

DEPARTMENT OF MECHATRONIC ENGINEERING
COURSE SYLLABUS

Course Details				
Code	Academic Year			Semester
ETE 311	3			1
Title	T	A	L	ECTS
Electronics I : Semiconductor Components	3	1	1	6
Language	German			
Level	Undergraduate	X	Graduate	Postgraduate
Department / Program	Mechatronics Engineering			
Forms of Teaching and Learning	Face-to-face study			
Course Type	Compulsory	X	Elective	
Objectives	The aim of this course is to understand the basic circuit elements and semiconductor elements used in electronic circuits, to gain the ability to measure, robustness test and use, to gain the ability of diode and transistor, used in DC and AC circuits to become.			
Content	<ul style="list-style-type: none"> • PN connection: load transfer, diffusion voltage, Boltzmann factor, Characteristic, breakthrough, barrier layer / diffusion capacity, Small signal response, charge switching behavior of the control model, • Diodes: PIN diodes, tunnel / zener diodes, photo diodes, solar cells, LEDs, Semiconductor laser diode circuits, - Bipolar transistor: circuit based on the input and output characteristics, Functional principle, input and output characteristics of the emitter circuit, Early effect, increase in capacity, static, dynamic behavior, • MOS transistor: MOS varactor, inversion, metal-semiconductor contact, Characteristic, channel clamping, equivalent circuit, limit frequency, Simulation parameters, short channel, thyristor, power MOS, IGBT 			
Prerequisites	-			
Coordinator	-			
Lecturer(s)	-			
Assistant(s)	-			
Work Placement	-			
Recommended or Required Reading				
Books / Lecture Notes	<ul style="list-style-type: none"> • Semiconductor circuit technology, Ulrich Tietze, Christoph Schenk, Eberhard Gamm, Springer, 15. Baskı, 2016 • Microelectronic Circuits, Adel Sedra, Kenneth Smith, Oxford, 7. Baskı, 2015 			
Other Sources	-			
Additional Course Material				
Documents	-			

DEPARTMENT OF MECHATRONIC ENGINEERING
COURSE SYLLABUS

Assignments	5 Homeworks
Exams	1 Midterm exam, 1 Final exam

Course Composition

Mathematics und Basic Sciences		20 %
Engineering		20 %
Engineering Design		20 %
Social Sciences		%
Educational Sciences		%
Natural Sciences		%
Health Sciences		%
Expert Knowledge		40 %

Assessment

Activity	Count	Percentage (%)
Midterm Exam	1	30
Quiz		
Assignments	5	20
Attendance		
Recitations		
Projects		
Final Exam	1	50
Total		100

ECTS Points and Work Load

Activity	Count	Duration	Work Load (Hours)
Lectures	14	4	56
Self-Study			
Assignments	5	3	15
Presentation / Seminar Preparation			
Midterm Exam	1	8	8
Recitations	14	4	56
Laboratory	14	2	28
Projects			
Final Exam	1	10	10
Total Work Load			173
ECTS Points (Total Work Load / Hour)			6

Learning Outcomes

DEPARTMENT OF MECHATRONIC ENGINEERING
COURSE SYLLABUS

1	Basics of mathematics and science
2	Basics of engineering Skills for using software tools
3	Definition of problems in the field of engineering, development and implementation of solution approaches
4	Experimental basis and interpretation of the results
5	Interdisciplinary learning skills
6	Ability to work in groups
7	Preparation for the lifelong learning process
8	Ethics, awareness of safety, health, the environment and social contribution
9	Engineering applications
10	Social science skills
11	Oral and written communication and presentation skills
12	

Weekly Content

1	Use of measuring equipment, pn semiconductor diode structure, distribution of the Electron hole densities
2	Equivalent circuit diagrams for diodes with simulation programs
3	Investigation of the diode properties
4	Rectifiers with peak and mean value
5	Trim and clamp circles
6	Structure and operating point of the Bipolar Junction Transistor (BJT)
7	Intermediate exams
8	Zener diode characteristics, voltage stabilization with Zener diode
9	Input and output characteristics of the BJT transistor
10	Functioning of common emitter and basal connections
11	Dynamic operation of the articulated collector connection
12	Field effect transformers (JFET, MOSFET)
13	Input / output characteristics, common source, common drain and Common gate circuit structures
14	DC Analysis and Applications of FET Circuits
15	Final exam

Contribution of Learning Outcomes to Program Objectives (1-5)

	P1	P2	P3	P4	P5	P6	P7
1							
2							

DEPARTMENT OF MECHATRONIC ENGINEERING
COURSE SYLLABUS

3							
4							
5							
6							
7							
8							
9							
10							
11							
12							
Contribution Level	1: Low 2: Low-intermediate 3: Intermediate 4: High 5: Very High						
Compiled by:							
Date of Compilation:							