



Ministry of Higher Education and
Scientific Research – Iraq
Al-Furat Al-Awsat Technical University
Al-Musaib Technical College
Department of Electrical Engineering Techniques



MODULE DESCRIPTOR FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	INSTRUMENTS AND MEASUREMENTS		Module Delivery
Module Type	CORE		☒ Theory ☒ Lecture ☒ Lab ☐ Tutorial ☒ Practical ☒ Seminar
Module Code	EET210		
ECTS Credits	5		
SWL (hr/sem)	125		
Module Level	2	Semester of Delivery	
Administering Department	Electrical Engineering Techniques	College	Al-Musaib Technical College
Module Leader		e-mail	
Module Leader's Acad. Title	Assistant lecturer	Module Leader's Qualification	MSC
Module Tutor	Name (if available)	e-mail	E-mail
Peer Reviewer Name	Name	e-mail	E-mail
Scientific Committee Approval Date	10/06/2023	Version Number	1

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	None	Semester	
Co-requisites module	None	Semester	

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Objectives أهداف المادة الدراسية	1. This course deals with define Measurement. 2. Knowledge of measurement errors, their types, their effect on measurements, and how to reduce their effect on measurements. 3. Introduce the Units and standard SI system. 4. Knowledge the Classification of Instruments. 5. Various Measurements, method for determining resistance, inductance and capacitance. 6. Know the system measurement. 7. High voltage measurements and testing.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Important: Write at least 6 Learning Outcomes, better to be equal to the number of study weeks. 1. Develop the knowledge of theoretical and mathematical principles of electrical measuring instruments. 2. Have knowledge and critical understanding of the well-established principles underpinning measurement. 3. Have knowledge and critical understanding of the well-established principles of measurement and instrument design. 4. Have an understanding of measurement's errors. 5. Understand the role of various factors in calibration. 6. Choose the proper type and specification of measuring procedure and measuring instruments for different plication. 7. Have an understanding of Statistical analysis. 8. Understand the working of various potentiometers, instruments for measurement of R, L and C. 9. Understand the high voltage measurements principles and method of works.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. <u>Part A - Fundamentals of Electronic Measurements and Instrumentation</u> D.C circuits, Current and voltage definitions, circuit elements, Combining resistive elements in series and parallel Ohm's law. Resistive networks, voltage and current sources, Thevenin equivalent circuits, current and voltage division, Capacitance and inductance RL, RC and RLC circuits <u>Part B - Measurements</u> Fundamental definitions, Measurements units, error of Measurements, Statistical analysis, D.c. measurement instrument. Ohmmeter as measurement instrument, Alternating - current indicating

	instruments, Electrodynamometer and application. Bridges, applications of D.c. Bridges, applications of A.c Bridges. Oscilloscope. High voltage measurement and its applications in electrical engineering techniques.
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Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	Type something like: The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering types of simple experiments involving some sampling activities that are interesting to the students.
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Student Workload (SWL)

الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	78	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	5.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	47	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	3.1
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	4	10% (10)	4,10	LO #1#4, #5#9
	Assignments	8	10% (10)	3,12	LO #3, #8
	Projects / Lab.	7	10% (10)	Continuou s	All
	Report	9	10% (10)	All	All
Summative assessment	Midterm Exam	1hr	20% (20)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Measurements and error.
Week 2	Statistical analysis.
Week 3	Units and standard SI system.
Week 4	Analogue instruments.
Week 5	D.c Ammeter. D.c Voltmeter.
Week 6	Series Type ohmmeter.
Week 7	Electrodynamic meters – wattmeters
Week 8	The cathode ray oscilloscope.
Week 9	D.C. Bridges & their applications.
Week 10	A.C. Bridges & their applications.
Week 11	Measurements of frequency, power angle, and power factor.
Week 12	D.C. High voltage measurements.
Week 13	A.C. High voltage measurements.
Weeks 14 , 15	Measurement's system.
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	INTRODUCTION TO LAB EQUIPMENT.
Week 2	AMMETER DESIGN.
Week 3	VOLTMETER DESIGN.
Week 4	LOADING EFFECT ON VOLTMETER.
Week 5	OHMMETER DESIGN.
Week 6	MEASUREMENT OF RESISTANCE USING WHEATSTONE BRIDGE.
Week 7	INDUCTANCE COMPARISON BRIDGE.

Week 8	CAPACITANCE COMPARISON BRIDGE.
Week 9	MAXWELL BRIDGE.
Week 10	HAY BRIDGE.
Week 11	SCHERING BRIDGE.
Week 12	WIEN BRIDGE.
Week 13	OSCILLOSCOPE AND MEASUREMENT OF FREQUENCY.
Week 14	OSCILLOSCOPE AND MEASUREMENT OF PHASE ANGLE.
Week 15	Review

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	Electronic instrumentation and measurement techniques, William David Cooper,	Yes
Recommended Texts	Electronic Instrumentation and Measurements, Third Edition, David A. Bell	No
Websites	https://www.abebooks.co.uk/book-search/title/electronic-instrumentation-and-measurements/	

Grading Scheme مخطط الدرجات				
Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 - 49)	FX – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note: 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.