جامعة المجمعة
Majmaah University

Course Specifications

Muharram 1437 H

Institution:	Majmaah University /College of Engineering
Academic Department :	Electrical Engineering.
Programme :	Electrical engineering
Course :	Power Electronics
Course Coordinator :	
Programme Coordinator :	
Course Specification Approved Date :	…./ … / …… H

This form compatible with NCAAA 2013 Edition

A. Course Identification and General Information

1 - Course title : Power electronics		Course Code: EE 374.	
2. Credit hours : (3 (3, 1,0))			
3 - Program(s) in which the course is offered: Electrical Engineering, Power and machine track			
4 – Course Language : English			
5 - Name of faculty member responsible for the course:			
6 - Level/year at which this course is offered : Spring semester, junior year			
7 - Pre-requisites for this course (if any) :EE 288			
8 - Co-requisites for this course (if any) : • EE374			
9 - Location if not on main campus **:** (College of Engineering)			
10 - Mode of Instruction (mark all that apply)			
A - Traditional classroom	◆	What percentage?	100 %
B - Blended (traditional and online)		What percentage?	……. %
D - e-learning		What percentage?	……. %
E - Correspondence		What percentage?	……. %
F - Other		What percentage?	……. %
Comments :			

B Objectives

What is the main purpose for this course?

The main objectives of this course are:

- Teaching the students the basics and concepts related to the semiconductor devices and converter circuits used in the power applications.
- Acquainting the students the ability of dealing with the several power electronics based equipment and converters found in the power system.
- Enabling the students to handle and master the recent concepts of controlling the electric machines as well as the active and reactive power flow in the power networks via the power electronic switches.
- Preparing the student for the advanced courses of the electric drives and the graduation project.

Briefly describe any plans for developing and improving the course that are

being implemented :
- Apply modern techniques and tools to simulate electrical power electronics circuits.
- Use software such as Matlab to design power electronics circuits.

C. Course Description

1. Topics to be Covered

List of Topics	No. of Weeks	Contact Hours
Contacts with students + overview of the course	1	4
Introduction, converters types.	1	4
Semi-conductor devices	1	4
Rectifier: single-phase, half-wave rectifiers	1	4
Rectifier: Bi-phase half-wave rectifiers	1	4
Single-phase, full-wave controlled rectifiers	1	4
Poly-phase rectifiers, Three-Phase star rectifier, six-phase star rectifier	1	4
Bridge rectifier	1	4
AC voltage controller: introduction, naturally-commutated ac controller	1	4
Pure resistive load, inductive load	1	4
Forced-commutated ac controller, Pure resistive load, inductive load	1	4
DC chopper : introduction, chopper classes	1	4
DC chopper with R-L back emf load	1	4
Inverter : introduction, single-phase inverter	1	4
Three-Phase inverter, pulse with modulation	1	4

2. Course components (total contact hours and credits per semester):

	Lecture	Tutorial	Laboratory	Practical	Other:	Total
Contact Hours	**45**.	**15**.	**0**	**0**	**0**	60
Credit	**3**	**0**	**0**	**0**	**0**	3

3. Additional private study/learning hours expected for students per week. 6

4. Course Learning Outcomes in NQF Domains of Learning and Alignment with Assessment Methods and Teaching Strategy

	NQF Learning Domains And Course Learning Outcomes	Course Teaching Strategies	Course Assessment Methods
1.0	**Knowledge**		
1.1			
1.2			
1.3	**The ability to recall, understand, and present information, including knowledge of specific facts, knowledge of concepts, principles and theories, and knowledge of procedures**	Lecture, debate, small group work, whole group and small group discussion, research activities, lab demonstrations, projects, debates, role playing, case studies, memorization and individual presentation	Standardized exams, Seminars and Assignments.
2.0	Cognitive Skills		
2.1	**An ability to design and conduct experiments, as well as to analyze and interpret data**	Lecture, small group work, , research activities, lab demonstrations, projects and individual presentation	Standardized exams, oral exams, micro projects
2.2	**An ability to design a system, component, or process to meet desired needs within realistic constraints**	Lecture, small group work, , research	Reports and presentations

