

Lecture Plan for FYS3610 (Romfysikk), Autumn 2015

Lectures: Tuesday 08:15-10:00 Room V316 Chemistry Building
 Thursday 12:15-14:00 Room V316 Chemistry Building
 Seminar: Friday 12:15-14:00 Room V316 Chemistry Building

Curriculum: Physics of the Earth's Space Environment, Proelss, Springer, (PESE)
 Basic Space Plasma Physics, Baumjohann & Treumann, ICP (BSPP)

3 hours written mid-term examination (counts 20%)

Project work (counts 20%)

Oral examination (counts 60%)

Week	Topic	Keywords	Curriculum
34	Introduction, plasma basics	Gyration, 1st order drifts, magnetic mirror, loss cone	BSPP Ch. 2 PESE Ch. 5.3
35	Magnetohydrodynamics	Particle distribution function, Vlasov equation, MHD equations, magnetic reconnection, Debye length, plasma frequency	BSSP Chs. 1.1, 6.1, 6.2, 6.5, 7.3
36	The Sun	Internal structure, atmospheric layers, dynamics	PESE Ch 3.1 lecture
37	Solar wind	Properties, Parker model, Parker spiral, sectoring & current sheets, radial dependence	PESE Chs. 6.1 & 6.2
38	Structure of the terrestrial magnetosphere	Internal magnetic field, spherical harmonic expansion, dipole description, Chapman-Ferraro current, tail current	PESE Chs. 5.2, 6.4, 6.5
39	Structure of the ionosphere	Ionization profile, D-, E-, F-layer, dynamics	PESE Chs. 3.2, 4.1-4.4
40	Structure of the atmosphere	Composition, thermal structure, Ozone & UV radiation	PESE Chs. 2.2 & 2.3
41	Midterm exam		
42	Open magnetosphere	Dungey cycle, corotation, convection, ECPC	BSSP 5.2-5.4
43	Ionospheric conductivity and currents	Pedersen/Hall conductivities, collision frequencies/mobilities, region 1/2 currents	BSSP 4.2, 4.4 PESE 7.2 7.3
44	Substorms and aurora	Generation of aurora, proton aurora, substorm phenomenology	BSSP 5.6 PESE 7.4, 8.1
45	Plasma interactions with other planets	Interaction with unmagnetized bodies, radiation belts	Lecture
46	Instrumentation	Incoherent & coherent scatter radars, magnetometers, all-sky imagers	Lecture
47	Reports, repetition		
48	Exam		