

Cover Sheet: Request 10591

EEE4379 Mixed Signal IC Testing I

Info

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|-------------|---------------------------------------|
| Process | Course New Ugrad/Pro |
| Status | Pending |
| Submitter | Edvardsson, Laurie laurie@ece.ufl.edu |
| Created | 12/3/2015 9:06:52 AM |
| Updated | 2/9/2016 9:59:09 AM |
| Description | New technical elective. |

Actions

| Step | Status | Group | User | Comment | Updated |
|--|----------|---|------------------|------------------------------|-----------|
| Department | Approved | ENG - Electrical and Computer Engineering 011905000 | Fox, Robert M | | 12/3/2015 |
| No document changes | | | | | |
| College | Approved | ENG - College of Engineering | Caple, Elizabeth | | 1/21/2016 |
| Replaced 4379 Mixed Signal IC Test - ucc1 syl.docx | | | | | 1/6/2016 |
| University Curriculum Committee | Comment | PV - University Curriculum Committee (UCC) | Case, Brandon | Added to the February agenda | 1/22/2016 |
| No document changes | | | | | |
| University Curriculum Committee | Pending | PV - University Curriculum Committee (UCC) | | | 1/22/2016 |
| 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 10591

Info

Request: EEE4379 Mixed Signal IC Testing I
Submitter: Edvardsson, Laurie laurie@ece.ufl.edu
Created: 2/9/2016 9:55:02 AM
Form version: 4

Responses

Recommended Prefix: EEE
Course Level : 4
Number : 379
Lab Code : None
Course Title: Mixed Signal IC Testing I
Transcript Title: Mixed Sig IC Test I
Effective Term : Fall
Effective Year: 2016
Rotating Topic?: No
Amount of Credit: 3
Repeatable Credit?: No
S/U Only?: No
Contact Type : Regularly Scheduled
Degree Type: Baccalaureate
Weekly Contact Hours : 003
Category of Instruction : Joint (Ugrad/Grad)
Delivery Method(s): On-Campus
Course Description : Fundamentals of testing IC devices and systems: test specifications, parametric testing, measurement accuracy, test hardware, sampling theory, digital signal processing based testing, and calibrations. Circuit analysis and design with analog and mixed-signal systems. Labs on testing passive components, LDOs, Op-amps, DACs/ADCs, Mixed-Signal ICs Labview and the National Instruments Savage Tester.
Prerequisites : EEE 3308C(C) & EEE 3701C(C)
Co-requisites : None
Rationale and Placement in Curriculum : This technical elective will teach students about IC testing.
Course Objectives : Students will be able to identify and explain the production testing and validation of mixed-signal ICs and systems.
Course Textbook(s) and/or Other Assigned Reading: a. Title: An Introduction to Mixed-Signal IC Test and Measurement
b. Author: Gordon Roberts, Friedrich Taenzler, Mark Burns
c. Publication date, edition, and company: 2nd Edition, Oxford Press, 2011
d. ISBN number: 978-0199796212
e. Software: LTSPICE or TINA, Workstations with Labview system on campus, off-campus you can use X-Windows or X-terminal on a high-speed internet link to UF Campus Computers

Weekly Schedule of Topics : (3 Classes) Introduction to mixed Signal IC test, Permission and survey, Labview Video Tutorials, NI STS Tester Links, Installing LabView, Intro to NI STS Tester,
Read Chapter 1 Overview of Mixed Signal Testing and Chapter 2 Tester Hardware (2 classes) Test Specification TestStand Notes, TestStand Basics, SMU Article 1, NI Tutorial, SMU Article 2, How to SMU.
Read Chapter 3.1 to 3.6
Homework 1, Problems 2.4, 2.5, 2.7

