EST on the date shown. Success in this course requires in-depth study of each module as assigned, timely completion of assignments, and regular participation in forum discussions.

Late work should be the exception and not the rule and may be downgraded at the

discretion of the Instructor, if accepted at all. Unless all work is submitted, the student could receive a failing grade for the course. Extensions may be granted for extenuating circumstances at the discretion of the Instructor and only for the length of time the Instructor deems appropriate. The most important element of success in an online course is to communicate with your Instructor throughout the term.

Conventions of “online etiquette,” which include courtesy to all users, will be observed. Students should use the Send Message function in Canvas for private messages to the Instructor and other students. The class discussion forums are for public messages.

It is highly recommended that students keep electronic copies of all materials submitted as assignments, discussion posts and emails, until after the end of the term and a final grade is received. When posting responses in a discussion forum, please confirm that the responses have actually been posted after you submit them.

Course Schedule

Module 1 - Introduction to Space Mission and Launch Operations: The Missions, Companies, and Nations of Space Operations

- 1.1 - Introduce Yourself
- 1.2 - Readings and Resources
- 1.3 - Research Project Criteria
- 1.4 - Executive Summary Criteria
- 1.5 - Research Project: Brainstorming

Module 2 - The Space Mission Design Process

- 2.1 - Readings and Resources
- 2.2 - Research Project: Topic Selection
- 2.3 - Executive Summary: Boost

Module 3 - Orbital Mechanics and the Space Environment

- 3.1 - Readings and Resources
- 3.2 - Executive Summary: Liftoff
- 3.3 - Research Project: Annotated Bibliography

Module 4 - Launch, Orbit, and Re-Entry Operations

- 4.1 - Readings and Resources
- 4.2 - Executive Summary: Presentation Submission
- 4.3 - Research Project: Title Page and Thesis Statement

Module 5 - Mission Regulations, International Treaties, and Budget

5.1 - Readings and Resources

5.2 - Research Project: Annotated Outline

5.3 - Executive Summary Presentation "Around the Room" Discussion

Module 6 - Commercial Space Operations: Sub-Orbital, Orbital, and Beyond

6.1 - Readings and Resources

6.2 - Research Project: Rough and Draft Peer-Review Submission

6.3 - Executive Summary Presentation "Around the Room" Discussion

Module 7 - Civil Space Exploration: A Case for Moon, Mars and Deep Space Missions

7.1 - Readings and Resources

7.2 - Executive Summary Presentation "Around the Room" Discussion

7.3 - Research Project: Rough Draft Peer Review

Module 8 - Military Space and Intelligence Operations

8.1 - Readings and Resources

8.2 - Executive Summary Presentation "Around the Room" Discussion

8.3 - Research Project: Final Submission

Module 9 - The Future of Space Mission and Launch Operations

9.1 - Readings and Resources

9.2 - Research Project: Presentation

Summary

- The below summary is provided for reference only. It is not considered part of the official Syllabus and is subject to change as assignments are published and unpublished to meet course needs. The links below are provided for quick access to graded activities in Canvas.
- Before you begin the course, read the Important Course Information and other items in the Start Here module. If you have any questions, please contact your instructor.
- Visit the Modules area for an overview of the course structure and direct navigation to all course content.
- All assignments due by 11:59 pm ET.

Date Due	Name (link)	Event Type	Points
5/29	1.5 - Research Project: Brainstorming	Discussion	100
6/5	2.2 - Research Project: Topic Selection	Assignment	100
6/12	3.3 - Research Project: Annotated Bibliography	Assignment	100
6/19	4.3 - Research Project: Title Page and Thesis Statement	Assignment	100
6/26	5.2 - Research Project: Annotated Outline	Assignment	100
7/3	6.2 - Research Project: Rough and Draft Peer Review Submission (PLG2)	Assignment	100
7/10	7.3 - Research Project: Rough Draft Peer Review	Discussion	100
7/17	8.3 - Research Project: Final Submission (PLG1)	Assignment	100
7/24	9.2 - Research Project: Presentation	Discussion	100

Date Due	Name (link)	Event Type	Points
8/28	Executive Summary	Discussion	100
	1.1 - Introduce Yourself	Discussion	0
	Student Lounge	Discussion	0
	Online Office	Discussion	0

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