AS 783: Ionospheres
Course Syllabus Spring 2012


Prerequisites AS703 & AS727 or equivalent

Instructor Meers Oppenheim, Associate Professor of Astronomy; Office: CAS 517, 725 Commonwealth Ave., 02215; Telephone: 617-353-6139 Cell: 617-8221-0952; Email: meerso@bu.edu Office hours: Tuesday and Thursday 10-11:30

Times Lectures: Tuesdays and Thursdays, 2-3:30pm
Office Hours: Monday 2-3:30 & Wed 2-3:30

Assignments

Term Project - (50% of Grade)

- Research project consisting of either original Ionospheric research or an exploration of an Ionospheric topic related to the student’s Ph.D. research.

- Grades based on:
  1. Oral Presentation - (25% of grade): 20 minute in-class presentation of project results followed by 10 minute question period graded based on clarity, quality, and ability to answer questions on Term Project and related topics.
  2. Written Presentation - (25% of grade): A scientific style paper in letter format (for an example, see Geophysical Research Letters)

Problem Sets - (50% of grade):

- Bi-weekly problem set assignments.
- Students may work in groups but should write up solutions individually. Recommendation: students should initially attempt problems individually.
- To receive full credit on a problem, it must include: a reasonably clear explanation of the method used to obtain a solution, legible and, single sided pages
- Not every problem will be graded.

Texts

1. Kelley, M.; The Earth’s Ionosphere: Plasma Physics and Electrodynamics (Second Edition); Good modern text covering principally the electrodynamics of the ionosphere from an observers viewpoint


3. Henry Rishbeth and Owen K. Garriott; Introduction to Ionospheric Physics; Old but has the foundations

Dates
### Lectures

1. Introduction to Class and Ionospheres
2. Neutral Atmospheres: Structure, Temperature, and Physics
3. Gravity Waves and Tides
4. Escape
5. Ionospheric Chemistry
6. Photo Ionization
7. Ionospheric Measurement Techniques: Radar Coherent (guest lecture or self)
8. Ionospheric Measurement Techniques: ISR (guest lecture)
9. Ionospheric Measurement Techniques: Optical (guest lecture)
10. Ionospheric Measurement Techniques: Spacecraft and Rockets (guest lecture)
11. Ionospheric Measurement Techniques: scintillation (guest lecture)
12. Comparative Planetary Ionospheres
13. Suggested Projects: Present 10 min. preliminary ideas
14. Low Latitude dynamics
15. Low Latitude Waves and Instabilities 1
16. Low Latitude Waves and Instabilities 2
17. Mid-latitude dynamics
18. High Latitude Dynamics
19. High Latitude Waves and Instabilities 1
20. Low Latitude Waves and Instabilities 2
21. Magnetospheric Ionospheric Coupling
22. Active Experiments: Rocket Releases & Heaters

23. Project Final Presentations / Oral exams

### Academic Conduct

The Dean of CAS/GRS has asked faculty to remind students of the academic conduct code. The objective of the GRS academic conduct code is: “In order to ensure that the academic competence of students be judged fairly, and to promote the integrity of graduate education, the Graduate School embraces two broad principles: (1) No honest student should be put to a disadvantage because of the dishonesty of another student; (2) Penalties should be commensurate with the misdemeanors.” Details of this policy can be found at [http://www.bu.edu/grs/academics/resources/adt.html](http://www.bu.edu/grs/academics/resources/adt.html).