(3 Classes) Tester Hardware Chapter 2, NI LabView Review, Lab 1B, Capacitance Measurement on the NI STS Tester
 Read Chapter 3.1 to 3.6 DC and Parametric Measurements
 (2 classes) Chapter 3 DC measurements on the Tester., Chapter 3 Exercise Examples, Capacitance Measurement Techniques Article, Device Capacitance Measurement Article
 Read Chapter 3.7 to 3.12, DC and Parametric Measurements
 (2 classes) Chapter 4 Data Analysis, Statistics for IC test, Validation Talk from TI
 Read Chapter 4.1 to 4.3
 (2 classes) Understanding LDO Device Operation, LDO Terms and Measurement, TI LDO chip; Data Sheet, LDO Dropout Measurements, LDO Transient Measurements
 Read Chapter 5 Yield Measurement, Accuracy and Test Time, Homework 3
 (2 classes) Chapter 5 Yield and Measurement Accuracy, NI Measurement Examples, Power and NI HSDIO.
 Homework 2 & 3 Solutions
 (2 classes) Midterm 1, TI Op Amp Test Lecture, OPA277 Spec Sheet
 Homework 4; Chapter 10 Analog Channel Testing
 (2 classes) TI OP Amp Testing Notes 1,
 Read Chapter 10 Analog Channel Testing
 (2 classes) Analog Channel Testing, OP-AMP Test Article Part 1, OP-AMP Test Article
 Homework 5; Homework 4 Solution
 (2 classes) Transmission Line TDR Tektronics, TI Temperature Sensor Test Lecture
 Read Chapter 15 Tester Interfacing DIB Design
 (2 classes) Transmission Line TDR Tektronics, Transmission Line TDR HP, S-Parameter
 Chapter 15 Tester Interfacing DIB Design
 (2 classes) Homework 5 Solution, Chapter 15 DIB board Practice Problems
 (2 classes) Transmission Line TDR HP, S-Parameter Handout Design for Test Techniques, Exam II
 (2 classes) Design for Test Techniques, Research in Mixed Signal IC Test
 Read Chapter 16 Design
Grading Scheme : 50% Exams and Quizzes
 50% Homework and Projects

Homework:

Undergraduates: Typically have 4 to 5 homework questions in each homework set.

Graduates: an additional 2 or 3 more in-depth homework questions at the end of the set.

Laboratories: Both the undergraduates and the graduates use the same test equipment and measure the same IC parts.

Undergraduates: characterize and report the testing of a single IC part.

Graduates: make measurement of multiple parts and answer questions about the statistical behavior of the parts as well as other questions.

Exams: All students take the same exams but the exams are graded against two different curves, a graduate curve and an undergraduate curve so they are considered separately and assigned grades separately.

Instructor(s) : Dr. William Eisenstadt

EEE 5378 Mixed Signal IC Testing I

1. Catalog Description – (3 credits) Fundamentals of Testing IC Devices and systems: test specifications, parametric testing, measurement accuracy, test hardware, sampling theory, digital signal processing based testing, and calibrations. Circuit analysis and design with analog and mixed-signal systems. Labs on testing passive components, LDOs, Op-amps, DACS/ADCs, Mixed-Signal ICs Labview and the National Instruments Savage Tester.
2. Pre-requisites – (EEE 3308C or equivalent) and (EEE 3701C or equivalent) or consent of instructor
3. Course Objectives – Students will be able to identify and explain the production testing and validation of mixed-signal ICs and systems.
4. Contribution of course to meeting the professional component (ABET only – undergraduate courses) – N/A
5. Relationship of course to program outcomes: Skills student will develop in this course (ABET only undergraduate courses) – N/A
6. Instructor – Dr. William Eisenstadt
 - a. Office location: 529 NEB
 - b. Telephone: 352-392-4946
 - c. E-mail address: wre@tec.ufl.edu
 - d. Class Web site: TBD
 - e. Office hours: Monday, Wednesday, Friday, 1:45 p.m.-2:45 p.m.
7. Teaching Assistant - None
 - a. Office location:
 - b. Telephone:
 - c. E-mail address:
 - d. Office hours:
8. Meeting Times and Location - Tuesday, 7th periods 1:55pm to 2:45pm, Thursday 7th and 8th periods (1:55 pm to 3:50pm), NEB 202
9. Class/laboratory schedule - 3 class periods each week consisting of 50 minutes each and 1 laboratory period consisting of 150 minutes
10. Material and Supply Fees - TBD
11. Textbooks and Software Required -
 - a. Title: An Introduction to Mixed-Signal IC Test and Measurement
 - b. Author: Gordon Roberts, Friedrich Taenzler, Mark Burns
 - c. Publication date, edition, and company: 2nd Edition, Oxford Press, 2011
 - d. ISBN number: 978-0199796212

