

# MODULE DESCRIPTION FORM

Module Information			
Module Title	Analog and Digital Electronics		Module Delivery
Module Type	Basic		<input checked="" type="checkbox"/> Theory <input checked="" type="checkbox"/> Lecture <input checked="" type="checkbox"/> Lab <input type="checkbox"/> Tutorial <input type="checkbox"/> Practical <input type="checkbox"/> Seminar
Module Code	MPH23013		
ECTS Credits	6 ECTS		
SWL (hr/sem)	150		
Module Level	UG II	Semester of Delivery	
Administering Department	MPY	College	College of Sciences
Module Leader	Ahmed Yahya Awad Kazem	e-mail	<a href="mailto:ahmed.ya@uowa.edu.iq">ahmed.ya@uowa.edu.iq</a>
Module Leader's Acad. Title	Lecturer Doctor	Module Leader's Qualification	Ph.D.
Module Tutor	Mowafaq Mohammed Bakr Saja Basim Ali Ibrahim Uday Mohsen	e-mail	<a href="mailto:Saja.b@uowa.edu.iq">Saja.b@uowa.edu.iq</a>
Peer Reviewer Name	Ahmed Musa Jaafar Othman	e-mail	Ahmed.mo@uowa.edu.iq
Scientific Committee Approval Date	17/9/2024	Version Number	1.0

Relation with other Modules			
Prerequisite module	None	Semester	
Co-requisites module	None	Semester	



*(Signature)*  
أ.م.د. ربيعاًد حسين نوري  
17/9/2024

Department Head Approval

*(Signature)*  
أ.م.د. ربيعاًد حسين نوري  
17/9/2024

Dean of the College Approval

## Module Aims, Learning Outcomes and Indicative Contents

<b>Module Objectives</b>	<ol style="list-style-type: none"> <li>1. To provide the student with the fundamental skills to understand the basics of semiconductors and components like diodes, transistor</li> <li>2. to get experience and a fundamental comprehension of electronics.</li> <li>3. The student will be able to perform the theoretical calculations necessary for analysis and design.</li> <li>4. The course aims to study the basic principles of the operation of electronic circuits that contain electronic elements such as diodes of their types, transistors of their types, and methods of connection in terms of bias and arrangement.</li> <li>5. the student will learn how to draw equivalent circuits for these electronic elements using different methods,</li> <li>6. the student will learn how the differences between the approved methods so that the student can analyze electronic circuits.</li> <li>7. To acquaint the students with the fundamental principles of two-valued logic and various devices to implement logical operations on variables.</li> <li>8. Developing the student's abilities and practical skills to operate digital devices, and benefiting from them to increase individual productivity.</li> <li>9. Introducing the student to the aspects of the digital electronics environment and the environment of the various devices attached to it.</li> <li>10. Introducing the student to applications for multiple digital devices and information in the medical field.</li> </ol>
<b>Module Learning Outcomes</b>	<ol style="list-style-type: none"> <li>1. To give knowledge of some basic electronic components and circuits.</li> <li>2. Identification of the structure of diode and transistor circuits.</li> <li>3. Identification of NPN, PNP, JFET, and MOSFET amplifiers</li> </ol>

	4. Able to identify and describe different analog modulation techniques 5. Describe and explain the operation of fundamental digital gates 6. Design and operate practical digital logic circuits 7. Use the basic logic gates and various digital logic circuit reduction techniques in detail. 8. Design combinational circuits. 9. Able to design and describe analog and digital logic circuits
<b>Indicative Contents</b>	) <u>Theory Lectures</u> Learning concepts of each theoretical lecture or groups of lectures.  <u>Lab. Lectures</u> Learning concepts of each laboratory lecture or groups of lectures. Total hrs = $\sum$ SSWL + (Mid Exam hrs+ Final Exam hrs)

Learning and Teaching Strategies	
<b>Strategies</b>	1. Lecture 2. Workshops 3. Laboratory sessions 4. Flipped classroom 5. Problem-based learning (PBL) 6. Peer teaching and collaborative learning 7. Reflective practice

