Date	Weekday	Weeknum	Lecture#	Topic	Main topics, concepts and tools	Assignment out	Assignment due	Reading	Notes
1/27/2016	Wednesday	35	1	Introduction	Overview of course, space missiong engineering, logistics, projects			SMAD ch 1-3	
1/29/2016	Friday	35	2	The Space Mission Engineering Process	Mission design process, phases, concept and architecture exploration and selection			SMAD ch 4-5	
2/1/2016	Monday	36	3	Mission Requirements	Types of requirements, guidelines for writing requirements, requirement allocation and budgeting		Project preferences	SMAD ch6	
2/3/2016	Wednesday	36	4	Review of orbit attitude dynamics and control	Two-body problem, orbits, spacecraft attitude dynamics			SMAD ch8-ch9	P:Peck
2/5/2016	Friday	36	5	Space Environment	Radiation, magnetic field, microgravity, space debris	HW1 out		SMAD ch7	
2/8/2016	Monday	37	6	Orbit design	Kepler's laws, orbit perturbations, orbital decay, maneuvers, Hohmann transfers, deorbiting, types of orbits			SMAD ch9-10	
2/10/2016	Wednesday	37	7	Constellation design and interplanetary orbits	Coverage figures of merit, access to ground stations, Walker constellations, constellation design, interplanetary orbits			SMAD ch9-10	
2/12/2016	Friday	37	8	STK exercise	Exercise to compute contact times, coverage figures of merit, orbital decay, satellite	HW2 out	HW1 due	STK user manual	(P:Hitomi)
2/15/2016	Monday	38							February Break
2/17/2016	Wednesday	38	9	ADCS, GN&C subsystems	Characteristics of sensors and actuators for attitude and orbit determination and control. Basic sizing of reaction wheels, thrusters, magnetic torquers.			SMAD ch 19	
2/19/2016	Friday	38	10	Propulsion	Rocket equation, staging, chemical propulsion, electric propulsion			SMAD ch 18	P:Krejci, MIT
2/22/2016	Monday	39	11	Overview of payloads	Types of payloads, EM spectrum, review of Fourier analysis		HW2 due	SMAD ch 15	
2/24/2016	Wednesday	39	12	Communications subsystem I	A/D conversion, modulations, coding schemes			SMAD ch 16	
2/26/2016	Friday	39	13	Communications subsystem II	RF and optical comms, link budgets	HW3 out		SMAD ch 21	
2/29/2016	Monday	40	14	Microwave remote sensing	Planck's law, blackbody radiation, emissivity, passive MW radiometers			SMAD ch 17	
3/2/2016	Wednesday	40	15	Microwave payload technologies	Antennas, filters, radar equation, synthetic aperture processing		SRR document	SMAD ch 17	
3/4/2016	Friday	40	16	Optical remote sensing	Types of optical payloads, remote sensing principles, technologies for VNIR solid surface sensing, TIR solid surface sensing			SMAD ch 17	
3/7/2016	Monday	41	17	Optical payload technologies	Types of optical payloads, remote sensing principles, technologies for atmospheric		HW3 due	SMAD ch 17	
3/9/2016	Wednesday	41		Review for quiz					(P:Hitomi)
3/11/2016	Friday	41		**Quiz 1**	Up to comms (HW3)				
3/14/2016	Monday	42	18	Power subsystem	Illumination, solar array and battery sizing, power budgets, alternative power generation methods, radiators, louvers	HW4 out		SMAD ch 21.2	
3/16/2016	Wednesday	42	19	Thermal control	Heat transfer, radiation, equilibrium temperature, multi-node models. Thermal control technologies: radiators, heaters, cryocoolers.			SMAD ch 22.2	
3/18/2016	Friday	42	20	Life Control Systems	Atmosphere control, food and water, closed-loop systems			TBD	P:Diaz Artiles
3/21/2016	Monday	43	21	Humans in Space	Human deconditioning in space, biomechanics, cardiovascular system		HW4 due	TBD	P:Diaz Artiles
3/23/2016	Wednesday	43	22	Avionics	On-board computers, data protocols, radiation, avionics architectures			SMAD ch 20	
3/25/2016	Friday	43	23	Structures, mechanisms and configuration	Loads, vibrations, modes, sizing and configurations, mechanisms			SMAD ch 22.1 and 14.3	P:Golkar, Skoltech
3/28/2016	Monday	44							Spring Break
3/30/2016	Wednesday	44							Spring Break
4/1/2016	Friday	44							Spring Break
4/4/2016	Monday	45	24	Communications missions	TBD				P:Lohmeyer, OneWeb (TBC)
4/6/2016	Wednesday	45	25	Ground and launch segment and operations	Launch vehicle selection, launch enviroment, launch configurations, operations, launch vehicle availability and reliability. Ground segment navigation, comms and tracking services	HW5 out	SDR document	SMAD ch 26,27, 28, 29	
4/8/2016	Friday	45	26	Cost estimation	Parametric methods, cost estimating relationships, bottom-up estimates, analogy-based estimates, software cost, complexity corrections			SMAD ch 11	
4/11/2016	Monday	46	27	Risk and reliability	Risk matrix, failure mode analysis, basic reliability calculations, Weibull distribution, min cut sets			SMAD ch 24	
4/13/2016	Wednesday	46	28	Astrophysics missions	TBD	HW6 out	HW5 due		P:Savransky
4/15/2016	Friday	46	29	Entry Descent and Landing	TBD			Griffin and French, ch 6	P:Benito, JPL
4/18/2016	Monday	47	30	Earth Science missions	TBD				
4/20/2016	Wednesday	47	31	CubeSats and SmallSats	Capabilities and technologies of CubeSats and small sats, trends, limitations, mission examples		HW6 due	SMAD ch 25.3, 25.4	
4/22/2016	Friday	47	32	Spacecraft charging and mission assurance	TBD				P:De Soria, JPL (TBC)
4/25/2016	Monday	48	33	Space policy, industry and organizations	Space actors, funding sources, regulations, policy considerations			SMAD ch 2, 12	
4/27/2016	Wednesday	48		**Quiz 2**	Everything up to risk and reliability (HW6)				
4/29/2016	Friday	48	34	Planetary exploration missions	TBD				P:Battat, SpaceX (TBC)
5/2/2016	Monday	49	35	Wrap-up					
5/4/2016	Wednesday	49		PDR presentations					
5/6/2016	Friday	49		PDR presentations					
5/9/2016	Monday	49		PDR presentations					
5/11/2016	Wednesday	49		PDR presentations					
5/18/2016	Friday	49					Design document due CDR plan due		