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 2025–2026

ASTE520 *Spacecraft Systems Design* is offered
only in the fall (2025) semester (not offered in Spring 2026).

Fall 2025 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 website (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, ASTE-330/331ab, and other classes you can waive the ASTE-520 requirement toward MS ASTE.

Please check first the ASTE-520 course content in Section 00, Part 1 and Part 2 (no password required) of the course notes. One can also view them them 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 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 2025

Class	Date	Subject	NS	W&E&P New SMAD (L&W SMAD); [FSM] Chapters	HW Due
1	Aug 28	Organization of the class. History of rocketry and space (self study). Universe, galaxy, solar system.	0 1 2	1 [1,2]	
2	Sep 04	Space environment.	3	7 (8) [3]	1,2
3	Sep 11	Orbital mechanics.	4	9 (5,6,7) [4-8]	3,4,5
4	Sep 18	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 25	Space mission geometry. Attitude determination and control (ADC).	5 7	8 (5) [9] 19 (10,11) [3]	9,10,11
6	Oct 02	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 16	MID-TERM	7:00–9:00 p.m. (Pacific)		
8	Oct 23	Spacecraft Propulsion	8	18 (17,18)	16,17,18
9	Oct 30	Launch systems. Communications	9 10	26,27 (17,18) 16,21 (10,11,13)	19,20
10	Nov 06	Communications	10	16,21 (10,11,13,16)	21,22
11	Nov 13	Electric power systems	11	21 (10,11)	23,24,25
12	Nov 20	Thermal control	12	22 (10,11)	26,27
13	Dec 04	Structures and mechanisms	13	22 (10,11)	28,29,30
	Dec 11	FINAL EXAM	7:00–8:30 p.m. (Pacific)		

PRELIMINARY

W&E&P New SMAD = Wertz, Everett, Puschell, The New SMAD L&W SMAD = Larson and Wertz, SMAD
FSM = Gruntman, Fundamentals of Space Missions
NS = Notes Section; HW = homework