

**EECS 187 ENGINEERING ELECTRODYNAMICS**  
(Elective for EE)

- Catalog Data:** **EECS 187 Engineering Electrodynamics (Credit Units: 4)** Time-varying electromagnetic fields including waveguides, resonant cavities, radiating systems. Motion of charged particles in electromagnetic fields, radiation by moving charges. Scattering and dispersion. Prerequisite: EECS180. Formerly ECE177. (Design units: 1)
- Textbook:** Schwarz, Steven E., *Electromagnetics for Engineers*, Oxford University Press, 1990.
- References:** Ramo, Whinnery, and VanDuzer, *Fields and Waves in communication Electronics*, 3<sup>rd</sup> edition, John Wiley and Sons, 1994.
- Coordinator:** Peter J. Burke
- Course Objectives:** To Understand waveguides and transmission lines, and the wave equations.  
To understand radiation and scattering of electromagnetic waves.  
To understand analysis and design of simple microwave components with particular emphasis to practical design based on real specifications.  
To understand the use of computer-based tools for analysis and design of microstrip based filters.
- Course Outcomes:** Students will:  
Understand the telegrapher wave equations, and how to apply them to transmission line and waveguide systems.  
Describe the steps involved in the design, implementation and characterization of microwave filters.  
Describe how computer tools are used to design microwave filters.
- Prerequisites By Topic:** Understanding of time independent Maxwell's equations.  
Understanding of static electric and magnetic fields.
- Lecture Topics:** The course is aimed at providing a comprehensive overview of the propagation and radiation of electromagnetic fields in confined geometries as well as in free space.
- Class Schedule:** Meets for 3 hours of lecture and 1 hour of discussion each week for 10 weeks.
- Computer Usage:** HP Advanced Design System.
- Laboratory Projects:**
- Professional Component:** Contributes toward the Electrical Engineering Major Design experience.
- Relationship to Program Outcomes:** This course relates to Program Outcomes a, e and k as stated at: <http://undergraduate.eng.uci.edu/degreeprograms/electrical/mission>

**Design Content Description**

**Approach:** The design methodologies of microstrip based microwave filters will be the emphasis of the class. -50%

**Lectures:** 100%

**Laboratory Portion:** 0%

**Grading Criteria:**

Home work:	20%
Midterm exam:	40%
Final exam:	<u>40%</u>
	100%

**Estimated ABET Category Content:**

Mathematics and Basic Science: 0 credit units or 0%

Engineering Science: 3 credit units or 75%

Engineering Design: 1 credit units or 25%

**Prepared by:** Peter J. Burke **Date:** July 2007

**CEP Approved:** Fall 2004