

ECE 5833 (Approved): Organic and Printed Flexible Electronics

Course Description

Conducting organic small molecules and polymers (structural, optical and electrical properties); printable metal-oxide semiconductors; Printing techniques, organic light emitting diodes; transport and carrier injection; organic transistors; organic lasers.

Prior Course Number: 835.02

Transcript Abbreviation: Flexible Electroni

Grading Plan: Letter Grade

Course Deliveries: Classroom

Course Levels: Undergrad, Graduate

Student Ranks: Senior, Masters, Doctoral

Course Offerings: Spring

Flex Scheduled Course: Never

Course Frequency: Odd Years

Course Length: 14 Week

Credits: 3.0

Repeatable: No

Time Distribution: 3.0 hr Lec

Expected out-of-class hours per week: 6.0

Graded Component: Lecture

Credit by Examination: No

Admission Condition: No

Off Campus: Never

Campus Locations: Columbus

Prerequisites and Co-requisites: Prereq: 3030 (432), or permission of instructor for non-ECE majors; or Grad standing in engineering, biological sciences, or math and physical sciences.

Exclusions: Not open to students with credit for 7833 (835.02) or 5194.04.

Cross-Listings:

Course Rationale: Existing course updated to better capture the content included. No changes to content other than giving it the proper and representative name.

The course is required for this unit's degrees, majors, and/or minors: No

The course is a GEC: No

The course is an elective (for this or other units) or is a service course for other units: Yes

Subject/CIP Code: 14.1001

Subsidy Level: Doctoral Course

Course Goals

Gain a fundamental understanding of the field of organic and printed electronic materials, fabrication techniques and devices and their potential impact

Course Topics

Topic	Lec	Rec	Lab	Cli	IS	Sem	FE	Wor
Motivation for study of organic and printed flexible electronics	2.0							

Topic	Lec	Rec	Lab	Cli	IS	Sem	FE	Wor
Materials properties/synthesis of printable semiconductors	4.0							
Materials parameter space for design	4.0							
Processing issues for organic and printable semiconductors	4.0							
Organic light-emitting diodes	4.0							
Organic and Printable Flexible Electronics	4.0							
Organic solar cells	4.0							
Molecular electronics with NDR & organic lasers	3.0							
Carbon-based electronics (nanotubes and graphene)	4.0							
Organic sensors (bio & chemical)/Future market opportunities	4.0							

Representative Assignments

In-class Discussion
Powerpoint Presentations of State-of-the-Art issues
Term Paper

Grades

Aspect	Percent
Class Discussions	20%
Class presentations	40%
Term Paper	40%

Representative Textbooks and Other Course Materials

Title	Author
<i>Organic and Printed Electronics: Fundamentals and Applications,</i>	G. Nosatp. D. Kupo. S. Ganz, P. Stanford , ISBN-13: 978-9814669740

ABET-EAC Criterion 3 Outcomes

Course Contribution		College Outcome
***	a	An ability to apply knowledge of mathematics, science, and engineering.
*	b	An ability to design and conduct experiments, as well as to analyze and interpret data.
*	c	An ability to design a system, component, or process to meet desired needs.
	d	An ability to function on multi-disciplinary teams.
	e	An ability to identify, formulate, and solve engineering problems.
*	f	An understanding of professional and ethical responsibility.
***	g	An ability to communicate effectively.
***	h	The broad education necessary to understand the impact of engineering solutions in a global and societal context.
***	i	A recognition of the need for, and an ability to engage in life-long learning.
***	j	A knowledge of contemporary issues.
*	k	An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

Additional Notes or Comments

Updated prereqs, exclusions, goals and topics to conform to university format 3/29/12

renumber from 7833

Modified prereqs to include ECE seniors and graduate students from Chemistry, Physics, etc.

Changed semester of offering to autumn odd and spring odd. 3/23/15.CED

Correct prereqs, to include grad students, and add "seniors" as level; 2/18/14

Capitalized "Graduate" in prereqs to match university version.

Clarify prereqs to Prereq: 3030 (432), or permission of instructor for non-ECE majors; or Grad standing in engineering, biological sciences, or math and physical sciences. 8/26/14
BLA

Changed text to Nisato et al 3//16 BLA

title change, adjustments to goals and topics 1/15/19 BLA

Prepared by: Paul Berger