

**TISHK INTERNATIONAL UNIVERSITY**  
**FACULTY OF EDUCATION**  
**Department of PHYSICS EDUCATION,**  
**2022-2023 Spring**  
**Course Information for PHYS 322 ELECTRONICS (Spring)**

<b>Course Name:</b>	ELECTRONICS (Spring)				
<b>Code</b>	<b>Regular Semester</b>	<b>Theoretical</b>	<b>Practical</b>	<b>Credits</b>	<b>ECTS</b>
PHYS 322	6	3	2	4	
<b>Name of Lecturer(s):</b>	Muhammad Hisham				
<b>Teaching Assistant:</b>	Sebur				
<b>Course Language:</b>	English				
<b>Course Type:</b>	Non-area Elective				
<b>Office Hours</b>	9-10				
<b>Contact Email:</b>	muhammad.hisham@tiu.edu.iq				
	Tel:07503830159				
<b>Teacher's academic profile:</b>	PhD in Applied and Engineering Physics				
<b>Course Objectives:</b>	<ul style="list-style-type: none"> <li>• To help students acquire the knowledge about electronics needed for understanding electronic devices and tools which are embedded our surroundings.</li> <li>• To help students acquire practical experiences which will enable them to develop skills in the use of tools, materials and processes associated with the electronics area.</li> <li>• To provide students with the fundamentals of the electronic devices and their application.</li> <li>• To provide students with the basic concepts and principles used in the electronic field.</li> <li>• To provide students with knowledge of theory and application of electronic devices and circuits</li> <li>• To provide students with basic knowledge of electronic and electrical drawings.</li> </ul>				
<b>Course Description (Course overview):</b>	<p>This course will address the following topics: Charge, electric fields in continuous and non-continuous charge distributions, dielectrics, energy and combinations of capacitors, Semiconductors, N-type silicon, P-type silicon, Water Analogy of Diodes, Open-Circuit Voltage Gain, Voltage Gain, Current Gain, Power Gain, DC Input Power, Conservation of Power, Efficiency, Current Amplifier Model, Diodes (pn junctions; Ideal diodes; diodes with a turn-on voltage; circuits with ideal diodes; rectifiers; limiters; regulators), op amps, Rectification, Amplification, coupling Amplifiers, Oscillation, Transistors(BJT, JFET, and MOSFETS in amplifiers and in digital logic circuits), Bipolar junction transistor, Optoelectronics, Light-Emitting Diodes (LEDs), Photoresistors, Photodiode, Solar Cell.</p>				

**COURSE CONTENT**

Week	Hour	Date	Topic
1	3	29/1-2/2/2023	registration
2	3	5-9/2/2023	introduction to the course
3	3	12-16/2/2023	Atomic structure
4	3	19-23/2/2023	energy band model
5	3	26/2-2/3/2023	Introduction to semiconductors
6	3	5-9/3/2023	Passive and active devices
7	3	12-16/3/2023	Diodes and transistors structure and Physics
8	3	19-23/3/2023	Diodes in circuits
9	3	26-30/3/2023	Transistors in circuits
10	3	2-6/4/2023	Midterm Exam
11	3	9-13/4/2023	Problem solving in electronic circuits
12	3	16-20/4/2023	Carriers of charge and doping
13	3	23-27/4/2023	drifting of carriers
14	3	30/4-4/5/2023	Digital Electronics
15	3	7-11/5/2023	number system
16	3	14-18/5/2023	logic gates
17	3	21-25/5/2023	Application in Digital Electronics
18	3	28/5-1/6/2023	Final Exam
19	3	4-8/6/2023	Final Exam

**COURSE/STUDENT LEARNING OUTCOMES**

- 1 Atomic Structure
- 2 Physics of electronic circuits
- 3 conductivity of semiconductors
- 4 Essential devices in electronics
- 5 Applications and Physics of electronic devices

