



Module Specification

Faculty of Engineering

Last update: 13th March 2018

1. Module Title

Electronic Principles

2. Module Code

EE2131

3. Number of Credits

10

4. Level

2

5. Semester

3

6. Pre-requisites for admission to the module

Normal progression rules

7. Module Coordinator

Dr. Sharina Yunus

8. Aim

To provide basic understanding of operating principles, characteristics and circuit models of diode, BJT, MOSFET and Operational amplifier (OpAmps).

9. Summary of Contents

The module covers the following topics:

- **Diode circuits:** Structure and I-V characteristics, ideal diode model, constant voltage drop model, and diode circuit analysis, and diode circuit applications (rectifiers, wave-shaping circuits, and simple diode logic)

- **Bipolar junction transistors:** BJT structure and I-V characteristics, and DC load-line and biasing techniques, DC and small signal analysis of linear amplification circuits, linear amplification circuits based on different BJT configurations.
- **Field effect transistors (FET) :** JFET/ MOSFET structures and I-V characteristics, biasing techniques, switching and amplification circuits based on different JFET and MOSFET configurations.
- **Operational amplifiers:** Ideal operational amplifier model, analysis of circuits containing ideal operational amplifiers, amplifier frequency response, negative feedback and simple circuit design by utilizing ideal operational amplifiers.

10. Module Intended Learning Outcomes

Upon successful completion of this module, students will be able to:

No.	MILOs	Weightage (%)
1	Describe operating principles of diodes, bipolar junction transistors (BJT) and field-effect transistors (FET) and OpAmps.	20
2	Analyse circuits containing diodes, BJT, and FET using the concept of load lines, operating points and various equivalent circuit models.	20
3	Characterise operational amplifier, feedback circuits and apply them in real applications.	20
4	Design electronic circuits using related software and compare with predicted circuit models.	30
5	Apply knowledge and understanding of workshop and laboratory practice.	10

11. Teaching Learning Activities (TLAs)

MILO No.	TLAs	Functions	Hours/Week
1-4	Lectures	Teaching and learning will be based on lectures in various principles, methods and applications of basic electronic devices and circuits.	2
1-4	Tutorials	Teaching and learning will be based on problem solving using different devices.	1
5	Laboratory	Experiments will be carried out through simulations and hardware set up. Students will submit individual lab report.	1

12. Assessment Tasks/Activities

MILO No.	Type of Assessment Tasks/Activities	Weightage (%)
1-3	Quiz: 2	5
4	Assignment: 1	5
1-3	Class test: 1	10
5	Laboratory: 3	10
1-4	University Examination	70

Assessment Criteria:

Assessment components of the module shall be University Examination and Coursework. To achieve a pass in the module students must obtain a minimum overall mark of 40% and a minimum of 30% in each assessment component.

Reassessment:

Students eligible for reassessment shall be assessed according to the Programme area examination board recommendation.

13. Attendance Requirements

Students are expected to attend all Lectures, Tutorials and Laboratory sessions.

14. Contribution to Programme Learning Outcomes

		Knowledge & Understanding	Application	Analysis & Evaluation	Creativity & Design
Maths and Science	Underpinning Science and Mathematics for the study of Engineering	√	√	√	
Core Engineering	The main principles and core subjects of the relevant Engineering Discipline	√	√	√	√
Computing and IT	Computer-based methods for the analysis and modeling of Engineering problems			√	
Communication Skills	Communicate effectively using a variety of techniques both written and oral			√	
Engineering Practice	Practical application of engineering skills combining theory and experience		√	√	√
Design	Creation, design and development of a product, process or system	√	√	√	√
Management & Economics	Management and financial methods to achieve objectives in production and projects				
Social & Environmental	Professional and ethical conduct; sustainable development; health and safety; environmental impact©				

15. Grading of Students Achievement

Grading System		
Marks (%)	Grades	Grade Definition
85-100	A+	Excellent
75-84	A	
70-74	B+	Very Good
65-69	B	
60-64	C+	Good
55-59	C	
50-54	D+	Satisfactory
45-49	D	
40-44	E	Marginal
0-39	F	Fail

16. Resources

Primary texts

No	Name of Author(s)	Year of Publication	Title of Book	Edition	Publisher's Name	ISBN
1	Albert Malvino and David Bates	2015	Electronic Principles with Simulation	8	McGraw-Hill	978-0073373881
2	Robert L. Boylestad and Louis Nashelsky	2012	Electronic Devices and Circuit Theory	11	Prentice Hall	978-0132622264

Secondary texts

No	Name of Author(s)	Year of Publication	Title of Book	Edition	Publisher's Name	ISBN
1	Adel S. Sedra and K. C. Smith	2015	Microelectronic Circuits	7	Oxford University Press	978-0199339136
2	Owen Bishop	2012	Electronic Circuits and Systems	4	Elsevier	978-0750684989