ÇANKAYA UNIVERSITY
Faculty of Engineering and Architecture
Course Definition Form

This form should be used for both a new elective or compulsory course being proposed and curricula development processes for an undergraduate curriculum at Çankaya University.

Please fill in the form completely and submit the printed copy containing the approval of the Department Chair to the Dean's Office, and mail its electronic copy to sercing@cankaya.edu.tr. Upon the arrival of *both copies*, the printed copy will be forwarded to the Faculty Academic Board for approval. Incomplete forms will be returned back to the Department. The approved form is finally sent to the President's office for Senate's approval.

Part I. Basic Course Information

Department Name *Use capital letters only*	ELECTRONICS AND COMMUNICATION ENGINEERING	Dept. Numeric Code	1 4
Course Code (Dept. Code+Course No)	E C E 2 4 6	Number of weekly lecture hours	3
Number of weekly lab/ tutorial hours	2	Number of Credit Hours	4
Course Web Site *Use capital letters only*	http://ece246.cankaya.edu.tr/	ECTS Credit	0 5

Course Name
This information will appear in the printed catalogs and on the web online catalog.

English Name *maximum 40 characters*
Fundamentals of Electronics + Laboratory

Abbreviated English Name *maximum 15 characters*
Fund.Elect. + Lab

Turkish Name *maximum 40 characters*
Temel Elektronik I+ Laboratuar

Abbreviated Turkish Name *maximum 15 characters*
Tem.Elekt. I+ Lab

Prerequisites (if any)
Give course codes and check all that are applicable.

1st | 2nd | 3rd | 4th

☐ Consent of the Instructor
☐ Senior Standing
☐ Give others, if any.

Co-requisites (if any)

1st | 2nd | 3rd | 4th

Course Type
Check all that are applicable

☒ Must course for Dept. ☐ Must course for other dept(s) ☐ Elective course for Dept. ☐ Elective course for other dept(s)

Is the new course **replacing** a former course in the curriculum**?**			
Former Course's Code	Dept. Code+Course No	Former Course's Name	
Is there any similar course which has content **overlap** with other courses offered by the university**?**			☐ Yes ☒ No
Most Similar Course	Dept. Code+Course No	Course Name	

Frequency of Offerings *Check all semesters that the course is planned to be offered.*	☐ Fall	☒ Spring	☐ Summer

First Offering					
Academic Year	200 2 / 200 3	Semester	☒ Spring	☐ Fall	
Maximum **Class Size** Proposed	60	Student **Quota** for Other Departments	5	Approximate **Number of Students** Expected to Take the Course	50

Part II. Detailed Course Information

Justification for the proposal *Maximum 80 words*

This course provides the fundamentals of electronics to the students. It is the first course about electronic devices and circuits. The basic semiconductor devices, such as diodes, bipolar junction transistor (BJTs), field effect transistors (FETs), and their various types (JFET, MOSFET etc.), their principles of operations, basic circuits and their analyses and applications, device models (dc and ac) are among the subjects of this course. This course provides the most basic and necessary subjects regarding electronics to the students.

Course Description
Provide a brief overview of what is covered during the semester. This information will appear in the printed catalogs and on the web online catalog. Maximum 60 words.

Basic semiconductor physics, diodes and diode circuits, bipolar junction transistors, biasing the BJTs, small signal operations, Field effect transistors, biasing the FETs, small signal operations, frequency responses of the small signal amplifiers

Course Objectives
Explain the aims of the course. Maximum 100 words.

1) Explanation of the physical structure of the semiconductors.
2) Analysis of a pn diode operation, description of the device characteristics
3) Investigation of diode circuits and applications
4) Analysis of a BJT, description of device characteristics
5) Definition of DC biasing circuits of BJTs, distinguishing the differences between circuits
6) Analysis of a JFET, description of device characteristics
7) Definition of DC biasing circuits of FETs, distinguishing the differences between circuits
8) Illustration of the differences between FET types (JFETs, MOSFETs, D- MOSFETs, E-MOSFETs)
9) Demonstration of the frequency behavior of an amplifier

Learning Outcomes
Explain the learning outcomes of the course. Maximum 10 items.

