

ATTACHMENT 5.

Kingdom of Saudi Arabia
The National Commission for Academic Accreditation &
Assessment

T6. Course Specifications
(CS)

Course Specifications

Institution Najran University	Date of Report 2/1/1438H
College/Department Engineering/Electrical	

A. Course Identification and General Information

1. Course title and code: Basics of Electronic Devices, EE 333			
2. Credit hours 3 (3 , 0 , 1)			
3. Program(s) in which the course is offered. (If general elective available in many programs indicate this rather than list programs) Electrical Programs			
4. Name of faculty member responsible for the course Dr Abdelouahab Amrani			
5. Level/year at which this course is offered 3 rd year for Electrical			
6. Pre-requisites for this course (if any) Integral Calculus, MATH106 Advanced Physics, PHYS105			
7. Co-requisites for this course (if any) None			
8. Location if not on main campus None			
9. Mode of Instruction (mark all that apply)			
a. Traditional classroom	<input checked="" type="checkbox"/>	What percentage?	100%
b. Blended (traditional and online)	<input type="checkbox"/>	What percentage?	<input type="text"/>
c. e-learning	<input type="checkbox"/>	What percentage?	<input type="text"/>
d. Correspondence	<input type="checkbox"/>	What percentage?	<input type="text"/>
f. Other	<input type="checkbox"/>	What percentage?	<input type="text"/>
Comments:			

B Objectives

1. What is the main purpose for this course? Identify the operation principle and characteristics of a diode, BJT transistor and FET transistor, and perform a small signal AC analysis.
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 responsible should take action to reduce the number of students to 15 because the classroom size is too small.
C. Course Description (Note: General description in the form to be used for the Bulletin or handbook should be attached)

Course Description: Intrinsic and doped semiconductors, drift and diffusion currents. PN junction diode: basic structure, I-V characteristics, large and small-signal models. Bipolar junction transistor (BJT): basic structure, modes of operation, dc biasing, dc and small-signal models, single stage BJT amplifiers. Field-effect transistors (FET): structure and operation of enhancement and depletion MOSFETs, I-V characteristics, dc biasing. Introduction to JFET.
--

1. Topics to be Covered		
List of Topics	No. of Weeks	Contact Hours
P-N junction as a circuit element: Intrinsic and extrinsic semiconductors, operational principle of p-n junction diode, current-voltage characteristics of a diode, simplified DC and AC diode models and dynamic resistance.	1,2,3	12 hours
Diode circuits: Half wave and full wave rectifiers, rectifiers with filter capacitor, characteristics of a Zener diode, clamping and clipping circuits.	4,5,6	12 hours
Bipolar Junction Transistor (BJT) as a circuit element: current components, BJT characteristics and regions of operation, biasing the BJT for discrete circuits, small signal circuit models.	7,8	8 hours
Single stage BJT amplifier circuits: Voltage gain, input and output impedance of a common base, common emitter and common collector amplifier circuits.	9,10	8 hours

Junction Field-Effect-Transistor (JFET): Structure and physical operation of JFET, transistor characteristics, pinch-off voltage, JFET amplifier circuits.	11,12	8 hours
Metal Oxide Semiconductor Field Effect Transistor (MOSFET) as circuit element: structure and physical operation of an enhancement MOSFET, threshold voltage, current-voltage characteristics of an enhancement MOSFET and integrated MOS amplifier circuits.	13,14	8 hours

2. Course components (total contact hours and credits per semester):						
	Lecture	Tutorial	Laboratory	Practical	Other:	Total
Contact Hours	42	14	None	None	None	56
Credit	3	None	none	None	None	3

3. Additional private study/learning hours expected for students per week.	4
--	---

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		
1.1	<ul style="list-style-type: none"> Become aware of the general characteristics of two important semiconductor materials: Si, Ge. Understand conduction using electron and hole theory. 	<ul style="list-style-type: none"> Lectures and tutorials Assist students during office hours. Encourage class 	Homework assignments

	<ul style="list-style-type: none"> Develop a clear understanding of the basic operation of a diode in the forward-bias and reverse-bias regions. Understand the impact of an equivalent circuit whether it is ideal or practical. Understand the operation and characteristics of a Zener diode and light-emitting diode. Understand the process of rectification to establish a dc level from a sinusoidal ac input. Understand the basic construction and operation of the Bipolar Junction Transistor. Recognize the characteristics of an npn or pnp transistor. Become familiar with the construction and operating characteristics of Junction Field Effect (JFET), Metal-Oxide Semiconductor FET (MOSFET). 	<ul style="list-style-type: none"> participation Give video examples and simulated animation to help students understand various concepts of the course topics. 	
2.0	Cognitive Skills		
2.1	<ul style="list-style-type: none"> Determine the static and dynamic resistance of a diode from the characteristics. Predict the output response of a clipper and clamper diode configuration. Determine the dc levels for the variety of important BJT configurations. Perform a load-line analysis of the most common BJT configurations. Use the BJT equivalent model to find the important ac parameters for an amplifier. Perform a dc and ac analysis of a variety of JFET and MOSFET configurations. 	<ul style="list-style-type: none"> Lectures and tutorials Discussion and problem solving. Assist students during office hours. Encourage class participation 	<ul style="list-style-type: none"> Homework assignments and class quizzes. Two midterm Exams and Final Exam.
3.0	Interpersonal Skills & Responsibility		
3.1	<ul style="list-style-type: none"> Ability to work independently and as part of team. Ability to communicate in class orally and written. During the classes students has to act responsible and ethical behaviour 	<ul style="list-style-type: none"> Solving problems in groups during lectures. Giving opportunity to students to lead the discussion in class for limited 	<ul style="list-style-type: none"> Impose deadline for homework assignments. Record the attendance of the students every lecture.

