COURSE SPECIFICATIONS
(CS)

Electronics

PHYS 325

June 2018

Course Specifications

Institution: King Saud University	Date: 2108
College/Department: College of Science, Physics &Astronomy Department	

A. Course Identification and General Information

1. Course title and code: Electronics (PHYS 325)			
2. Credit hours: 3(2+0+2)			
3. Program(s) in which the course is offered. (If general elective available in many programs indicate this rather than list programs) Physics and other science and engineering programs			
4. Name of faculty member responsible for the course			
5. Level/year at which this course is offered 6 level			
6. Pre-requisites for this course (if any): Electromagnetism (PHYS 221)			
7. Co-requisites for this course (if any):			
8. Location if not on main campus 1. Main campus in Diriyah , College of Science, Department of Physics & Astronomy			
9. Mode of Instruction (mark all that apply)			
a. traditional classroom	√	What percentage?	30%
b. blended (traditional and online)	√	What percentage?	20%
c. e-learning		What percentage?	
d. correspondence		What percentage?	
f. Lab	√	What percentage?	%50
Comments:			

B Objectives

1. What is the main purpose for this course? a) The student should be able to interpret the basic concepts of semiconductor electronics. b) The student should be able to use Diodes and Transistors and explain their physics. c) The student should be able to develop the practical skills by conducting electronic experiments. d) The student should have the attitude to improve his generic skills (knowledge – cognitive – interpersonal – communication – problem solving – IT)
2. Briefly describe any plans for developing and improving the course that are being implemented. (e.g. increased use of IT or web based reference material, changes in content as a result of new research in the field) • The course syllabus and contents are posted on the web. • previous exam papers are posted on the web. • practice on some electronic circuits is proceeded in electronics lab and using special computer software

C. Course Description (Note: General description in the form used in Bulletin or handbook)

Course Description: Semiconductors, semiconductor doping, the p-n junction properties and applications, the diode, the bipolar transistor, signal amplification, the field effect transistor, Circuit symbols and components, Semiconductor devices, Amplifier operation, feedback. Lock-in operational amplifiers and applications, modulation and detection, integrated circuits. A brief introduction to digital electronics and analog to digital (A/D) conversion.

1. Topics to be Covered

List of Topics	No. of Weeks	Contact hours
Introduction to semiconductors, Energy bands, Carriers in intrinsic and extrinsic semiconductors and temperature dependence, drift and diffusion of carriers and Poisson' s equations.	2	4
pn junctions: Diffusion and drift currents and effect of the depletion region, current – voltage characteristics.	2	4
The diode and its Applications: Equivalent circuit of the diode, Load line and operating point, Rectifier Circuits.	3	6
Bipolar junction Transistors (BJT): PNP and NPN transistors, transistor connections and their characteristics, leakage current and Stability factor, Biasing Circuits, Amplifier Circuits.	4	8
Junction Field Effect transistors (JFET): N – channel and P – channel characteristics, Biasing Circuits, Amplifier Circuits.	2	4
Metal oxide semiconductor Field Effect (MOSFET)	1	2
Digital Electronics	1	2

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

	Lecture	Tutorial	Laboratory or Studio	Practical	Other:	Total
Contact Hours	30		30			60
Credit	30		15			45

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

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

On the table below are the five NQF Learning Domains, numbered in the left column.

First, insert the suitable and measurable course learning outcomes required in the appropriate learning domains (see suggestions below the table). **Second**, insert supporting teaching strategies that fit and align with the assessment methods and intended learning outcomes. **Third**, insert appropriate assessment methods that accurately measure and evaluate the learning outcome. Each course learning outcomes, assessment method, and teaching strategy ought to reasonably fit and flow together as an integrated learning and teaching process. (Courses are not required to include learning outcomes from each domain.)

