Cover Sheet: Request 13589

EEL4XXX Modern Memory Device Technologies

Info

Process	Course|New|Ugrad/Pro
Status	Pending at PV - University Curriculum Committee (UCC)
Submitter	Shannon Chillingworth schill@ece.ufl.edu
Created	2/6/2019 2:24:27 PM
Updated	4/10/2019 10:22:09 AM
Description of request	New Course Request

Actions

Step	Status	Group	User	Comment	Updated
Department	Approved	ENG - Electrical and Computer Engineering 011905000	Robert Fox	New undergrad course	2/6/2019
EEL5XXX_Memory_Dev_Tech_Syll_UCC1.docx					2/6/2019
College	Approved	ENG - College of Engineering	Heidi Dublin	Approved by HWCOE Curriculum Committee and Faculty Council	3/15/2019
No document changes					
University Curriculum Committee	Pending	PV - University Curriculum Committee (UCC)			3/15/2019
No document changes					
Statewide Course Numbering System					
No document changes					
Office of the Registrar					
No document changes					
Student Academic Support System					
No document changes					
Catalog					
No document changes					
College Notified					
No document changes					

Course|New for request 13589

Info

Request: EEL4XXX Modern Memory Device Technologies
Description of request: New Course Request
Submitter: Shannon Chillingworth schill@ece.ufl.edu
Created: 2/6/2019 2:10:27 PM
Form version: 1

Responses

Recommended Prefix EEL
Course Level 4
Number XXX
Category of Instruction Advanced
Lab Code None
Course Title Modern Memory Device Technologies
Transcript Title MDRN MEMORY DEV TECH
Degree Type Baccalaureate

Delivery Method(s) On-Campus
Co-Listing Yes
Co-Listing Explanation This course is co-listed with the graduate class. The homework portion of the graduate section will involve additional work and more advanced concepts with respect to the undergraduate section. The exams will also involve additional questions for the graduate section with respect to the undergraduate section.

Grading for the homework and projects are different from the undergraduate course. The graduate and undergraduate sections will be graded separately, for which the graduate section has additional problems and different weights for all problems.
Effective Term Earliest Available
Effective Year Earliest Available
Rotating Topic? No
Repeatable Credit? No

Amount of Credit 3
If variable, # min 0
If variable, # max 0
S/U Only? No
Contact Type Regularly Scheduled
Weekly Contact Hours 3
Course Description This course discusses state-of-the-art volatile and nonvolatile memory device technologies and their limitations. It also discusses emerging memory device technologies, including those that could be adopted by industry in the next decades due to their potential performance, density, power and cost advantages.
Prerequisites EEE3396C
Co-requisites None.
Rationale and Placement in Curriculum This course builds on core concepts covered in EEE 3396C and exposes students to topics in memory device technology.
Course Objectives The students are expected to understand (1) state-of-the-art memory technologies, (2) emerging memory technologies for future big data applications, (3) mechanisms and limitations of each memory device technology, (4) memristive devices for neuromorphic computing.
Course Textbook(s) and/or Other Assigned Reading Required Textbooks and Software
Title: Emerging Nanoelectronic Devices
Author: An Chen et al.
Publication date, edition, and publisher: 1st edition, Wiley, 2014
ISBN number: 978-1118447741

Weekly Schedule of Topics Course Schedule
Week 1: Brief introduction of field-effect transistors

Week 2-3: State-of-the-art volatile memory devices: DRAM
Week 4-5: SRAM memory device technology (homework1 due)
Week 6-7: Flash memory technology
Week 8: Spin transfer torque memory devices (homework 2 due)
Week 9: Phase change memory devices
Week 9: Midterm Exam
Week 10: Resistive memory devices (homework 3 due)
Week 11: Crossbar architecture
Week 12-13: Device models of memristors (homework 4 due)
Week 14: Other devices for neuromorphic computing
Week 15-16: Final project and presentation

Links and Policies Attendance Policy, Class Expectations, and Make-Up Policy
Excused absences are consistent with university policies in the undergraduate catalog (https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx) and require appropriate documentation.

Grading Policy:

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93.0 - 100	A	4.00
90.0 – 92.9	A-	3.67
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77.0 – 79.9	C+	2.33
73.0 – 76.9	C	2.00
70.0 – 72.9	C-	1.67
67.0 – 69.9	D+	1.33
63.0 – 66.9	D	1.00
60.0 – 62.9	D-	0.67
0 – 59.9	E	0.00

A “C-” will not be a qualifying grade for critical tracking courses. In order to graduate, students must have an overall GPA and an upper-division GPA of 2.0 or better (C or better). Note: A “C-” average is equivalent to a GPA of 1.67, and therefore, it does not satisfy this graduation requirement.

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Course Evaluation
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or concerns, please consult with the instructor or TAs in this class.

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Student Health Care Center, 392-1161.

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E-learning technical support, 352-392-4357 (select option 2) or e-mail to Learning-support@ufl.edu. https://lss.at.ufl.edu/help.shtml.

Career Resource Center, Reitz Union, 392-1601. Career assistance and counseling. https://www.crc.ufl.edu/.

Library Support, http://cms.uflib.ufl.edu/ask. Various ways to receive assistance with respect to using the libraries or finding resources.

