Universidad Carlos III de Madrid
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COURSE: Space Vehicles and Orbital Dynamics (251-14169)		
DEGREE: Aerospace Engineering	YEAR: 4nd	TERM: 2st

WEEKLY PLANNING

WEEK	SESSION	DESCRIPTION	GROUPS (mark X)		SPECIAL ROOM FOR SESSION	Indicate YES/NO If the session needs 2 teachers	WEEKLY PROGRAMMING FOR STUDENTS		
			LECTURES	SEMINARS			DESCRIPTION	CLASS HOURS	HOMEWORK HOURS (Max. 7h week)
1	1	Course Presentation. Two body problem. Conservation laws. Conics and orbital elements	X				Study class materials and solve proposed problems	1,6	
1	2	Problems: rv to COE and COE to rv calculations		X			Study class materials and solve proposed problems	1,6	5
2	3	Kepler's equation. Formulation for the elliptic, parabolic, hyperbolic cases	X				Study class materials and solve proposed problems	1,6	
2	4	Computer lab: Solving Kepler's equation numerically		X	X		Study class materials and solve proposed problems	1,6	5
3	5	Orbital Maneuvers I. Hohmann, bielliptic transfers, phasing maneuvers	X				Study class materials and solve proposed problems	1,6	
3	6	Problems: Hohmann transfer, plane change maneuver, phasing		X			Study class materials and solve proposed problems	1,6	7

4	7	Orbital Maneuvers II. Plane change maneuvers. Fundaments of spherical trigonometry. Electric orbit rising	X				Study class materials and solve proposed problems	1,6	
4	8	Computer lab: bi-elliptic transfer trade-off, plane change maneuver, electric orbit raising		X	X		Study class materials and solve proposed problems	1,6	5
5	9	Preliminary orbit determination. Lambert's problem	X				Study class materials and solve proposed problems	1,6	
5	10	Problems: Gibbs problem, Gauss problem		X			Study class materials and solve proposed problems	1,6	5
6	11	**Quiz 1**	X				Study class materials and solve proposed problems	1,6	
6	12	Computer lab: Lambert problem, porkchop diagrams		X	X		Study class materials and solve proposed problems	1,6	7
7	13	2BP Perturbations I: special perturbation methods; geopotential	X				Study class materials and solve proposed problems	1,6	
7	14	Problems: drag and solar radiation		X			Study class materials and solve proposed problems	1,6	5
8	15	2PB Perturbations II: general perturbation methods	X				Study class materials and solve proposed problems	1,6	
8	16	Computer lab: spherical harmonics, sunsync, GEO effects		X	X		Study class materials and solve proposed problems	1,6	5
9	17	Interplanetary trajectories: Patched conics method	X				Study class materials and solve proposed problems	1,6	
9	18	Problems: patched conics, B-plane targeting		X			Study class materials and solve proposed problems	1,6	5
10	19	Relative Motion and Rendezvous	X				Study class materials and solve proposed problems	1,6	
10	20	Problems: relative motion calculations and analysis		X			Study class materials and solve proposed problems	1,6	7
11	21	Circular restricted three body problem (CR3BP)	X				Study class materials and solve proposed problems	1,6	
11	22	Problems: Lagrange point location and critical energies		X			Study class materials and solve proposed problems	1,6	5
12	23	Trajectories and stability in the CR3BP	X				Study class materials and solve proposed problems	1,6	
12	24	Computer lab: Linear and nonlinear motion about Lagrange points		X	X		Study class materials and solve proposed problems	1,6	7
13	25	Spacecraft attitude	X				Study class materials and solve	1,6	7

							proposed problems		
13	26	Computer lab: torque-free and gravity gradient torque on spacecraft		X	X		Study class materials and solve proposed problems	1,6	
14	27	Introduction to space missions and space systems	X				Study class materials and solve proposed problems	1,6	
14	28	Problems: Sizing spacecraft subsystems		X			Study class materials and solve proposed problems	1,6	7
*	29	Computer quiz		X	X	X	Study class materials and solve proposed problems	1,6	
							Subtotal 1	**48,33**	**82**
							Total 1 *(Hours of class plus student homework hours between weeks 1-14)*	130.33	

15		Tutorials, handing in, etc						7	
16		Assessment						3	19.66
17									
18									
							Subtotal 2	**3**	**26.66**
							Total 2 *(Hours of class plus student homework hours between weeks 15-18)*	29.66	

TOTAL *(Total 1 + Total 2. Maximum 180 hours)*	**160**