

SPST619

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Course Summary

Course : SPST619 **Title :** The Psychology and Physiology of Space

Length of Course : 8

Prerequisites : SPST500, SPST501 **Credit Hours :** 3

Description

Course Description: CORE COURSE: A review of the major stresses, tensions, and other physical and mental issues experienced by humans on entering in and living in space. Case studies from manned flights and other research will be provided. Students will study how the mental and physical issues may be addressed for future increased human activity in space. Prereq: SPST500 and SPST501

Course Scope:

At the end of this course you will have a firm understanding of the key concepts and basic theories of the psychology and physiology of human spaceflight.

Objectives

Space presents humans with the harshest of environments within which to both live and explore. The impact of the myriad of physical and mental challenges associated with human space travel will be introduced. After successfully completing this course, you will be able to:

CO-1 Discuss the hazards of ionizing radiation to human DNA molecules and the potential long-term consequences.

CO-2 Describe the impact of the space environment on human physiology, including the neurovestibular, musculo-skeletal and cardiovascular systems.

CO-3 Describe the psychosocial issues associated with human spaceflight and the methods of providing psychological support to crewmembers.

CO-4 Discuss the current countermeasures employed to minimize the impacts of the space environment, especially during long-duration spaceflight.

CO-5 Describe the medical risks of performing an extravehicular activity (EVA), especially decompression sickness (DCS), and the necessary countermeasures.

CO-6 Discuss the challenges of providing an adequate diet during long-duration spaceflight and the important role of nutrition in available countermeasures.

CO-7 Discuss the strategies and facilities for providing health care and medical treatment during spaceflight.

Outline

Week 1: Space Life Sciences and Space Biology, Radiation Hazards

Learning Objective(s)

LO-1: Understand the roles of space physiology and space medicine in the Space Life Sciences field.

LO-2: Describe ionizing radiation and examine its effects on DNA molecules.

Reading(s)

Buckey: Chapter 3

Clément: Chapter 1, Chapter 2 & Chapter 8 (section 8.3.5)

Week 1 Lesson Module

Assignment(s)

Week 1 (Virtual Introductions) Forum

Exam #1

Week 2: The Neurovestibular System in Space, Space Motion Sickness (SMS)

Learning Objective(s)

LO-3: Examine the effects of microgravity on the neurovestibular system, including SMS and its possible causes.

LO-4: Describe possible countermeasures for neurovestibular issues.

Reading(s)

Buckey: Chapters 6 & 9

Clément: Chapter 3

Week 2 Lesson Module

Assignment(s)

Exam #2

Forum 2 (Initial Post)

Week 3: The Musculo-skeletal System in Space, Nutrition

Learning Objective(s)

LO-5: Examine the effects of microgravity on the musculo-skeletal system, especially bone calcium loss and muscle atrophy. Describe possible countermeasures.

LO-6: Describe the nutritional issues associated with spaceflight.

Reading(s)

Buckey: Chapters 1, 4 & 8

Clément: Chapter 5

Week 3 Lesson Module

Assignment(s)

Exam #3

Forum 2 (Replies)

Week 4: The Cardiovascular System in Space, Extravehicular Activity (EVA)

Learning Objective(s)

LO-7: Examine the effects of microgravity on the cardiovascular system, including the effects of fluid shift and concerns of orthostatic intolerance. Describe possible countermeasures.

LO-8: Describe the medical risks of performing an EVA, especially decompression sickness.

Reading(s)

Buckey: Chapters 7 & 5

Clément: Chapter 4

Week 4 Lesson Module

Assignment(s)

Exam #4

Forum 3

Week 5: Psychosocial Issues and Support, Preflight Preparation and Postflight Recovery

Learning Objective(s)

LO-9: Examine the psychosocial issues associated with spaceflight, including asthenia and the third quarter phenomenon.

LO-10: Understand the key components of preflight preparation and postflight recovery.

Reading(s)

Buckey: Chapters 2, 10 & 11

Clément: Chapter 6

Week 5 Lesson Module

Assignment(s)

Exam #5

Forum 4 (Initial post)

Week 6: Long-Duration Flight: Medical Planning and Care

Learning Objective(s)

LO-11: Describe the strategies and facilities for providing health care and medical treatment during spaceflight.

Reading(s)

Buckey: Chapter 12

Clément: Chapter 7

Week 6 Lesson Module

Assignment(s)

Forum 4 (responses)

Week 7:

Learning Objective(s)

None

Reading(s)

Week 7 Lesson Module

Assignment(s)

Forum 5 – Initial Post

Week 8:

Learning Objective(s)

None

Reading(s)

Week 8 Lesson Module

Assignment(s)

Research Paper Due by 11:55 pm ET Sunday

Forum 5 – Replies

Evaluation

Forums Assignments

There will be a new forum every one to two weeks throughout the course. Your knowledge of the assigned readings will be reflected in your ability to actively participate and discuss key course concepts. **Your initial posting should be between 400-500 words in length** (not including citations), well written in your own words (unless otherwise noted) and grammatically correct. **Your responses to your fellow students should be at least 250 words in length and include direct questions.** Additionally, your responses need to have substance; simply saying “good point” and/or “I agree” isn’t adequate.

In the forums, you will be required to post your response to the topic being discussed. *And you will also be required to reply to at least two of your fellow students and ask that student a question about what he/she has written. If you are asked questions about your posting, I expect you to answer at least one of the questions.* **Note that you will not receive full credit for the forum assignments unless you fully follow these instructions.** In other words, you will not receive full credit unless you complete your initial post, ask a question to at least two students and answer at least one question that you are asked.