Code #	NQF Learning Domains And Course Learning Outcomes	Course Teaching Strategies	Course Assessment Methods
1.0	**Knowledge**		
	- To define insulators, conductors and semiconductors. - to describe the properties of N and P type semiconductors. - To define the diode: its characteristic, bias with simple applications. -To describe the BJT transistor: operation, characteristic, bias, and its use as an amplifier and as a switch -To describe the FET transistor : operation , characteristic and bias .	- Lecturers and debates - Homework assignments - Lab demonstrations - small group work	- Exams -peer evaluations - analytical reports -long and short essays - group reports
2.0	**Cognitive Skills**		
	- To explain the daily life applications of the studied topics. - To explain the most famous and useful instruments build on the studied topics. - To recognize how technology is built from simple to advanced present states - To summarize some interesting experiments and applications in the field of the studied course.	- whole group and small group discussions - Case studies - individual presentation - brainstorming	-portfolios -discussion forums -interviews -debates
3.0	**Interpersonal Skills & Responsibility**		

	- writing reports - To modify the English language - To demonstrate solving problems - To illustrate Searching on the internet - choosing the material of the course	-Guest speakers - whole group and small group discussions - research activities -projects	-Individual and group presentations -speeches - posters - case studies
4.0	**Communication, Information Technology, Numerical**		
	- To illustrate how to Communicate with others: the lecturer – students in the class - To interpret Information Technology through the Internet and to assess the computer skills - To evaluate the Numerical skills through: solving problems- computation – data analysis – feeling physical reality of results.	- memorization - projects - whole group and small group discussions - brainstorming	- log books - analytical reports - graphic organizers - graphs and tables - group presentations
5.0	**Psychomotor**		
	Not applicable	Not applicable	Not applicable

6. Schedule of Assessment Tasks for Students During the Semester

	Assessment task (e.g. essay, test, group project, examination, speech, oral presentation, etc.)	Week Due	Proportion of Total Assessment
1	First Mid-term exam		15%
2	Second Mid-term exam		15%
3	Home works, assignments, and experimental		30%
4	Final Exam		40%

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)

- Office hours 3 hr/ week

E Learning Resources

1. List Required Textbooks
   1- Electronic Devices, by: Thomas L. Floyd. 9th edition, 2016. Prentice Hall.
2. List Essential References Materials (Journals, Reports, etc.)
   1- Electronic Devices, by: Thomas L. Floyd. 9th edition, 2016. Prentice Hall.
3. List Recommended Textbooks and Reference Material (Journals, Reports, etc)
   1- Electronic Devices, by: Thomas L. Floyd. 9th edition, 2016. Prentice Hall.

4. List Electronic Materials, Web Sites, Facebook, Twitter, etc. Websites on the internet that are relevant to the course topics
5. Other learning material such as computer-based programs/CD, professional standards or regulations and software. Multimedia associated with the text book and the relevant websites

F. Facilities Required

Indicate requirements for the course including size of classrooms and laboratories (i.e. number of seats in classrooms and laboratories, extent of computer access etc.)
1. Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.) • Lecture room with at least 25 seats • Equipped Laboratory
2. Computing resources (AV, data show, Smart Board, software, etc.) • Computer room equipped with electronic circuits software
3. Other resources (specify, e.g. if specific laboratory equipment is required, list requirements or attach list) • Availability of equipment relevant to the course material • Safety facilities

G Course Evaluation and Improvement Processes

1 Strategies for Obtaining Student Feedback on Effectiveness of Teaching • Course evaluation by student • Students- faculty meetings
2 Other Strategies for Evaluation of Teaching by the Instructor or by the Department • Peer consultation on teaching • Departmental council discussions • Discussions within the group of faculty teaching the course
3 Processes for Improvement of Teaching • Conducting workshops given by experts on the teaching and learning Methodologies. • Periodical departmental revisions of its methods of teaching. • Monitoring of teaching activates by senior faculty members.
4. Processes for Verifying Standards of Student Achievement (e.g. check marking by an independent member teaching staff of a sample of student work, periodic exchange and remarking of tests or a sample of assignments with staff at another institution) • Providing samples of all kind of assessment in the departmental course portfolio of each course • Assigning group of faculty members teaching the same course to grade same questions for various students.
5 Describe the planning arrangements for periodically reviewing course effectiveness and planning for improvement. • The course material and learning outcomes are periodically reviewed and the changes to

be taken are approved in the departmental and higher councils.
- The head of department and faculty take the responsibility of implementing the proposed changes.

Name of Instructor: _____

Signature: _____ Date Report Completed: _____

Program Coordinator: _____

Signature: _____ Date Received: _____