EECS 598 – Terahertz Technology & Applications

MW 12pM-1:30PM, 1012 EECS (Fall 2009)

Instructor: Mona Jarrahi
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Text: "Terahertz Optoelectronics" by Kiyomi Sakai (Springer 2005), Books on the reference list are recommended. In addition to these texts, the handouts (thanks to Dr. Konstantin Vodopyanov) will also be available on CTools.

References

- "Sensing with Terahertz Radiation", Daniel Mittleman, ed. (Springer, 2004)
- "Terahertz Spectroscopy: Principles and Applications" (Optical Science and Engineering Series), Susan L. Dexheimer, ed. (CRC Press, Taylor and Francis group, 2007)
- "Terahertz Sensing Technology: Emerging Scientific Applications & Novel Device Concepts "(Selected Topics in Electronics and Systems, Vol. 32), Dwight L. Woolard, William R. Loerop, Michael Shur (Eds), (World Scientific, 2003)
- "Millimeter and Submillimeter Wave Spectroscopy of Solids" (Topics in Applied Physics) by George Gruner (Editor), (Springer, Topics in Appl. Phys, vol.74, 1998)
- "Infrared and millimeter waves" Kenneth J. Button (editor) (New York: Academic Press, 1979)

Homework: Weekly assignments are due on Wednesdays in the class. Late homework is discounted at 50% for the first day, not accepted if more than a day late. Homework solutions will be available on CTools.

Exams: The midterm examination will be a written test on October 28th during class time. The examination is open-book, and you may use any notes, handouts, or materials from the class. The final examination is in the form of 15min students' presentations and a final paper, the topic should be selected from THz articles from different journals.

Grading:

Midterm	(October 28th)	30%
Homework		30%
Final presentation		40%

Course Outline

This course will provide graduate students with an overview on the unique specifications of terahertz waves and potential applications as well as the state of the current terahertz systems and the major technological challenges in the field. The topics covered in this course are THz Detectors (single-photon detectors, microbolometers, Golay cells, Pyroelectric detectors, diode detectors, and focal-plane arrays), THz Sources (vacuum-electronics-based, semiconductor-based, photoconduction-based and nonlinearity-based), THz electronic components (waveguides, Metamaterials, filters and modulators), sensing with THz radiation (THz spectroscopy, imaging and tomography), and THz applications (biology, medicine, space sciences, pharmaceutical industry, security and communications).