



**COLLEGE OF ENGINEERING AND MINES
DEPARTMENT OF ELECTRICAL AND COMPUTER ENGINEERING**







INTRODUCTION TO ELECTRICAL AND COMPUTER ENGINEERING

EE F102-F01
CRN: 32682

SPRING
2023

COURSE OUTLINE

COURSE INFORMATION

TITLE	Introduction to Electrical and Computer Engineering		
LECTURE	Day(s)	Monday, Wednesday	
	Date(s)	17 JAN 2023 – 06 MAY 2023	
	Time	09:15 – 10:15	
	Venue	DU 252	
	Type	In-Person (F2F)	
LABORATORY	Day(s)	Monday	
	Time	14:15 - 17:15	
	Venue	ELIF 331	
	Type	In-Person (F2F)	
CREDITS	3 (2.0 Lecture Hours + 3.0 Laboratory Hours)		
INSTRUCTOR	MAHER AL-BADRI		
	Office	DU 215	
		(907) 474-6049	
		maher.albadri@alaska.edu (Please use your @alaska.edu to contact me)	
	Office	Friday	09:00 - 11:00
	Hours	Other times	By appointment
		Email	Anytime
TEACHING ASSISTANTS	TBA		
	Office		Office
			Hourse
			
	TBA		
	Office		Office
		Hourse	
			
TEXTBOOK(S)	EE102 Lecture Notes and Laboratories		

COURSE DESCRIPTION

Basic modern devices, concepts, technical skills, and instruments of electrical engineering. Students will gain experience in basic circuit analysis and design, usage of various lab instrumentation and computer aided measurement and analysis programs. Students will be provided opportunities to perform on individual assignments and on team assignments.

INSTRUCTION METHODS

In-class lectures are closely integrated with homework exercises, quizzes, laboratory assignments. There are 5 contact hours per week.

PREREQUISITES

Undergraduate - UAF level **MATH F251X (Calculus I)** Minimum Grade of C- or concurrent enrollment
Or permission of instructor.

EVALUATION / GRADING

"+" or "-" grading will be used – see UAF Catalog/Academics for numerical values. Grades will be assigned based on absolute scores.

Homework	150	(15%)
Laboratory	200	(20%)
Team Project	150	(15%)
Mid-Term Exam I	100	(10%)
Mid-Term Exam II	100	(10%)
Final Exam	200	(20%)
Quizzes	50	(5%)
In Class Participation	50	(5%)

TOTAL	1000	(100%)

Letter Grades	Numerical Scale of Grades	Letter Grades	Numerical Scale of Grades
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A+	$96 \leq P$	B-	$75 \leq P < 80$
A	$90 \leq P < 96$	C+	$70 \leq P < 75$
A-	$88 \leq P < 90$	C	$65 \leq P < 70$
B+	$85 \leq P < 88$	C-	$60 \leq P < 65$
B	$80 \leq P < 85$	F	$P < 60$

COURSE POLICIES

HOMEWORK

- Homework will typically be assigned on a weekly basis.
- Homework shall be submitted at the date and time issued by the instructor and shown on the homework Cover Page and the course CANVAS. No late homework will be accepted unless previously authorized by the instructor. **No late homework will be accepted under any circumstance once the homework solution is posted.**
- Discussion of solution techniques with your fellow students is encouraged, however, **Direct copying of solutions from classmates or solution manuals will result in "zero" points.**
- **Add your name on the Cover Page** and make it the first page of your electronic document.
- Homework shall be submitted electronically via **CANVAS Assignments**. Any assignment sent directly to the instructor or TA's emails, will be declined.

- Homework solution will be posted on CANVAS when the submission process is complete.

QUIZZES

- Short 15-minute quizzes (6-8 total) will be given (normally at the end of lecture) throughout the semester.
- Quizzes are **closed book** and **closed notes**. Formulas (if needed) will be provided by the instructor.
- Quizzes are meant to help you judge your understanding of the material as the course progresses.
- **Make-up quizzes will not be given.** However, at the end of the semester, **the lowest quiz grade will be assigned to only one missing quiz. Any other missing quizzes will result in zero points.**

LABORATORY

- Every week, students will either be in the lab doing individual lab assignments or will be working on team projects. **Participation in the team is mandatory.** The level of participation will be determined at the end of the semester by the team members.
- Each student will be required to generate a report for each laboratory. **Direct copying of a classmate's or lab partner's report will result in "zero" points.**
- **ALL LABORATORIES MUST BE ATTENDED AND COMPLETED (INCLUDING LAB REPORTS) TO PASS THE COURSE.** Do not miss lab sessions as they are virtually impossible to make up.
- A laboratory syllabus including lab report format, grading, and policies will be handed out at the first lab.
- Instructions for each lab assignment will be posted on the course CANVAS before the scheduled laboratory.
- **Add your name on the Cover Page** provided for each laboratory, and make it the first page of your electronic document.
- Laboratory reports shall be submitted electronically via **CANVAS Assignments**. Any report sent directly to the instructor or TA's emails, will be declined.
- **Late report submission will result in a penalty of 1% reduction of total points earned for that late report for each day that follows the set deadline.**

TEAM PROJECT

The Team Project Assignment will fill up student's laboratory time for the remainder of the semester, following the last laboratory session. Typically, it starts after the spring break. Project description and details will be given by the instructor before the spring break.

