

**Bulletin Course Description:**

Introduction to the measurement of electrical quantities; instrumentation; basic circuits, their operation and applications; electronic devices; amplifiers, oscillators, power supplies, wave-shaping circuits, and basic switching circuits.

**Course Title: Electronics Laboratory A (2 credits)**

Fall 2017

Stony Brook University

Department of Electrical & Computer Engineering

College of Engineering and Applied Sciences

Course Instructor: Prof. Matthew D. Eisaman

**Instructor and TA contact information:**

Prof. Matthew D. Eisaman

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Work Phone: 631-632-8421

Office Location: Light Engineering, 145

Office Hours: Mondays 11:00am - 1:00pm. Always available to answer questions over email.

**Prerequisites:** ESE 271

**Corequisites:** ESE 372

**COURSE REQUIREMENTS**Attendance and Make Up Policy

Late work will not be accepted. Attendance at all exams is mandatory. In the case of: 1) Verifiable illness, 2) Verifiable family emergency, 3) University-sanctioned religious holiday, or 4) Participation in official University-sponsored events (for documented student athletes only), excuse must be documented on official letterhead (as appropriate) and will be verified by the instructor.

Description and schedule of Required Readings and/or Assignments.**REQUIRED TEXTBOOKS**

- D. Johnson et al., "Electric Circuit Analysis, 3rd ed." (Weeks 1-7). Chapters covered: 1, 2, 4, 5, 6, 7, 8, 9, 10, 12, 13, 14, and 15.
- D. Neamen, "Microelectronics Circuit Analysis and Design, 4th ed." (Weeks 8-15). Chapters (paragraphs) covered: 1 (1.1-1.5), 2 (2.1-2.2), 3 (3.1-3.6), 4 (4.1-4.5), 5 (5.1-5.2), 7 (7.1-7.3), 9 (9.1-9.5), 11 (11.1-11.2, 11.6-11.8), 12 (12.1-12.10), 14 (14.1 -14.5)

**ADDITIONAL TEXTBOOKS (NOT REQUIRED):**

- J.A. Svoboda, "PSpice for linear circuits, 2nd ed." (uses PSpice 15, but we use 17.2 in class)
- A.S. Sedra, K.C. Smith, "Microelectronic circuits, 7th ed."
- P. Horowitz and W. Hill, "The Art of Electronics" and "Student Manual for The Art of Electronics"

**SYLLABUS**

Week	Dates (Lec, Lab1, Lab2)	Topics	Text Readings
Week 1	8/28, 8/29 no lab, 8/31 no lab	<b>Lecture 1: Review of basics + PSPICE</b> Lab 1: Analysis of DC and AC circuits using PSpice (Lab in Rm. 281, anytime during CADLAB open hours)	Johnson 1,5,6,8
Week 2: LABOR DAY	<b>9/4 NO LECTURE, 9/5 NO LAB, 9/7 NO LAB</b>	<b>LABOR DAY</b>	none
Week 3	9/11, 9/12, 9/14	<b>Lecture 2: Kirchhoff's voltage/current law</b> Lab 2: Measurement of DC voltages and currents	Johnson 2,4
Week 4	9/18, 9/19, 9/21	<b>Lecture 3: AC signal analysis, QUIZ 1</b> <b>Kirchhoff's Law</b> Lab 3: Measurement of AC signals	Johnson 8,9,10
Week 5	9/25, 9/26, 9/28	<b>Lecture 4: Transient response</b> Lab 4: Transient analysis of RC and LR circuits	Johnson 6
Week 6	10/2, 10/3, 10/5	<b>Lecture 5: Transfer function</b> Lab 5: Frequency response of RC and LR circuits	Johnson 11,12,13, 14
Week 7	10/9, 10/10, 10/12	<b>Lecture 6: Response of higher-order circuits + transformers, QUIZ 2 Transfer functions</b> Lab 6: Frequency response of higher-order circuits (Rm. 281, anytime during the CADLAB open hours)	Johnson 7, 15
Week 8	10/16, 10/17, 10/19	<b>TEST #1</b> Lab 7: Transformers	
Week 9	10/23, 10/24, 10/26	<b>Lecture 7: PN junctions</b> Lab 8: Semiconductor diodes	Neamen 1.1-1.5
Week 10	10/30, 10/31, 11/2	<b>Lecture 8: Diode in electronic circuits</b> Lab 9: Diodes in rectifier circuits	Neamen 2.1-2.2
Week 11	11/6, 11/7, 11/9	<b>Lecture 9: Bipolar Junction Transistors (BJTs) - Principles of operation, QUIZ 3 Diode in circuits</b> Lab 10: Configurations of BJTs in stages	Neamen 5.1-5.2
Week 12	11/13, 11/14, 11/16	<b>Lecture 10: BJT - Equivalent circuit for small signals</b> Lab 11: BJT - Common base, emitter and collector, common emitter amplifier	Neamen 7.1-7.3, 11.1-11.2, 11.6-11.8, 12.1-12.10
Week 13	11/20, <b>11/21 NO LAB, 11/23 NO LAB</b>	<b>Lecture 11: MOSFET, QUIZ 4 BJT</b> <b>No lab - Thanksgiving</b>	Neamen 3.1-3.6, 4.1-4.5
Week 14	11/27, 11/28, 11/30	<b>TEST #2</b> Lab 12: MOSFET differential amplifier	
Week 15	12/4, 12/5, 12/7	<b>Lecture 12: Ideal Operational amplifier</b> Lab 13: Operational amplifiers	Neamen 9.1-9.5, 14.1 -14.5

## LABS

The core of ESE211 is set of laboratory experiments designed for step by step introduction into electronic circuit analysis and design. The weekly (very short) lectures cover (minimum) background for the laboratory experiments (ESE 372 gives full theoretical background). The textbook readings listed in syllabus are to guide you to the relevant sections for each week.