Student Workload (SWL)			
Structured SWL (h/sem)	60	Structured SWL (h/w)	40
Unstructured SWL (h/sem)	87	Unstructured SWL (h/w)	5.8
Total SWL (h/sem)	147 + 3 final = 150		

Module Evaluation					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5 and 11	3,7
	Assignments	2	10%	6 and 13	1,8

	<b>Lab.</b>	1	5%	Continuous	All
	<b>Report</b>	1	5%	14	5
<b>Summative assessment</b>	<b>Midterm Exam</b>	1hr	10% (10)	7	3,4
	<b>Final Exam</b>	3hr	50% (50)	16	9
<b>Total assessment</b>			100% (100 Marks)		

### Delivery Plan (Weekly Syllabus)

	Material Covered
<b>Week 1</b>	Introduction, Insulators, conductors, semiconductors
<b>Week 2</b>	Intrinsic semiconductors, extrinsic semiconductors, PN-junction and applications
<b>Week 3</b>	Transistor, PNP, NPN, common emitter dc-analysis
<b>Week 4</b>	Biasing circuits, Common collector circuits, common base circuit
<b>Week 5</b>	FET, JFET, Output characteristic curves of JFET, JFET small signal parameters
<b>Week 6</b>	MOSFET
<b>Week 7</b>	Mid. Exam
<b>Week 8</b>	Introduction to digital electronics
<b>Week 9</b>	NUMBER SYSTEMS: Decimal & Binary system
<b>Week 10</b>	Binary Arithmetic
<b>Week 11</b>	Logic Gates and Logic Circuits
<b>Week 12</b>	Boolean Algebra
<b>Week 13</b>	Boolean Algebra and Logic Simplification
<b>Week 14</b>	Sequential Logic: Latches
<b>Week 15</b>	Flip-Flops

### Delivery Plan (Weekly Lab. Syllabus)

	Material Covered
<b>Week 1</b>	Static characteristic of crystal diode
<b>Week 2</b>	Zener diode characteristic
<b>Week 3</b>	Light emitting diode characteristic

<b>Week 4</b>	Transistor common emitting npn
<b>Week 5</b>	Transistor common base npn
<b>Week 6</b>	Half wave rectifier
<b>Week 7</b>	Full wave rectifier
<b>Week 8</b>	Introduction to Gates digital electronics
<b>Week 9</b>	AND Gate
<b>Week 10</b>	OR Gate
<b>Week 11</b>	NOT Gate
<b>Week 12</b>	NAND Gate
<b>Week 13</b>	NOR Gate
<b>Week 14</b>	The Exclusive-OR Gate
<b>Week 15</b>	Exclusive-NOR Gate

### Learning and Teaching Resources

	<b>Text</b>	<b>Available in the Library?</b>
<b>Required Texts</b>	ELECTRONIC PRINCIPLES, 8 <sup>th</sup> Edition, 2016, McGraw-Hill Education.	No
<b>Recommended Texts</b>	Digital fundamentals Thomas, 11 <sup>th</sup> Edition, 2015, Pearson Education.	No
<b>Websites</b>	<a href="https://www.talkingelectronics.com/Download/Malvino_Electronic-Principles.pdf">https://www.talkingelectronics.com/Download/Malvino_Electronic-Principles.pdf</a>	

Grading Scheme مخطط الدرجات				
Group	Grade	التقدير	Marks %	Definition
<b>Success Group (50 - 100)</b>	<b>A</b> - Excellent	امتياز	90 - 100	Outstanding Performance
	<b>B</b> - Very Good	جيد جدا	80 - 89	Above average with some errors
	<b>C</b> - Good	جيد	70 - 79	Sound work with notable errors
	<b>D</b> - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	<b>E</b> - Sufficient	مقبول	50 - 59	Work meets minimum criteria
<b>Fail Group (0 – 49)</b>	<b>FX</b> – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	<b>F</b> – Fail	راسب	(0-44)	Considerable amount of work required
<b>Note:</b> Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.				