1. Define how a diode, a BJT and a FET operate.
2. Identify, distinguish and calculate the diode, BJT transistor and FET circuits.
3. Analyze the dc biasing circuits of BJTs and FETs.
4. Calculate and distinguish the small signal voltage amplification, input and output impedances of BJT and FET circuits
5. Interpret the frequency behavior of an amplifier
6. Draw the Bode plot for an amplifier, compute the critical frequencies, evaluate the performance
7. Analyze and design a dc rectifier circuit

Course Classification
Give the appropriate percentages for each category.

Category	Percentage
Mathematics & Natural Sciences	30%
Engineering Sciences	20%
Engineering Design & Technology	50%
Architectural Theory & History	0%
Architectural Design & Planning	0%
Administrative Sciences	0%
Humanities & Law	0%
Arts	0%

Course Outline
List the topics covered within each week.

Week	Topic(s)
1	Semiconductor Diodes
2-3	Diode Applications
4	Bipolar Junction Transistors (BJTs)
5-6	DC Biasing-BJTs
7	Field Effect Transistors (FETs)
8	FET Biasing (JFET, MOSFET)
9	BJT Modeling-Small Signal Analysis
10	FET Modeling-Small Signal Analysis
11-12	MOSFET modeling and small signal analysis
13-14	BJT and FET Frequency Response

Textbook(s)
List the textbook(s), if any, and other related main course materials.

Author(s)	Title	Publisher	Publication Year	ISBN
R.L. Boylestadt, L. Nashelsky	Electronic Devices and Circuit Theory 10th edition	Prentice-Hall, Inc.	2009	978-0-13-606463-3

Reference Books
List the reference books as supplementary materials, if any.

Author(s)	Title	Publisher	Publication Year	ISBN
F.H. Mitchell,JR, F.H. Mitchell, SR	Introduction to Electronics Design 2nd edition	Prentice-Hall, Inc.	1992	
Adel S. Sedra and Kenneth C. Smith	Microelectronic Circuits	Oxford University Press	1998	

Teaching Policy
Explain how you will organize the course (lectures, laboratories, tutorials, studio work, seminars, etc.)

3 hours of lecturing and 2 hours of laboratory per week

Laboratory/Studio Work
Give the number of laboratory/studio hours required per week, if any, to do supervised laboratory/studio work, and list the names of the laboratories/studios in which these sessions will be conducted.

2 laboratory hours per week per group. There will be 3 groups. Experiment sheets were prepared and an assistant will support the laboratory hours.

Computer Usage
Briefly describe the computer usage and the hardware/software requirements in the course.

SPICE or Proteus type circuit design, analysis and simulation tools will be taught during laboratory hours. Students will verify their experimental results by using these tools.

Grading Policy
List the assessment tools and their percentages that may give an idea about their relative importance to the end-of-semester grade.

Assessment Tool	Quantity	Percentage	Assessment Tool	Quantity	Percentage	Assessment Tool	Quantity	Percentage
Homework	4	2.5%	Case Study			Attendance	42 hours	2.5
Quiz			Lab Work	28 hours	25%	Field Study		
Midterm Exam	1	30%	Class Participation					
Term Paper			Oral Presentation					
Project			Final Exam	1	40%			

ECTS Workload
List all the activities considered under the ECTS.