Students will select a laboratory partner at the first meeting of laboratory section. Groups of more than two students are not permitted. Labs will be posted on blackboard one week prior to the lab itself. Each lab posting consists of a prelab assignment that each student must individually complete prior to the lab, and the lab report that is to be submitted at the following week's lab. Lab 1 does not have a prelab.

### Lab Section Requirements

- 1) Please prepare: Read the lab manual carefully and finish the prelab before your section.
- 2) Submit your **last lab report** and get **TA's signature and date** for your **current prelab (one prelab for one student)** at the beginning of each lab.
- 3) Don't Be Late: TA will **not sign the prelab or accept last week's lab after 15 mins** from the beginning of one lab section. **No exceptions.**
- 4) When you finish the lab, **get TA's signature and date for your data sheet.**
- 5) Finish the lab on time: TA will **not sign the data sheet after the end of the section.**

### Lab Report Guidelines

Every laboratory report is written with a particular purpose, and for a particular audience. The content of the report is chosen to fit with its purpose and audience. In ESE211 the audience is your Professor and T.A., and the purpose is education. With those goals in mind we suggest the following lab report contents:

- 1) A title page with the number and name of the lab assignment, your name, your partner's name, the date the lab was performed, the text "ESE211" and your section number.
- 2) A brief introduction. Each lab has one or more important ideas that we are trying to present. In the introduction, you should briefly mention what the important ideas from that lab are.
- 3) A discussion of experiment data and results.
  - *This section should contain all of the graphs and calculations, as well as the answers to the questions posed in the lab assignment.*
  - *Organize and summarize your data and results clearly and neatly in the order of experiment tasks. Messy organization may lose points.*
  - *Correct units must be used in your discussion, calculations, and graphs.*
  - *Graphs must be drawn with instruments or on a computer, and explained.*
  - *Data points must be marked.*
- 4) A brief conclusion. Explain how the data supports (or doesn't support) the main idea of the lab.
- 5) A copy of your data sheets with TA's signature. **(Data sheet cannot serve as the summary of your experimental results.)**
- 6) Individual prelab with TA's signature.
- 7) Any required PSpice results.

### Report Grading Policy

- 1) Lab reports are graded on a 10-point scale including 2-3 points for pre-lab assignment.
- 2) Pre-labs without TA's signature will not be graded.
- 3) Lab reports without signed data sheet will not be graded.
- 4) For simulation labs, each student should submit one lab report individually. For experimental lab, each group should submit one lab report with individual pre-labs for each student.

**GRADING**

Item	Percent
Labwork (prelabs + lab reports)	50
Test 1	20
Test 2	20
Quizzes	10

Grades are based on the following scale:

A = 93-100, A- = 90-92, B+ = 88-89, B = 83-87, B- = 80-82, C+ = 78-79, C = 73-77, C- = 70-72, D+ = 68-69, D = 63-67, F <63

**LAB LOCATIONS**

**Experimental Lab:** Light Engineering, Room **283**, Contact person: Anthony Olivo

**CAD Lab (PSpice):** Light Engineering, Room **281**, Contact person: Scott Campbell

Student will need to obtain account to get access to CAD lab resources. ***Please do this ASAP!!!***

**MEETING SCHEDULE**

Lectures: Monday, 10:00AM - 10:53AM, MELVILLE LBR W4525 WESTCAMPUS

Lab section 1: Tues., 7:00pm - 10:00pm, Light Eng. 283 (PSpice simulation: Light Eng. 281 CAD lab)

Lab section 2: Thurs., 7:00pm - 10:00pm, Light Eng. 283 (PSpice simulation: Light Eng. 281 CAD lab)

Tests and quizzes: During lecture time as indicated on syllabus

Final exam: N/A

**CLASS PROTOCOL**

All electronic devices are to be turned off during class unless advance permission is given by the instructor. No recording of lectures of any kind (including audio and video) is allowed.

**CLASS RESOURCES**

Blackboard (<http://blackboard.stonybrook.edu>) will be used as the primary means of distribution for readings from the primary literature and submission of assignments.

If you have a physical, psychological, medical or learning disability that may impact your course work, please contact Disability Support Services, ECC (Educational Communications Center) Building, room 128, (631) 632-6748. They will determine with you what accommodations, if any, are necessary and appropriate. All information and documentation is confidential.

Students who require assistance during emergency evacuation are encouraged to discuss their needs with their professors and Disability Support Services. For procedures and information go to the following website: <http://www.stonybrook.edu/ehs/fire/disabilities>]

Each student must pursue his or her academic goals honestly and be personally accountable for all submitted work. Representing another person's work as your own is always wrong. Faculty are required to report any suspected instances of academic dishonesty to the Academic Judiciary. Faculty in the Health Sciences Center (School of Health Technology & Management, Nursing, Social Welfare, Dental Medicine) and School of Medicine are required to follow their school-specific procedures. For more comprehensive information on academic integrity, including categories of academic dishonesty, please refer to the academic judiciary website at <http://www.stonybrook.edu/uaa/academicjudiciary/>

Stony Brook University expects students to respect the rights, privileges, and property of other people. Faculty are required to report to the Office of Judicial Affairs any disruptive behavior that interrupts their ability to teach, compromises the safety of the learning environment, or inhibits students' ability to learn. Faculty in the HSC Schools and the School of Medicine are required to follow their school-specific procedures.