	NQF Learning Domains And Course Learning Outcomes	Course Teaching Strategies	Course Assessment Methods
		activities, lab demonstrations, projects and individual presentation	
2.3			
2.4	**The ability to analyze, design, and implement systems.**	Lecture, small group work, , research activities, lab demonstrations, projects and individual presentation.	Standardized exams, oral exams, micro projects
2.5			
2.6			
3.0	**Interpersonal Skills & Responsibility**		
3.1			
3.2			
3.3			
3.4			
3.5			
3.6			
4.0	**Communication, Information Technology, Numerical**		
4.1	**An ability to apply knowledge of mathematics, science, and engineering**	Lecture, research activities, lab demonstrations, projects, case studies, memorization and individual presentation	Standardized exams, oral exams, micro projects
4.2			
4.3			
4.4			

	NQF Learning Domains And Course Learning Outcomes	Course Teaching Strategies	Course Assessment Methods
4.5			
4.6			
5.0	Psychomotor		
5.1			
5.2			
5.3			
5.4			
5.5			
5.6			

5. Schedule of Assessment Tasks for Students During the Semester:

	Assessment task	Week Due	Proportion of Total Assessment
1	Homework and micro project	3rd , 5th, 9th and 12th	10%
2	Quizzes	4th , 7th, 11th and 13th	10%
3	Exams (First and Second).	6th and 10th	40%
4	Final Exam	16th	40%
5			
6			
7			
8			

D. Student Academic Counseling and Support

1. Arrangements for availability of faculty and teaching staff for individual student consultations and academic advice. (include amount of time teaching staff are expected to be available each week) Four office hours are dedicated for student.

E. Learning Resources

1. List Required Textbooks : • **W. Hart, Introduction to Power Electronics, Prentice Hall, New York, 1997**
2. List Essential References Materials: (Journals, Reports, etc.) • **C. W. Lander, Power Electronics, McGraw-Hill, London, 1993.**
3. List Recommended Textbooks and Reference Material : None
4. List Electronic Materials : None
5. Other learning material : • **Computer-based programs/CD.** • **Professional standards or regulations and software.**

F. Facilities Required

1. Accommodation None
2. Computing resources (AV, data show, Smart Board, software, etc) A laptop for the instructor.
3. Other resources None

G Course Evaluation and Improvement Processes

1 Strategies for Obtaining Student Feedback on Effectiveness of Teaching: • **Completion course evaluation questionnaire,** • **Classroom observations to measure student behavior through how well the student groups are interacting in-class activity and how well the in-class activity went.**
2 Other Strategies for Evaluation of Teaching by the Program/Department Instructor **Faculty Peer Assessment**
3 Processes for Improvement of Teaching : **1. Plan: The instructor will develop a strategy for teaching.** **2. Do: The strategy will be implemented for one semester.** **3. Study: The experiences of the students will be collected through**

a survey. 4. Act: Effective teaching strategies will be implemented and revised as more experiences are gained.
4. Processes for Verifying Standards of Student Achievement Check marking of a sample of examination papers
5 Describe the planning arrangements for periodically reviewing course effectiveness and planning for improvement : 1. Continuous improvement is a circular process, encompassing student assessment, course planning and design, implementation, evaluation, and revision. 2. A feedback from all relevant assessment tools must be considered in the continuous processof course objectives refinement and assessment. 3. Continuous process for reviewing feedback from student on the quality of the course and planning for improvement

Course Specification Approved
Department Official Meeting No (…..) Date … / …. / ….. *H*

Course's Coordinator		Department Head	
Name :	.....	***Name :***	.....
Signature :	.....	***Signature :***	.....
Date :	…./ … / …… *H*	***Date :***	…./ … / …… *H*