Activity	Quantity	Duration (hours)	Total Workload (hours)
Attending Lectures (*weekly basis*)	14	3	42
Attending Labs/Recitations (*weekly basis*)	14	2	28
Preparation beforehand and finalizing of notes (*weekly basis*)	14	1	14
Collection and selection of relevant material (*once*)	1	3	3
Self study of relevant material (*weekly basis*)	14	1	14
Homework assignments	4	3	12
Preparation and after work for Laboratories	14	1	14
Preparation for Midterm Exams (*including the duration of the exams*)	1	8	8
Preparation of Term Paper/Case Study Report (*including oral presentation*)	0		0
Preparation of Term Project/Field Study Report (*including oral presentation*)	0		0
Preparation for Final Exam (*including the duration of the exam*)	1	15	15
		TOTAL WORKLOAD	150
		TOTAL WORKLOAD / 30	5.0
		ECTS Credit	**5**

Program Qualifications vs. Course's Learning Outcomes

Consider the below program qualifications determined in terms of learning outcomes of all the courses in the curriculum and capabilities. Look at the learning outcomes of this course given above. Relate these two using the Likert Scale by marking with X in one of the five choices at the right..

No	Program Qualifications (Specific to each program)	Contribution				
		0	**1**	**2**	**3**	**4**
ECE-01	Adequate knowledge in mathematics, science and engineering subjects pertaining to Electronics and Communication Engineering; ability to use theoretical and applied information in these areas to model and solve Electronics and Communication Engineering problems.			**X**		
ECE-02	Ability to identify and define complex Electronics and Communication Engineering problems; ability to select and apply proper analysis tools and operations research methods and modeling techniques for formulating and solving such problems.			**X**		
ECE-03	Ability to analyze a complex system and/or a subsystem or a process and ability to design it under realistic constraints and conditions, in such a way as to meet the desired result; ability to apply modern systems design methods for this purpose.			**X**		
ECE-04	Ability to devise, select, and use modern techniques and computing tools needed for Electronics and Communication Engineering practice; ability to employ and make use of information technologies effectively with the knowledge of state-of-the art hardware but mostly software capabilities related to Electronics and Communication Engineering			**X**		
ECE-05	Ability to design and conduct experiments, gather data, analyze and interpret results for investigating engineering problems in general and for systems analysis, design, implementation and continuous improvement from Electronics and Communication Engineering perspective in particular.				**X**	
ECE-06	Ability to search data bases and other information sources effectively; ability to identify and extract effectively the required information and knowledge from literature and other open sources.			**X**		
ECE-07	Ability to work individually, to take independent initiatives, to create original inferences and to work in teams efficiently; ability to collaborate effectively in intra-disciplinary and multi-disciplinary teams; ability to take responsibility within teams.			**X**		
ECE-08	Ability to communicate effectively in Turkish, both orally and in writing and knowledge of a minimum of one foreign language (English in particular) at a fluency level enough to follow easily Electronics and Communication Engineering knowledge presented in that language and enough to communicate effectively with colleagues.		**X**			
ECE-09	Ability to report the findings, conclusions and interpretations related to a project, ability to write technical reports, to prepare and conduct effective presentations.			**X**		
ECE-10	Recognition of the need for lifelong learning; ability to access information, to follow developments in science and technology, and to keep continuous self-improvement.			**X**		
ECE-11	Awareness of professional and ethical responsibility issues and their legal consequences.		**X**			
ECE-12	Awareness of environmental issues, occupational safety and health, and their legal consequences.	**X**				
ECE-13	Knowledge about contemporary issues and the global and societal effects of engineering practices; awareness of the legal consequences of engineering solutions; awareness of entrepreneurship, innovation, and sustainable development.	**X**				

Contribution Scale to a Qualification: **0**-None, **1**-Little, **2**-Medium, **3**-Considerable, **4**-Largest

Other Relevant Information

Part III. Approval Process

Names of other **faculty** members who may be interested in **teaching** this course *Give the Academic Title first.*		**Proposed by**	Faculty Member *Give the Academic Title first.*	Signature
Göker Şener			Assoc. Prof. Dr. Celal Zaim Çil	
Date	Dec 2009			

Departmental Board Meeting Date		Meeting Number		Decision Number	
Department Chair	Assoc. Prof. Dr. Celal Zaim ÇİL	Signature		Date	

Faculty Academic Board Meeting Date		Meeting Number		Decision Number	
Dean	Prof. Dr. Levent KANDİLLER	Signature		Date	

Senate Meeting Date		Meeting Number		Decision Number	