		time. • Ask questions about previous lectures.	<ul style="list-style-type: none"> Active class participation. Grade quizzes and homework assignments.
4.0	Communication, Information Technology, Numerical		
4.1	<ul style="list-style-type: none"> Ability to formulate a mathematical solution. Ability to ask question. Invite the students to benefit from the office hours to ask more about their subject. 	<ul style="list-style-type: none"> Make students solve problems on the board. Encourage students to study collectively. Encourage students to consult the instructor for help during office hours. Encourage students to browse websites related to electronic device topics. 	Evaluating homework assignments, quizzes, midterm exams and final exam.
5.0	Psychomotor		
5.1	None		

5. Map course LOs with the program LOs. (Place course LO #s in the left column and program LO #s across the top.)									
Course LOs #	Program Learning Outcomes (Use Program LO Code #s provided in the Program Specifications)								
	1.1	1.2		2.1	2.4	3.2		4.1	
Develop a clear understanding of the basic operation and characteristics of a diode and its network applications.				✓	✓				

Identify the operation principle and characteristics of BJTs.				✓	✓				
Analyse different circuit configurations of BJT transistor.				✓	✓				
Identify the operation principle and characteristics of JFET and MOSFET and perform a small signal AC analysis.				✓	✓				

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	Test 1	6	20%
2	Test 2	12	20%
3	Homeworks and quizzes	4,5 and 8,9	10%
4	Final Exam	End of semester	50%

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)
<ul style="list-style-type: none"> Teaching staff are available weekly for all the students and can answer any query that rises, beside the students can email their enquiries to the main lecture. Beside students have Open general discussions with other class mates. 5 hours per week and can be arranged according to the student needs.

E. Learning Resources

1. List Required Textbooks
Electronic Devices and Circuit Theory, Robert L. Boylestad, 11th Edition, 2013, Pearson Education.
2. List Essential References Materials (Journals, Reports, etc.)
Electronic devices, Tomas. L. Floyd, 9th Edition, 2011, Prentice Hall. Electronic Principles, Albert Malvino and David Bates, 7th Edition, 2006, McGraw-Hill Education.
3. List Recommended Textbooks and Reference Material (Journals, Reports, etc)
None
4. List Electronic Materials (eg. Web Sites, Social Media, Blackboard, etc.)
http://lib.nu.edu.sa/digitallibrary.aspx www. en.wikipedia.org www. allaboutcircuits.com
5. Other learning material such as computer-based programs/CD, professional standards or regulations and software.
None

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.)
<ul style="list-style-type: none"> Lecture room with a maximum of 15 seats and adequate daylight equipped with data projector. Size of classrooms is approximately 70 m²
2. Computing resources (AV, data show, Smart Board, software, etc.)
Projector to facilitate going over student papers in class, separated from white board.
3. Other resources (specify, e.g. if specific laboratory equipment is required, list requirements or attach list)
None

G Course Evaluation and Improvement Processes

1 Strategies for Obtaining Student Feedback on Effectiveness of Teaching
<ul style="list-style-type: none"> Complete course evaluation questionnaire by the students. Open discussion Throughout the Course for students to touch their weak and strong points in the subject. Feedback from the mid-term and final exam records.
2 Other Strategies for Evaluation of Teaching by the Program/Department Instructor
<ul style="list-style-type: none"> Written feedback from a classroom observation that details judgment on teaching. Written feedback that details judgment on course materials such as syllabi, handouts and exams. Written documentation that details teaching contribution to the department.
3 Processes for Improvement of Teaching
<ul style="list-style-type: none"> Learning from instructor and department feedbacks. Learning form student's feedback. Learning/Using various teaching methods (lecturing, discussions, workshops, exams...). Learning/Using various teaching Medias (projector, whiteboard, videos). Reducing the number of students to 15 during classroom lecture. Conducting workshops given by experts on the teaching and learning methodologies.
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)
Check marking by an independent member teaching staff of a sample of student work.

5 Describe the planning arrangements for periodically reviewing course effectiveness and planning for improvement.

- Ongoing updating and improving (during the course).
- Annual updating and improving.
- Have a curriculum review committee to review the curriculum periodically and suggest improvements.

Name of Instructor: Dr Abdelouahab Amrani

Signature: _____ Date Report Completed: 2/1/1438H

Name of Course Instructor Dr Abdelouahab Amrani

Program Coordinator: _____

Signature: _____ Date Received: