

ASTE 520 *Spacecraft System Design*



Required for *Astronautical Engineering*

Regardless of your engineering or science major (electrical, mechanical, aerospace, systems, computer, etc. or physics, astronomy, chemistry, math, etc.) and regardless of your **job function** (research, development, design, test, manufacturing, management, marketing, etc.)

If you work or plan/desire to work in the space/defense industry or government space R&D centers or in space operations, then ... this is a course (on the fundamentals of space systems) that you must take.

ASTE520 focuses on the fundamentals of space systems. It will help you put into perspective your area of specialization and enable professional communications with other subsystem specialists.

This popular course is among the largest graduate space systems and space technology courses in the United States, with **2300 students enrolled since 1994.**

Academic year 2024–2025

ASTE520 *Spacecraft Systems Design* is offered **only in the fall (2024) semester (not offered in Spring 2025).**

Fall 2024 Thursday, 6:40 – 9:20 pm (Pacific Time)

Class enrollment is unlimited

For students enrolled in the class:

Course materials for *ASTE 520* will be posted on the DEN class website in mid-August.

**Help with access the D2L site <http://courses.uscden.net> at DEN:
<http://gapp.usc.edu/graduate-programs/den/students>**

ASTE-520 public web site (<http://astronauticsnow.com/aste520/>) provides information on the syllabus, textbooks, and much more.

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For students with ASTE Bachelor of Science degree from USC (BS ASTE)

Since you studied some ASTE-520 topics in ASTE-280 and ASTE-330/331ab, you can waive the ASTE-520 requirement toward MS ASTE.

Please check first the ASTE-520 course content (covering the fundamentals of space systems) in [Section 00, Part 1 and Part 2](#) (no password required) of the course notes – you can also view them (from the previous year) at

http://astronauticsnow.com/aste520/aste520_info_web_recent.pdf

Then, decide. The decision is entirely up to you.

If you decide to waive the ASTE-520 requirement, then you **must** contact [ASTE Student Services Director Mr. Luis Saballos](#) and inform him – the waiver must be added to your file.

For students with non-USC Bachelor of Science degrees

If you took a course similar to (or significantly overlapping with) ASTE-520 (covering the fundamentals of space systems) during your studies, then you can waive this course requirement towards MS ASTE.

Please consult

http://astronauticsnow.com/msaste/faq.html#Waiver_of_the_required_course

how to proceed.

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Spacecraft Design – ASTE 520

Thursday, 6:40–9:20 p.m., OHE-100D

Fall 2024

Class	Date	Subject	NS	W&E&P New SMAD (L&W SMAD); [FSM] Chapters	HW Due
1	Aug 29	Organization of the class. History of rocketry and space (self study). Universe, galaxy, solar system.	0 1 2	1 [1,2]	
2	Sep 05	Space environment.	3	7 (8) [3]	1,2
3	Sep 12	Orbital mechanics.	4	9 (5,6,7) [4-8]	3,4,5
4	Sep 19	Orbital mechanics. Space mission geometry.	4 5	8,9 (5,6,7) [5-8] 8,9 (5,6,7) [9]	6, 7, 8
5	Sep 26	Space mission geometry. Attitude determination and control (ADC).	5 7	8 (5) [9] 19 (10,11) [3]	9,10,11
6	Oct 03	Attitude determination and control (ADC).	7	19 (10,11) [3]	12,13,14,15
Fall recess	Fall recess	Spacecraft and mission design overview. Facilities. Operations. Reliability watch lecture NS-6, no HW; 2-day recess	6	1,3,4,6,14,24,28,29 (1,3,4,10,14,15,19)	
7	Oct 17	Spacecraft Propulsion.	8	18 (17,18)	16,17,18
8	Oct 24	MID-TERM		7:00–9:00 p.m. (Pacific)	
9	Oct 31	Launch systems. Communications	9 10	26,27 (17,18) 16,21 (10,11,13)	19,20
10	Nov 07	Communications	10	16,21 (10,11,13,16)	21,22
11	Nov 14	Electric Power systems.	11	21 (10,11)	23,24,25
12	Nov 21	Thermal control.	12	22 (10,11)	26,27
13	Dec 05	Structures and mechanisms	13	22 (10,11)	28,29,30
	Dec 12	FINAL EXAM		7:00–8:30 p.m. (Pacific)	

W&E&P New SMAD = Wertz, Everett, Puschell, The New SMAD
FSM = Gruntman, Fundamentals of Space Missions

L&W SMAD = Larson and Wertz, SMAD

NS = Notes Section; HW = homework