Ministry of Higher Education and
Scientific Research - Iraq
Al-Furat Al-Awsat Technical University
Technical College /Al-Mussaib
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	ATU23044				
ECTS Credits	5				
SWL (hr/sem)	125				
Module Level	٢		**Semester of Delivery**	٢	
Administering Department	Electrical Engineering Techniques		**College**	Technical College /Al-Mussaib	
Module Leader			**e-mail**		
Module Leader's Acad. Title			**Module Leader's Qualification**		
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date	١٠/٠٦/٢٠٢٣		**Version Number**	١	

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	١. This course deals with define Measurement. ٢. Knowledge of measurement errors, their types, their effect on measurements, and how to reduce their effect on measurements. ٣. Introduce the Units and standard SI system. ٤. Knowledge the Classification of Instruments. ٥. Various Measurements, method for determining resistance, inductance and capacitance. ٦. Know the system measurement. ٧. High voltage measurements and testing.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Important: Write at least ٦ Learning Outcomes, better to be equal to the number of study weeks. ١. Develop the knowledge of theoretical and mathematical principles of electrical measuring instruments. ٢. Have knowledge and critical understanding of the well-established principles underpinning measurement. ٣. Have knowledge and critical understanding of the well-established principles of measurement and instrument design. ٤. Have an understanding of measurement's errors. ٥. Understand the role of various factors in calibration. ٦. Choose the proper type and specification of measuring procedure and measuring instruments for different plication. ٧. Have an understanding of Statistical analysis. ٨. Understand the working of various potentiometers, instruments for measurement of R, L and C. ٩. 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.
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.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	٧٨	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	٥,٢
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	٤٧	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	٣,١
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	١٢٥		

Module Evaluation
تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	٤	١٠٪ (١٠)	٤,١٠	LO #١#٤, #٥#٩
	Assignments	٨	١٠٪ (١٠)	٣,١٢	LO #٣, #٨
	Projects / Lab.	٧	١٠٪ (١٠)	Continuous	All
	Report	٩	١٠٪ (١٠)	All	All
Summative assessment	**Midterm Exam**	١hr	٢٠٪ (٢٠)	٧	LO #١ - #٧
	Final Exam	٣hr	٥٠٪ (٥٠)	١٦	All

Total assessment	١٠٠٪ (١٠٠ Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week ١	Measurements and error.
Week ٢	Statistical analysis.
Week ٣	Units and standard SI system.
Week ٤	Analogue instruments.
Week ٥	D.c Ammeter. D.c Voltmeter.
Week ٦	Series Type ohmmeter.
Week ٧	Electrodynamic meters – wattmeters
Week ٨	The cathode ray oscilloscope.
Week ٩	D.C. Bridges & their applications.
Week ١٠	A.C. Bridges & their applications.
Week ١١	Measurements of frequency, power angle, and power factor.
Week ١٢	D.C. High voltage measurements.
Week ١٣	A.C. High voltage measurements.
Weeks ١٤	Measurement's system.
Week ١٥	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week ١	INTRODUCTION TO LAB EQUIPMENT.
Week ٢	AMMETER DESIGN.
Week ٣	VOLTMETER DESIGN.
Week ٤	LOADING EFFECT ON VOLTMETER.
Week ٥	OHMMETER DESIGN.
Week ٦	MEASUREMENT OF RESISTANCE USING WHEATSTONE BRIDGE.

Week ٧	INDUCTANCE COMPARISON BRIDGE.
Week ٨	CAPACITANCE COMPARISON BRIDGE.
Week ٩	MAXWEEL BRIDGE.
Week ١٠	HAY BRIDGE.
Week ١١	SCHERING BRIDGE.
Week ١٢	WIEN BRIDGE.
Week ١٣	OSCILLOSCOPE AND MEASUREMENT OF FREQUENCY.
Week ١٤	OSCILLOSCOPE AND MEASUREMENT OF PHASE ANGLE.
Week ١٥	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 (٥٠ - ١٠٠)	**A** - Excellent	امتياز	٩٠ - ١٠٠	Outstanding Performance
	B - Very Good	جيد جدا	٨٠ - ٨٩	Above average with some errors
	C - Good	جيد	٧٠ - ٧٩	Sound work with notable errors
	D - Satisfactory	متوسط	٦٠ - ٦٩	Fair but with major shortcomings
	E - Sufficient	مقبول	٥٠ - ٥٩	Work meets minimum criteria
Fail Group (٠ – ٤٩)	**FX** – Fail	راسب (قيد المعالجة)	(٤٥-٤٩)	More work required but credit awarded
	F – Fail	راسب	(٠-٤٤)	Considerable amount of work required

Note: Marks Decimal places above or below ٠,٥ will be rounded to the higher or lower full mark (for example a mark of ٥٤,٥ will be rounded to ٥٥, whereas a mark of ٥٤,٤ will be rounded to ٥٤. 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.