EXAMS

- Exams are **closed book** and **closed notes** with **two** Mid-Term Exams and Final Exam. Formula sheet will be posted on the course CANVAS prior to each exam and a copy will be made available to students during the exam. .
- **Laptops, cell phones, and calculators with communication capability (Bluetooth, etc.) are not permitted to be used during the exams.**
- Absences from exams must be preceded by a valid excuse. **In the event of a valid excused absence it is the student's responsibility to contact the instructor to arrange for a make-up exam prior to the regularly scheduled exam.**
- Exam package will be provided by the instructor which includes Test Booklet, Answer Booklet, and Formula Sheet. Those materials are collected by the instructor at the end of the exam.

CHEATING / PLAGIARISM

Cheating and plagiarism will not be tolerated and will result in failure of the course. Please review the University of Alaska Fairbanks [Academic Misconduct Policy](#).

ATTENDANCE

Class attendance is mandatory. **Attendance will be taken and will count towards the participatory part of your grade.**

As directly quoted from the UAF Course Catalog under [UAF Academics and Regulations: Attendance](#): **"You are expected to adhere to the class attendance policies set by your instructors. If you miss class, you are responsible for conferring with your instructor concerning your absence, and to discuss the possibilities for arranging alternative learning opportunities".**

GENERAL ABET ENGINEERING PROGRAM CRITERIA

The B.S.E.E. program at UAF is accredited by the Accreditation Board for Engineering and Technology (ABET). Accreditation requires that all students graduating from this program must achieve the following Student Outcomes.

Engineering programs must demonstrate that their graduates have:

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
5. An ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives
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.

GENERAL ABET CRITERIA SATISFIED BY EE 102

Specific topics are used in EE 102 to demonstrate the learning outcomes listed below.

1. The student will be able to:

- Understand the relationships between voltage, current, and power in circuit elements and be able to use those relationships to analyze and/or design a circuit.
- Understand I-V curves and be able to use I-V curves to identify source and load regions and to analyze and/or design a circuit.
- Understand the concept of an electric circuit and be able to apply Kirchhoff's voltage and current laws and Ohm's law to simple electrical circuits.
- Understand B-H curves and be able to use B-H curves to analyze a simple magnetic circuit.
- Understand the concept of a magnetic circuit and be able to apply Ampere's law to simple magnetic circuits.
- Analyze diode and transistor circuits when those components are used as switches.

3. an ability to communicate effectively with a range of audiences

STUDENT LEARNING OUTCOMES

- The students will be able to generate well written lab reports and provide oral presentation of their design project.
5. **an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives**
 - Attend meetings, met deadlines, followed through on commitments, did fair share of work, and stayed focused on goals.
 - Open to ideas of others, treat others respectfully, participate in discussions, support others, display positive attitude, and help improve teamwork.
 6. **an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgement to draw conclusions**
 - Use common lab equipment safely and effectively to test circuits and measure electrical signals.
 - Understand the concepts of accuracy and precision as applied to measured and calculated quantities.
 - Use computer simulation tools (PSpice) to simulate simple circuits.

SYLLABUS ADDENDUM

COVID-19 STATEMENT

Students should keep up-to-date on the university's policies, practices, and mandates related to COVID-19 by regularly checking this website:

<https://sites.google.com/alaska.edu/coronavirus/uaf?authuser=0>

Further, students are expected to adhere to the university's policies, practices, and mandates and are subject to disciplinary actions if they do not comply.

STUDENT PROTECTIONS STATEMENT

UAF embraces and grows a culture of respect, diversity, inclusion, and caring. Students at this university are protected against sexual harassment and discrimination (Title IX). Faculty members are designated as responsible employees which means they are required to report sexual misconduct. Graduate teaching assistants do not share the same reporting obligations. For more information on your rights as a student and the resources available to you to resolve problems, please go to the following site:

<https://catalog.uaf.edu/academics-regulations/students-rights-responsibilities/>.

DISABILITIES STATEMENT

I will work with the Office of Disability Services to provide reasonable accommodation to students with disabilities. Disability Services is located in 208 Whitaker, 474-5655, fydso@uaf.edu.