<b>COURSE'S CONTRIBUTION TO PROGRAM OUTCOMES</b> (Blank : no contribution, I: Introduction, P: Profecient, A: Advanced )			
<b>Program Learning Outcomes</b>			<b>Cont.</b>
1	Discuss concepts and principles of physics.		I
2	Conduct proper experiments safely and interpret the data in physics teaching physics.		I
3	Use the results of recent education and subject-specific developmental research when designing, implementing and justifying their own practice as a teacher.		I
4	Apply analytical and theoretical skills to model and solve physics problems.		I
5	Identify students' misconceptions and deal with them in classroom.		I
6	Prepare physics lessons with appropriate learning materials and teaching methods.		I
7	Effectively assess, plan, teach, organize, and manage physics classrooms.		I
8	Use appropriate methods and techniques to improve students' critical thinking, creative thinking and problem-solving skills in physics.		I
9	Use required modern methods and techniques for student-centered teaching by considering individual and cultural differences of students.		I
10	Effectively use a variety of teaching technologies and techniques and classroom strategies to foster student learning.		I
11	Communicate effectively and work collaboratively within the context of a global society.		I
12	Exhibit character and decision-making skills embodying professionalism and ethical behavior.		I
<b>Prerequisites (Course Reading List and References):</b>		Electronic Devices By Floyd 9 Edition 2011 • Principles of Electronics, V. K. Mehta & Rohit Mehta, Publisher: S. Chand & Co Ltd, Year: 2008, Edition: 11th. • Basic Electronics: Theory and Practice, S. Westcott & J. Riescher Westcott, Publisher: David Pallai, Mercury Learning and Information, Year: 2015.	
<b>Student's obligation (Special Requirements):</b>		• Students should attend in class to take notes during explanation with the bringing of (at least) two different color pens. • Other stationaries during tutorial and exam with a scientific calculator. • Do not knock the door also he/she should come to class quietly during lecture to avoid cut a lecture and disturbing other students. • Should listen carefully • Assignments and report are very important to be pass easy in this course. • Students can ask at any time in the class by rising their hand or can write a note then ask.	
<b>Weekly Laboratory/Practice Plan:</b>		<b>Week</b>	<b>Hour</b>
		<b>Date</b>	<b>Topics</b>
		1	2
		29/1-2/2/2023	Introduction to the lab
		2	2
		5-9/2/2023	electronic components and circuits
		3	2
		12-16/2/2023	Recording the current-voltage characteristics of diodes
		4	2
		19-23/2/2023	capacitors and current rectifying
		5	2
		26/2-2/3/2023	half currenr rectification
		6	2
		5-9/3/2023	rectifiers and bridges
		7	2
		12-16/3/2023	full current rectification
		8	2
		19-23/3/2023	LEDs in electronic circuits
		9	2
		26-30/3/2023	Recording the current-voltage characteristics of zener-diodes
		10	2
		2-6/4/2023	Voltage-limiting with a Z-diode
		11	2
		9-13/4/2023	Revisions
		12	2
		16-20/4/2023	final exam
		13	2
		23-27/4/2023	final exam
		14	2
		30/4-4/5/2023	final exam
		15	2
		7-11/5/2023	final exam
		16	2
		14-18/5/2023	final exam
		17	2
		21-25/5/2023	final exam
		18	2
		28/5-1/6/2023	final exam
		19	2
		4-8/6/2023	final exam
<b>Course Book/Textbook:</b>		1. Electronics Lab Manual 2. Fundamental of Power Semiconductor devices 3. Sabis books	
<b>Other Course Materials/References:</b>		Sensors and Actuators A journal Electronics in solid state journal	
<b>Teaching Methods (Forms of Teaching):</b>		Lectures, Presentation, Project, Assignments, , ,	
<b>COURSE EVALUATION CRITERIA</b>			
<b>Method</b>	<b>Quantity</b>	<b>Percentage (%)</b>	
Participation	1	5	
Quiz	2	5	
Project	1	10	
Midterm Exam	1	20	
Practical Exam	1	15	
Final Exam	1	40	

**Total**

**100**

**Examinations:** Essay Questions, True-False, Fill in the Blanks, Short Answers, , ,

**Extra Notes:**

**ECTS (ALLOCATED BASED ON STUDENT) WORKLOAD**

<b>Activities</b>	<b>Quantity</b>	<b>Workload Hours for 1 quantity*</b>	<b>Total Workload</b>
Theoretical Hours	19	3	57
Practical Hours	19	2	19
Final Exam	1	40	40
Participation	1	5	5
Quiz	2	5	10
Project	1	10	10
Midterm Exam	1	20	20
Practical Exam	1	15	15
<b>Total Workload</b>			<b>176</b>
<b>ECTS Credit (Total workload/25)</b>			<b>7</b>

**Peer review**

Signature:

Name:

Lecturer

Signature:

Name:

Head of Department

Signature:

Name:

Dean