EECS 517 (NERS 578). Physical Processes in Plasmas
Fall 2010 - TuTh 10:30 AM - 12:00 PM - 1012 EECS

Instructor: Mark J. Kushner
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Grader-Teaching Assistant: To be announced

Goals of Course: This course addresses the fundamental science and the technology of low temperature, partially ionized, non-equilibrium plasmas. This class of plasmas is used, for example, for etching and deposition of materials, surface treatment, lighting sources, flat panel displays, welding, laser ablation, lasers and biomedical applications. These plasmas are also naturally occurring, such as the aurora, shock waves and lightning. The objectives of this course are to first provide a foundation of the fundamentals of electron-atom collisions, electron and ion transport and the different ways in which low temperature plasmas are created. After providing this foundation, the course will apply those fundamentals to study of technologies which use partially ionized plasmas, with examples taken from lasers, plasma materials processing, lighting sources and plasma medicine.

Grading Policy: The field of low temperature plasmas is intrinsically interdisciplinary. The linkages between the supporting fields are best appreciated by problem solving in a real-world context. As a result, one will not be able to fully benefit from the course without putting a good-faith effort into the homeworks. To acknowledge the importance of homework, it is being heavily weighted in the grading policy. The grading policy will be:

Homework	30%
Mid-Term Exam	30%
Final Project	30%
Instructor's discretion	10%

Instructor's discretion includes my qualitative assessment of students' effort towards the course (e.g., class attendance and participation).

Texts:

Required: M. Lieberman, Principles of Plasma Discharges and Material Processing, 2nd Edition (Wiley, New Jersey, 2005)

Optional Text: A. Friedman and L. A. Kennedy, Plasma Physics and Engineering (Taylor and Francis, New York, 2004)

Note that both of these texts are available electronically through a subscription by the UM Engineering Library.

"Principles of plasma discharges and materials processing" can be accessed online at http://proxy.lib.umich.edu/login?url=http://www.myilibrary.com?id=25507

"Plasma physics and engineering" can be accessed online at http://proxy.lib.umich.edu/login?url=http://www.myilibrary.com?id=34790

Course Website: The course website will be located at "http://uigelz.eecs.umich.edu → Classes → EECS 517 ". The materials that will be posted on the website include:

1. Introductory materials
2. Homework assignments
3. Handout Packages (Note that some, but NOT ALL of the handouts can also be downloaded individually!)
4. Class announcements (such as cancellations, rescheduled classes, exam dates)