STUDENT ACADEMIC SUPPORT

- Speaking Center (907-474-5470, uaf-speakingcenter@alaska.edu, Gruening 507)
- Writing Center (907-474-5314, uaf-writing-center@alaska.edu, Gruening 8th floor)
- UAF Math Services, uafmathstatlab@gmail.com, Chapman Building (for math fee paying students only)
- Developmental Math Lab, Gruening 406
- The Debbie Moses Learning Center at CTC (907-455-2860, 604 Barnette St, Room 120, <https://www.ctc.uaf.edu/student-services/student-success-center/>)
- For more information and resources, please see the Academic Advising Resource List (https://www.uaf.edu/advising/lr/SKM_364e19011717281.pdf).

STUDENT RESOURCES

- Disability Services (907-474-5655, uaf-disability-services@alaska.edu, Whitaker 208)
- Student Health & Counseling [6 free counseling sessions] (907-474-7043, <https://www.uaf.edu/chc/appointments.php>, Whitaker 203)
- Center for Student Rights and Responsibilities (907-474-7317, uaf-studentrights@alaska.edu, Eielson 110)
- Associated Students of the University of Alaska Fairbanks (ASUAF) or ASUAF Student Government (907-474-7355, asuaf.office@alaska.edu, Wood Center 119)

EFFECTIVE COMMUNICATION/ WRITING ASSISTANCE

Students who have difficulties with oral presentations and/or writing are strongly encouraged to get help from the UAF Department of Communication's Speaking Center (907-474-5470, speak@uaf.edu) and the UAF English's Department's Writing Center (907-474-5314, Gruening 8th floor), and/or CTC's Learning Center (604 Barnette St, 907-455-2860). Writing assistance is available at the English Writing Center in Gruening 801, 474-5314.

NON- DISCRIMINATION STATEMENT

The University of Alaska is an affirmative action/equal opportunity employer and educational institution. The University of Alaska does not discriminate on the basis of race, religion, color, national origin, citizenship, age, sex, physical or mental disability, status as a protected veteran, marital status, changes in marital status, pregnancy, childbirth or related medical conditions, parenthood, sexual orientation, gender identity, political affiliation or belief, genetic information, or other legally protected status. The University's commitment to nondiscrimination, including against sex discrimination, applies to students, employees, and applicants for admission and employment. Contact information, applicable laws, and complaint procedures are included on UA's statement of nondiscrimination available at www.alaska.edu/nondiscrimination. For more information, contact:

UAF Department of Equity and Compliance
1760 Tanana Loop
355 Duckering Building
Fairbanks
AK 99775
907-474-7300
uaf-deo@alaska.edu


INTRODUCTION TO ELECTRICAL AND COMPUTER ENGINEERING

Tentative Lecture and Laboratory Schedule

All dates and topics are tentative. Midterm exam dates are subject to change

W	MONDAY		TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
	09:15 – 10:15	14:15 – 17:15		09:15 – 10:15		
	16 JAN 2023		17 JAN 2023	18 JAN 2023	19 JAN 2023	20 JAN 2023
I	PUBLIC HOLIDAY ALASKA CIVIL RIGHTS DAY		NO CLASS	LECTURE 1 Course Introduction, Units, and Numbers	NO CLASS	NO CLASS
	23 JAN 2023		24 JAN 2023	25 JAN 2023	26 JAN 2023	27 JAN 2023
II	LECTURE 2 Waveforms CHAPTER 1	LABORATORY 1 Resistance Measurements	NO CLASS	LECTURE 3 Basic Concepts (I) CHAPTER 2	NO CLASS Homework 1 Assignment	NO CLASS
	30 JAN 2023		31 JAN 2023	01 FEB 2023	02 FEB 2023	03 FEB 2023
III	LECTURE 4 Basic Concepts (II) CHAPTER 2	LABORATORY 2 Voltage/Current Measurements Simulation Lab 1 Report Submission Due	NO CLASS	LECTURE 5 Basic Laws (I) CHAPTER 3 Quiz 1	NO CLASS Homework 2 Assignment	NO CLASS Homework 1 Submission Due
	06 FEB 2023		07 FEB 2023	08 FEB 2023	09 FEB 2023	10 FEB 2023
IV	LECTURE 6 Basic Laws (II) CHAPTER 3	LABORATORY 3 Arduino Programming Lab 2 Report Submission Due	NO CLASS	LECTURE 7 Resistance (I) CHAPTER 4 Quiz 2	NO CLASS Homework 3 Assignment	NO CLASS Homework 2 Submission Due