- e. Software: LTSPICE or TINA, Workstations with Labview system on campus, off-campus you can use X-Windows or X-terminal on a high-speed internet link to UF Campus Computers

12. Recommended Reading -

- a. Title: An Introduction to Mixed-Signal IC Test and Measurement
- b. Author: M. Burns and G. Roberts
- c. Publication date and edition: 1st Edition, 2000, Oxford Press
- d. ISBN number: 9780195140163

13. Course Outline (provide topics covered by week or by class period) –

Weekly Date, Class topics, Readings, In Class Notes in pdf form

| Classes | |
|---------|--|
| 3 | Introduction to mixed Signal IC test, Permission and survey, Labview Video Tutorials, NI STS Tester Links, Installing LabView, Intro to NI STS Tester, Read Chapter 1 Overview of Mixed Signal Testing and Chapter 2 Tester Hardware |
| 2 | Test Specification TestStand Notes, TestStand Basics, SMU Article 1, NI Tutorial, SMU Article 2, How to SMU. Read Chapter 3.1 to 3.6 Homework 1, Problems 2.4, 2.5, 2.7 |
| 3 | Tester Hardware Chapter 2, NI LabView Review, Lab 1B, Capacitance Measurement on the NI STS Tester Read Chapter 3.1 to 3.6 DC and Parametric Measurements |
| 2 | Chapter 3 DC measurements on the Tester., Chapter 3 Exercise Examples, Capacitance Measurement Techniques Article, Device Capacitance Measurement Article Read Chapter 3.7 to 3.12, DC and Parametric Measurements |
| 2 | Chapter 4 Data Analysis, Statistics for IC test, Validation Talk from TI Read Chapter 4.1 to 4.3 |
| 2 | Understanding LDO Device Operation, LDO Terms and Measurement, TI LDO chip; Data Sheet, LDO Dropout Measurements, LDO Transient Measurements Read Chapter 5 Yield Measurement, Accuracy and Test Time, Homework 3 |
| 2 | Chapter 5 Yield and Measurement Accuracy, NI Measurement Examples, Power and NI HSDIO. Homework 2 & 3 Solutions |
| 2 | Midterm 1, TI Op Amp Test Lecture, OPA277 Spec Sheet Homework 4; Chapter 10 Analog Channel Testing |
| 2 | TI OP Amp Testing Notes 1, Read Chapter 10 Analog Channel Testing |
| 2 | Analog Channel Testing, OP-AMP Test Article Part 1, OP-AMP Test Article Homework 5; Homework 4 Solution |
| 2 | Transmission Line TDR Tektronics, TI Temperature Sensor Test Lecture |

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|---|---|
| | Read Chapter 15 Tester Interfacing DIB Design |
| 2 | Transmission Line TDR Tektronics, Transmission Line TDR HP, S-Parameter Chapter 15 Tester Interfacing DIB Design |
| 2 | Homework 5 Solution, Chapter 15 DIB board Practice Problems |
| 2 | Transmission Line TDR HP, S-Parameter Handout Design for Test Techniques, Exam II |
| 2 | Design for Test Techniques, Research in Mixed Signal IC Test Read Chapter 16 Design |

14. Attendance and Expectations – All though attendance is not mandatory, absence from class can result in missing materials tested on exams. Students are responsible to study all in class materials including those written on the board and presented orally, all Class Handouts all assigned readings, all projects and homework.

All students are required to have a Gator link account and use Canvas for course handouts, grade information, course notices, etc..

To use the Labview Video Tutorials, set up a new account on the National Instruments training website and then login and following the links on the NI training page.

Cell phones and other electronic devices are to be silenced. No text messaging during class or exams.

Requirements for class attendance and make-up exams, assignments, and other work in this course are consistent with university policies that can be found in the online catalog at: <https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx>

15. Grading –

50% Exams and Quizzes
50% Homework and Projects

Homework:

Undergraduates: Typically have 4 to 5 homework questions in each homework set

Graduates: an additional 2 or 3 harder homework questions at the end of the set.

Laboratories: Both the undergraduates and the graduates use the same test equipment and measure the same IC parts.

Undergraduates: characterize and report the testing of a single IC part.

Graduates: make measurement of multiple parts and answer questions about the statistical behavior of the parts as well as other questions.

Exams: All students take the same exams but the exams are graded against two different curves, a graduate curve and an undergraduate curve so they are considered separately and assigned grades separately.

16. Grading Scale –

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|--------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|------|
| A | A- | B+ | B | B- | C+ | C | C- | D+ | D | D- | E |
| 93-100 | 90-92 | 87-89 | 83-86 | 80-82 | 77-79 | 73-76 | 70-72 | 67-69 | 63-66 | 60-62 | 0-59 |

“Undergraduate students, in order to graduate, 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. Graduate students, in order to graduate, must have an overall GPA of 3.0 or better (B or better).” Note: a B- average is equivalent to a GPA of 2.67, and therefore, it does not satisfy this graduation requirement. For more information on grades and grading policies, please visit:

<https://catalog.ufl.edu/ugrad/current/regulations/info/grades.aspx>

17. Make-Up Exam Policy - If you have a University-approved excuse and arrange for it in advance, or in case of documented emergency, a make-up exam will be allowed and arrangements can be made for making up missed work. University attendance policies can be found at:

<https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx>

Otherwise, make-up exams will be considered only in extraordinary cases, and must be taken before the scheduled exam. The student must submit a written petition to the instructor two weeks prior to the scheduled exam and the instructor must approve the petition.

18. Honesty Policy – UF students are bound by The Honor Pledge which states, “We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honor and integrity by abiding by the Honor Code. On all work submitted for credit by students at the University of Florida, the following pledge is either required or implied: “On my honor, I have neither given nor received unauthorized aid in doing this assignment.” The Honor Code (<http://www.dso.ufl.edu/sccr/process/student-conduct-honor-code/>) specifies a number of behaviors that are in violation of this code and the possible sanctions. Furthermore, you are obligated to report any condition that facilitates academic misconduct to appropriate personnel. If you have any questions or concerns, please consult with the instructor or TAs in this class.
19. Accommodation for Students with Disabilities – Students requesting classroom accommodation must first register with the Dean of Students Office. That office will provide documentation to the student who must then provide this documentation to the course instructor when requesting accommodation.
20. UF Counseling Services – Resources are available on-campus for students having personal problems or lacking clear career and academic goals. The resources include:
 - UF Counseling & Wellness Center, psychological and psychiatric services, 3190 Radio Rd, 392-1575, online: <http://www.counseling.ufl.edu/cwc/Default.aspx>,
 - Career Resource Center, Reitz Union, career and job search services, 392-1601.
 - University Police Department, 392-1111 or 911 for emergencies

21. Software Use – All faculty, staff and student of the University are required and expected to obey the laws and legal agreements governing software use. Failure to do so can lead to monetary damages and/or criminal penalties for the individual violator. Because such violations are also against University policies and rules, disciplinary action will be taken as appropriate. We, the members of the University of Florida community, pledge to uphold ourselves and our peers to the highest standards of honesty and integrity.
22. Course Evaluation – Students are expected to provide feedback on the quality of instruction in this course based on 10 criteria. These evaluations are conducted online at: <https://evaluations.ufl.edu>. Evaluations are typically open during the last two or three weeks of the semester, but students will be given specific times when they are open. Summary results of these assessments are available to students at: <https://evaluations.ufl.edu/results>.