

للعام الدراسي

الجامعة : الجامعة العربية

الكلية / المعهد : التقني / الهندسي

القسم العلمي : هذه ثقلنا في الاجمزة الطبية

تاریخ ملء الملف : ۹۸۴۶ / ۷ / ۹

CS

التوقيع :

التوقيع : PSA

اسم رئيس القسم : د. د. علي محمد

التاريخ : ٥ / ٧ / ٢٠٢٦

التاريخ: ٧/٥/٢٠٢١

شعبة ضمان الجودة والأداء الجامعي

التاريخ / /

التوقيع



عميد الكلية التقنية الهندسية

C. 5/2/0



Course Description

This course description provides a concise summary of the most important characteristics of the course and the learning outcomes expected of the student to achieve and demonstrate whether they have made the most of the available learning opportunities. It must be linked to the description of the program.

Shatt Al , Arab University	Educational .1 Institution
Medical Device Technology Engineering	Scientific .2 Department/Center
Electronics Capacity/MIET3204	Course Name/Code .3
8 hours per week/ practical	Available Forms of .4 Attendance
Semi-annual	Semester/Year .5
150 hours / per week 8 hours	Number of Hours .6 (Total)
2026/1/1	Date this description .7 was prepared
Course Objectives .8	
1. Develop problem-solving skills and understand power electronics theories through the application of practical techniques and methods. 2. Understand how thyristor and transistor act as electronic switches in different electrical circuits. 1. This course deals with the basic concepts of rectifiers, their working principles, and their applications. 2. This course deals with the basic principles of choppers and how they work in power electronics circuits.	

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| <p>3. Understand the working principles and applications of AC-AC converters and inverters.</p> <p>Identify power electronics applications, particularly in medical devices and equipment. •</p> |
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Course Outcomes, Teaching, Learning and Assessment Methods .9

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| <ol style="list-style-type: none"> 1. Learn how power electronics work within electrical circuits. 2. Enumerate the basic terms and concepts associated with power electronics. 3. Summarize the basic concepts of power electronics and demonstrate their importance. 4. Discussion of the mechanism of action of rectifier circuits and the role of their components in the evaluation process. 5. Describe the characteristics and principles of the work of the thyristor, transistor, and diode. 6. Explain the working principles of DC–DC converters and their basic types. 7. Identify the elements of basic power electronics circuits and indicate their different applications. 8. Discuss the operating principle and how AC–AC converters work. 9. Discuss the characteristics, principles of operation and applications of inverters. 10. Explain the applications of power electronics in industrial fields, particularly in medical devices and equipment. |
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Skill Objectives of the Course:
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By the end of this course, the student is expected to be able to:
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| <ol style="list-style-type: none"> 1. Analyzing power electronics circuits and determining the functions of their essential elements. 2. Distinguish between electronic switch elements such as SCRs, transistors, and diodes, and choose the right one for the desired application. |
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Design and analysis of rectifiers of various types and study of their operational characteristics •
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| <ol style="list-style-type: none"> 1. Analyze and operate DC-DC Choppers and understand their impact on voltage and current control. |
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2. 3. 4. 5. 6.	Analyze inverters and AC-AC converters and explain their mechanism of action. Interpret the forms of voltage and current waves in power electronics circuits and link them to the practical performance of the circuit. The use of electrical meters to measure voltage, current, and signals in power electronics experiments. Employ engineering simulation software such as MATLAB/Simulink, PSIM or Multisim to simulate power electronics circuits and analyze their results. Troubleshoot minor faults in power electronics circuits and suggest appropriate solutions to them. Apply power electronics concepts in the design and analysis of industrial and medical applications with efficiency and safety in mind. •
Teaching and Learning Methods	
Study Lectures Discussions between different student groups on the application of theories Creating workshops and demonstrations on how to use the basics of simple and complex electrical and electronic circuits Use multiple means to increase understanding and clarification Discussions and extra-curricular assignments to increase understanding of drawing examples and applications used in electronic applications and circuits	
Evaluation Methods	
Semester Exams Quizzes Other Extra-Curricular Tests	
Emotional and Values Goals 1. Promote scientific thinking and develop a sense of professional and ethical responsibility in analyzing power electronics circuits, and adhering to safety and quality standards when dealing with electrical and electronic systems. 1. Develop students' attitudes towards systematic and creative thinking in the analysis and design of power electronics circuits, and encourage them to propose innovative technical solutions to engineering problems.	

2.	Consolidating the values of cooperation and respect for the opinions of others through scientific discussions and teamwork in the implementation of practical experiments and the analysis of their results, while adhering to engineering ethics.
	Developing the student's interest in following up on the recent developments in the field of power electronics and their industrial and medical applications, and encouraging him to use modern software and engineering tools in the analysis, simulation and design of power electronics circuits.E.
Teaching and Learning Methods	
1. 2.	Theoretical presentation of the curriculum's vocabulary, its importance and use, with realistic examples. Theoretical application in the laboratory with a thorough explanation of the set of instruments used and measurements. .Class group discussions for practical and practical examples
Evaluation Methods	
	For tests of various daily types Duties Learning Matrix by presenting and discussing the results with discussion participants
Reports and Studies	
	d. Transferred general and qualifying skills (other skills related to employability and personal development). D1- Communication skills and conveying information in the correct form D2- Analysis and investigation to produce complex circuits using available tools D3. Using modern technology to design electronic circuits D4- The importance of teamwork to produce what is required, as the goal can only be achieved with the presence of an integrated team.

الأسبوع	الساعات	مخرجات التعلم المطلوبة	اسم الوحدة / أو الموضوع	طريقة التعليم	طريقة التقييم
1	8 ساعات عملي اسبوعيا	المفهوم و الأهمية	Introduction to power electronics. Lect.1 and 1a	محاضرات عملية	تقيم مختلف طرق التقييم اختبار تحصيلي + واجب صفي
2			Switching devices, power & control device	محاضرات عملية	
3			Types and characteristic, rating (diode, transistor ...).	محاضرات عملية	
4			Methods of turning – on & turning – off.	محاضرات عملية	
5			Protection of power devices.	محاضرات عملية	
6			Triggering & base drive circuits.	محاضرات عملية	
7			Mid-Exam + Controlled rectifiers, 1 – phase	محاضرات عملية	
8			Controlled Rectifier 3 – phase circuits	محاضرات عملية	
9			Half – wave & full – wave circuits3 phase Rectifiers.	محاضرات عملية	
10			D.C choppers; step – up & step – down choppers	محاضرات عملية	
11			A.C phase controllers.	محاضرات عملية	
12			Invertors, 1 – phase & 3 – phase bridges	محاضرات عملية	
13			Some applications: a – uninterruptible power supply UPS).	محاضرات عملية	
14			switching mode power supply (SMPS)	محاضرات عملية	
15			Application of power Electronics in medical instruments	محاضرات عملية	

Infrastructure .1	
Power Electronics By Lander	Required Textbooks -1

Power Electronics and drive By Mohmmmed T.Lazim	Main References (Sources) -2
	Recommended books and references (ا) (scientific journals, reports,
M.T.Lazim	Electronic References, Websites, (ب)

Course Development Plan .2
Adding vocabulary to the curriculum within the development of the course and by a percentage not exceeding 5% Adding new and modern sources with the addition of a video explaining the drawing process