Teaching Center, Broward Hall, 392-2010 or 392-6420. General study skills and tutoring. https://teachingcenter.ufl.edu/.

Writing Studio, 302 Tigert Hall, 846-1138. Help brainstorming, formatting, and writing papers. https://writing.ufl.edu/writing-studio/.

Student Complaints Campus: https://www.dso.ufl.edu/documents/UF_Complaints_policy.pdf.

On-Line Students Complaints: http://www.distance.ufl.edu/student-complaint-process.

Grading Scheme Evaluation of Grades:

Assignment	Percentage of Final Grade
Homework Sets (4)	15%
Midterm Exam	45%
Final project/presentation	40%

This course is co-listed with the graduate class. The homework portion of the graduate section will involve additional work and more advanced concepts with respect to the undergraduate section. The exams will also involve additional questions for the graduate section with respect to the undergraduate section.

Grading for the homework and projects are different from the undergraduate course. The graduate

and undergraduate sections will be graded separately, for which the graduate section has additional problems and different weights for all problems.

The final project shall be on the topics of memory device technologies learned throughout the course, and consist of the following parts (i) Motivation (ii) Background, (iii) Technical Approach (iv) Results, (v) Discussions, and (vi) conclusions. It will be graded according to the following percentages: 30% for parts (i) and (ii), 45% for parts (iii) and (iv), 25% for parts (v) and (vi). Parts (i), (ii) and (v) shall discuss relations and comparisons between various memory device technologies discussed in the course, and parts (ii) and (iv) can focus specifically on one memory device technology.

Instructor(s) Dr. Jing Guo

Modern Memory Device Technologies

EEL 4XXX Section #XXX

Class Periods: TBD

Location: TBD

Academic Term: TBD

Instructor

- Name: Jing Guo
- Email Address: guoj@ufl.edu
- Office Phone Number: NEB 551
- Office Hours: TBD

Teaching Assistants:

Please contact through the Canvas website

- Name of TA, email address, office location, office hours
- Name of TA, email address, office location, office hours

Course Description

Discusses state-of-the-art volatile and nonvolatile memory device technologies and their limitations. Discusses emerging memory device technologies, including those that could be adopted by industry in the next decades due to their potential performance, density, power and cost advantages. 3 credit hours.

Course Pre-Requisites / Co-Requisites

EEE 3396C

Course Objectives

The students are expected to understand (1) state-of-the-art memory technologies, (2) emerging memory technologies for future big data applications, (3) mechanisms and limitations of each memory device technology, (4) memristive devices for neuromorphic computing.

Materials and Supply Fees

N/A

Professional Component (ABET)

This course consists of 1.5 credits of Engineering Design and 1.5 credits of Engineering Science

Relation to Program Outcomes (ABET)

Engineering Criteria

1. an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics
2. an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors
3. an ability to communicate effectively with a range of audiences
4. an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts
6. an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions
7. an ability to acquire and apply new knowledge as needed, using appropriate learning strategies

EE Program Criteria:

EE2 - knowledge of mathematics, basic and engineering sciences necessary to analyze and design complex systems
EE3 - knowledge of advanced mathematics including linear algebra, complex variables and discrete mathematics

Required Textbooks and Software

- Title: Emerging Nanoelectronic Devices
- Author: An Chen et al.
- Publication date, edition, and publisher: 1st edition, Wiley, 2014
- ISBN number: 978-1118447741
- Software: None

(if course notes derived from various published sources are used, provide information above for each source)
(if course notes are developed by the instructor, so state)

Recommended Materials

- None

Course Schedule

Week 1: Brief introduction of field-effect transistors
Week 2-3: State-of-the-art volatile memory devices: DRAM
Week 4-5: SRAM memory device technology (homework1 due)
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Week 10: Resistive memory devices (homework 3 due)
Week 11: Crossbar architecture
Week 12-13: Device models of memristors (homework 4 due)
Week 14: Other devices for neuromorphic computing
Week 15: Final project and presentation

Attendance Policy, Class Expectations, and Make-Up Policy

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Modern Memory Device Technologies

EEL 5XXX Section XXX

Class Periods: TBD

Location: TBD

Academic Term: TBD

Instructor:

- Name: Jing Guo
- Email Address: guoj@ufl.edu
- Office Phone Number: NEB 551
- Office Hours: TBD

Teaching Assistants:

Please contact through the Canvas website

- Name of TA, email address, office location, office hours
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Course Description

This course discusses state-of-the-art volatile and nonvolatile memory device technologies and their limitations. It also discusses emerging memory device technologies, including those that could be adopted by industry in the next decades due to their potential performance, density, power and cost advantages. 3 credit hours.

Course Pre-Requisites / Co-Requisites

Solid State Devices

Course Objectives

The students are expected to understand (1) state-of-the-art memory technologies, (2) emerging memory technologies for future big data applications, (3) mechanisms and limitations of each memory device technology, (4) memristive devices for neuromorphic computing.

Materials and Supply Fees

NA

Required Textbooks and Software

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- Software: None

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Recommended Materials

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Course Schedule

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Week 14: Other devices for neuromorphic computing
Week 15-16: Final project and presentation

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