	W	MONDAY		TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
		09:15 – 10:15	14:15 – 17:15		09:15 – 10:15		
V		13 FEB 2023		14 FEB 2023	15 FEB 2023	16 FEB 2023	17 FEB 2023
		LECTURE 8 Resistance (II) CHAPTER 4	LABORATORY 4 Temperature Sensor Design	NO CLASS	LECTURE 9 Circuit Analysis (I) CHAPTER 5 Quiz 3	NO CLASS	NO CLASS
VI		20 FEB 2023		21 FEB 2023	22 FEB 2023	23 FEB 2023	24 FEB 2023
		LECTURE 10 Circuit Analysis (II) CHAPTER 5	LABORATORY 5 Board Layout Lab 4 Report Submission Due	NO CLASS	MID-TERM EXAMINATION I (Lectures 1-10)	NO CLASS	NO CLASS Lab 3 Report Submission Due
VII		27 FEB 2023		28 FEB 2023	01 MAR 2023	02 MAR 2023	03 MAR 2023
		LECTURE 11 Magnetism (I) CHAPTER 6	LABORATORY 6 Solder – Prototype No report is required for lab 6 Lab 5 Report Submission Due	NO CLASS	LECTURE 12 Magnetism (II) CHAPTER 6	NO CLASS Homework 4 Assignment	NO CLASS
VIII		06 MAR 2023		07 MAR 2023	08 MAR 2023	09 MAR 2023	10 MAR 2023
		LECTURE 13 Magnetism (III) CHAPTER 6	LABORATORY 7 Atmospheric Temperature Data Logger This lab report shall be made the FINAL REPORT	NO CLASS	LECTURE 14 Magnetism (IV) CHAPTER 6 Quiz 4	NO CLASS	NO CLASS Homework 4 Submission Due

W	MONDAY		TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
	09:15 – 10:15	14:15 – 17:15		09:15 – 10:15		
	13 MAR 2023		14 MAR 2023	15 MAR 2023	16 MAR 2023	17 MAR 2023
IX						
	20 MAR 2023		21 MAR 2023	22 MAR 2023	23 MAR 2023	24 MAR 2023
X	LECTURE 15 I-V Characteristics (I) CHAPTER 7	TEAM PROJECT Task 1 Lab FINAL REPORT Submission Due	NO CLASS	LECTURE 16 I-V Characteristics (II) CHAPTER 7 Quiz 5	NO CLASS Homework 5 Assignment	NO CLASS
	27 MAR 2023		28 MAR 2023	29 MAR 2023	30 MAR 2023	31 MAR 2023
XI	LECTURE 17 Diodes (I) CHAPTER 8	TEAM PROJECT Task 2 Task 1 Report Submission Due	NO CLASS	LECTURE 18 Diodes (II) CHAPTER 8 Quiz 6	NO CLASS Homework 6 Assignment	NO CLASS Homework 5 Submission Due
	03 APL 2023		04 APL 2023	05 APL 2023	06 APL 2023	07 APL 2023
XII	LECTURE 19 Transistors (I) CHAPTER 9	TEAM PROJECT Task 3 Task 2 Report Submission Due	NO CLASS	LECTURE 20 Transistors (II) CHAPTER 9 Quiz 7	NO CLASS	NO CLASS Homework 6 Submission Due

W	MONDAY		TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
	09:15 – 10:15	14:15 – 17:15		09:15 – 10:15		
XIII	10 APL 2023		11 APL 2023	12 APL 2023	13 APL 2023	14 APL 2023
	LECTURE 21 Transistors (III) (Review) CHAPTER 9	TEAM PROJECT Task 4 Task 3 Report Submission Due	NO CLASS	MID-TERM EXAMINATION II (Lectures 11-21)	NO CLASS	NO CLASS
XIV	17 APL 2023		18 APL 2023	19 APL 2023	20 APL 2023	21 APL 2023
	LECTURE 22 Digital Circuits (I) CHAPTER 10	TEAM PROJECT Task 5 Task 4 Report Submission Due	NO CLASS	LECTURE 23 Digital Circuits (II) CHAPTER 10 Quiz 8	NO CLASS	Task 5 Final Report & PowerPoint Submission Due
XV	24 APL 2023		25 APL 2023	26 APL 2023	27 APL 2023	28 APL 2023
	TEAM PROJECT Presentation & Critical Design Review	TEAM PROJECT Presentation & Critical Design Review	NO CLASS	FINAL EXAM REVIEW	NO CLASS	NO CLASS
XVI	01 MAY 2023		02 MAY 2023	03 MAY 2023	04 MAY 2023	05 MAY 2023
	FINAL EXAM REVIEW	FINAL EXAM REVIEW	No Classes Last day of instruction 01 MAY 2023			FINAL EXAMINATION 08:00 - 10:00 DU 252