- Initial posting: (50 points)
- Responses/replies to your fellow students: (40 points maximum)
- Answer to the professor and fellow students: (10 points)

Concept Exams

The five (open book) concept exams are worth a total of 50 percent of your course grade and will test your knowledge of the terms and concepts covered in the assigned reading. *With the exception of my notes and the experiment descriptions on the NASA Website, there will be questions on the exams covering the information in the weekly lessons.* **The exams are not comprehensive and will only cover the assigned reading and lesson of that week.** Each concept exam will consist of a combination of multiple choice, true/false, matching, fill-in-the-blank and short answer/essay questions. For each short answer/essay question, 75% of your grade will be based on your answer’s content and 25% on writing standards (correct grammar, spelling, punctuation, etc.). No proctor is required for the exams. **You will have 90 minutes to complete each exam.** Although open book, it is literally impossible to pass the exams without having completed all assigned reading.

Research Paper

You will be required to write one research paper for this course, which must address the following scenario:

The President of the United States must make a critical decision – whether or not to start the mission planning process to send astronauts on a 2.5-year round-trip journey to explore the planet Mars. You have been tasked to write a 10-page paper for the President, introducing him/her to the physical and mental challenges of human space travel and exploration.

Your paper is due by 11:55 pm (Eastern time zone) on Sunday of Week 8.

Grading:

Name	Grade %
Forums	15.00 %
Introductory Forum	2.50 %
Forum 2	2.50 %
Forum 3	2.50 %
Forum 4	2.50 %
Forum 5	2.50 %
Book Summary	2.50 %
Concept Exams	35.00 %
Concept Exam #1	7.00 %

Concept Exam #2	7.00 %
Concept Exam #3	7.00 %
Concept Exam #4	7.00 %
Concept Exam #5	7.00 %
Research Paper	35.00 %
Research Paper	35.00 %
Book Review	15.00 %
Book Review	15.00 %

Materials

Book Title: Space Physiology- ebook available through the APUS Online Library

Author: Buckey, Jay

Publication Info: Oxford University Press

ISBN: 9780195137255

Book Title: Fundamentals of Space Medicine, 2nd ed.

Author: Gilles Clement

Publication Info: Springer

ISBN: 9781441999047

Additional Resources and Websites

I also encourage you to use the APUS Online Library Research Center, as well as the APUS Space Studies Program Portal in the APUS Online Library (found at the following Web address: http://apus.campusguides.com/space_studies) in support of your research efforts.

Course Guidelines

Citation and Reference Style

- Attention Please: Students will follow the APA Format as the sole citation and reference style used in written work submitted as part of coursework to the University. Assignments completed in a narrative essay or composition format must follow the citation style cited in the APA Format.

Tutoring

- Tutor.com offers online homework help and learning resources by connecting students to certified tutors for one-on-one help. AMU and APU students are eligible for 10 free hours* of tutoring provided by APUS. Tutors are available 24/7 unless otherwise noted. Tutor.com also has a SkillCenter Resource Library offering educational resources, worksheets, videos, websites and career help. Accessing these resources does not count against tutoring hours and is also available 24/7. Please visit the APUS Library and search for 'Tutor' to create an account.

Late Assignments

- Students are expected to submit classroom assignments by the posted due date and to complete the course according to the published class schedule. The due date for each assignment is listed under each Assignment.
- Generally speaking, late work may result in a deduction up to 15% of the grade for each day late, not to exceed 5 days.
- As a working adult I know your time is limited and often out of your control. Faculty may be more flexible if they know ahead of time of any potential late assignments.

Turn It In

- Faculty may require assignments be submitted to Turnitin.com. Turnitin.com will analyze a paper and report instances of potential plagiarism for the student to edit before submitting it for a grade. In some cases professors may require students to use Turnitin.com. This is automatically processed through the Assignments area of the course.

Academic Dishonesty

- Academic Dishonesty incorporates more than plagiarism, which is using the work of others without citation. Academic dishonesty includes any use of content purchased or retrieved from web services such as CourseHero.com. Additionally, allowing your work to be placed on such web services is academic dishonesty, as it is enabling the dishonesty of others. The copy and pasting of content from any web page, without citation as a direct quote, is academic dishonesty. When in doubt, do not copy/paste, and always cite.

Submission Guidelines

- Some assignments may have very specific requirements for formatting (such as font, margins, etc) and submission file type (such as .docx, .pdf, etc) See the assignment instructions for details. In general, standard file types such as those associated with Microsoft Office are preferred, unless otherwise specified.

Disclaimer Statement

- Course content may vary from the outline to meet the needs of this particular group.

Communicating on the Forum

- Forums are the heart of the interaction in this course. The more engaged and lively the exchanges, the more interesting and fun the course will be. Only substantive comments will receive credit. Although there is a final posting time after which the instructor will grade comments, it is not sufficient to wait until the last day to contribute your comments/questions on the forum. The purpose of the forums is to actively participate in an on-going discussion about the assigned content.
- “Substantive” means comments that contribute something new and hopefully important to the discussion. Thus a message that simply says “I agree” is not substantive. A substantive comment contributes a new idea or perspective, a good follow-up question to a point made, offers a response to a question, provides an example or illustration of a key point, points out an inconsistency in an argument, etc.
- As a class, if we run into conflicting view points, we must respect each individual's own opinion. Hateful and hurtful comments towards other individuals, students, groups, peoples, and/or societies will not be tolerated.

University Policies

[Student Handbook](#)

- [Drop/Withdrawal policy](#)

- [Extension Requests](#)
- [Academic Probation](#)
- [Appeals](#)
- [Disability Accommodations](#)

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