Universidad Carlos III de Madrid

DENOMINACIÓN ASIGNATURA: Diseño de Sistemas Espaciales (Space Systems Design)		
POSTGRADO: MÁSTER UNIVERSITARIO EN INGENIERÍA AERONÁUTICA Profesor/a: Filippo Cichocki	ECTS: 6	CUATRIMESTRE: 2

CRONOGRAMA DE LA ASIGNATURA (versión detallada)

SEMANA	SESIÓN	DESCRIPCIÓN DEL CONTENIDO DE LA SESIÓN (En su caso, incluir las recuperaciones, tutorías, entrega de trabajos, etc)	GRUPO (marcar X)		Indicar espacio necesario distinto aula (aula informática, audiovisual, etc..)	TRABAJO DEL ALUMNO DURANTE LA SEMANA		
			1	2		DESCRIPCIÓN	HORAS PRESENCIALES	HORAS TRABAJO Semana Máximo 7 H
1	1	Introduction to Space Systems and Missions, the different segments (space, ground and launch) and subsystems.	X			Personal study	1.66	5
1	2	Space Environment I; atmosphere and ionosphere, effects of vacuum, plasma and microgravity		X		Personal study	1.66	5
2	3	Space Environment II: sun radiation, magnetosphere, radiation effects and ECLSS	X			Personal study	1.66	5

2	4	Space Systems engineering I; introduction, TRL levels, project phases, V cycle		X		Personal study	1.66	5
3	5	Space Systems engineering II; requirements flow-down, management, verification and control, concurrent engineering, preliminary design phases		X		Personal study	1.66	5
3	6	Lab 1: Requirements flow-down and preliminary design		X	Computer	Practice with exercises, and personal study	1.66	5
4	7	Mission analysis I; basics of orbital mechanics, Tsiolkovsky's equation, orbital maneuvers	X			Personal study	1.66	5
4	8	Mission analysis II; groundtracks, repeating groundtrack orbits, space mission examples (LEO, MEO, GEO, interplanetary)	X			Personal study	1.66	5
5	9	Lab 2: Mission analysis exercises and homework presentation		X	Computer	Practice with exercises, and homework	1.66	8
5	10	Space Propulsion subsystem I: overview and classification of propulsion subsystems, chemical propulsion and system components	X			Personal study	1.66	5

6	11	Space Propulsion subsystem II: electric propulsion, propulsion subsystem selection and sizing guidelines		X		Personal study	1.66	5
6	12	The launch segment: launchers and access to space	X			Personal study	1.66	5
7	13	Lab 3: Propulsion subsystem sizing and launch segment exercises	X		Computer	Practice with exercises, and personal study	1.66	5
7	14	In-class quiz or homework presentation		X		Preparation for the quiz topics or homework	1.66	6
8	15	Attitude and orbit and control subsystem I: review of attitude dynamics, introduction to AOCS, pointing budget, sensors and actuators	X			Personal study	1.66	5
8	16	Attitude determination and control subsystem II: AOCS architecture and modes, RCS, control algorithm, RCS and RW control, AOCS examples		X		Personal study	1.66	5
9	17	Translational guidance, navigation and control (GNC) in interplanetary missions	X			Personal study	1.66	5

9	18	Lab 4: AOCS sizing and translational GNC exercises		X	Computer	Practice with exercises, and personal study	1.66	5
10	19	Communications subsystem I		X		Personal study	1.66	5
10	20	Communications subsystem II	X			Personal study	1.66	5
11	21	Electric Power Subsystem I		X		Personal study	1.66	5
11	22	Electric Power Subsystem II	X			Personal study	1.66	5
12	23	Lab 5: Communications and electric power exercises	X		Computer	Practice with exercises, and personal study	1.66	5
12	24	In-class quiz or homework presentation		X		Preparation for the quiz topics or homework	1.66	6

13	25	Spacecraft structures and mechanisms I		X		Personal study	1.66	5
13	26	Spacecraft structures and mechanisms II		X		Personal study	1.66	5
14	27	Thermal control subsystem I	X			Personal study	1.66	5
14	28	Thermal control subsystem II	X			Personal study	1.66	5
15	29	Lab 6: Structure and thermal design exercises		X	Computer	Practice with exercises, and personal study	1.66	5
TOTAL HORAS							48.3	150