MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	Fundamentals of Electrical Engineering			**Module Delivery**	
Module Type	Core			**Theory** **Lecture** **Lab** **Tutorial**	
Module Code	STUTTC111				
ECTS Credits	**9**				
SWL (hr/sem)	**225**				
Module Level	1		**Semester of Delivery**	1	
Administering Department	ESTE		**College**	TTC	
Module Leader	Baqer Turki attuai		**e-mail**	dr.baqer_turki@stu.edu.iq	
Module Leader's Acad. Title	**Professed**		**Module Leader's Qualification**	Ph.D	
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name	Assistant Professor Dr. Warid Sayel Warid		**e-mail**	Warid.sayel@stu.edu.iq	
Scientific Committee Approval Date	25/9/2024		**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. Learn the fundamentals and principles of electrical engineering. 2. Knowledge of electric circuit elements. 3. Analysis of electric circuits. 4. Electrical circuits theorems. 5. Calculations of currents, voltages and electrical power for DC and AC circuits 6. Analysis of resonance in AC circuits (Series and parallel resonance) 7. Analysis of Electromagnetic circuits

Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Able to Recognize the Basic concepts of electrical circuits, elements and values. Understand Ohm's Law and Power , Efficiency , Energy definitions **2.** Able to Recognize the resistors in series - voltage sources in series - Kirchhoff's voltage law - battery signal and voltage drop and Understand Voltage divider law internal resistance voltage sources voltage regulation 3. Able to Recognize the Parallel circuits: resistors in parallel - parallel networks - Kirchhoff's current law - bypass law - open circuits and short circuits. Understand series-parallel circuits, series-parallel networks. 4. Discuss the Stream sources: converting sources - approved and unaccredited sources and Current sources in series - Current sources in parallel – Limiters. 5. Describe Analysis methods: sub-stream method. Grid current method - node voltage method. 6. Identify the Arch circles. Understand Transform (delta-star) and (star-delta). 7. Discuss the Network theories: superposition theory - Thevenin theory Norton's theory . 8. Able to Recognize the theory of transfer of greatest ability and Melman's theory 9. Discuss the AC circuits and sinusoidal quantities. Understand Phase relations - average values and effective values - response (resistance - coil and capacitance) to voltage and alternating current - average power and power factor 10. Explain the Complex numbers: representation of complex numbers using the orthogonal system - the polar system - conversion between systems. Understand Arithmetic operations using complex numbers - converting electrical quantities from the system of time indication to the phase system. 11. Identify the AC circuits: Impedance - tolerance - phase diagram - Resistance and capacitance - regression response - inductive yield - capacitive yield - power and power factor. Understand series AC circuits - impedance and phase diagram -, R-L-C, R-C in series - voltage divider law - frequency response. 12. Explain the Parallel alternating current circuits - tolerance and phase diagram Understand R-L-C, R-C, and R-L circuits in parallel. 13. Able to Recognize the Circuits of inductors and reactive power - capacitor circuits. Understand Power triangle - P, Q, S power factor correction. 14. Able to Recognize the Magnetic circuits: magnetic field, field intensity, magnetic field strength. Understand Permeability coefficient, magnetic force, and hysteresis. 15. Able to Recognize the Magnetic circuits in series and parallel

Indicative Contents المحتويات الإرشادية	Part A -DC Circuit Basic concepts, introduction to electrical circuits, elements and values of DC circuits, Ohm's Law - Power - Efficiency – Energy series circuit: resistors in series - voltage sources in series - Kirchhoff's voltage law - battery signal and voltage divider law internal resistance voltage sources voltage regulation Parallel circuits: resistors in parallel - parallel networks - Kirchhoff's current law - bypass law - open circuits and short circuits Series-parallel circuits: series-parallel networks, sources: converting sources - approved and unaccredited sources Current sources in series - Current sources in parallel - Limiters [36 hr] DC circuits Analysis methods I –sub-stream method Grid current method - node voltage method Arch circles, Transform (delta-star) and (star-delta). [18hrs] Network theories: superposition theory - Thevenin theory, Norton's theory, the theory of transfer of greatest ability ,Melman's theory. [36 hr] Part B - AC Circuits AC Circuits II - AC circuits and sinusoidal quantities Phase relations - average values, effective values - response (resistance - coil and capacitance) to voltage, alternating current - average power and power factor. [18hrs] Complex numbers: representation of complex numbers using the orthogonal system - the polar system - conversion between systems Arithmetic operations using complex numbers - converting electrical quantities from the system of time indication to the phase system. [18hrs] AC circuits: Impedance - tolerance - phase diagram - Resistance and capacitance - regression response - inductive yield - capacitive yield - power and power factor Series AC circuits - impedance and phase diagram -, R-L-C, R-C in series - voltage divider law - frequency response Parallel alternating current circuits – tolerance, and phase diagram R-L-C, R-C, and R-L circuits in parallel. [18 hr] Current bypass law - series circuits - alternating parallel - series and parallel circuits Power in alternating current circuits: resistance circuits - apparent power Circuits of inductors and reactive power-capacitor circuits Power triangle - P, Q, S power factor correction [18 hr] Magnetic circuits: magnetic field, field intensity, magnetic field strength Permeability coefficient, magnetic force, hysteresis Magnetic circuits in series and parallel [18 hr]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	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 SSWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	139	**Structured SSWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	9
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	86	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	5
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**225**		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	1	5% (5)	5 and 12	LO #1, #3 and # 6, #8
	Assignments	1	5% (5)	8 and 14	LO #4 and #9, #13
	Project	1	5% (5)	Continuous	All
	Report	1	10% (10)	1-13	LO #5, #8 and #10
	Lab Reports and Lap Exam	امتحان 1 ,تقرير15 عملي	تقارير (10)% 0.666 امتحان عملي (5)% 5	1-15,8	LO #1- #15, LO #1- #8
Summative assessment	**Midterm Exam**	1 hr نظري	10% (10)	8	LO #1 - #7
	Final Exam	3 hr 2 hr نظري 1hr عملي	50% (50) 35% نظري 15% عملي	15	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Basic concepts and introduction to electrical circuits, elements, and values DC circuits Ohm's Law - Power - Efficiency - Energy
Week 2	Series circuit: resistors in series - voltage sources in series - Kirchoff's voltage law - battery signal and voltage drop Voltage divider law internal resistance voltage sources voltage regulation
Week 3	Parallel circuits: resistors in parallel - parallel networks - Kirchoff's current law - bypass law - open circuits and short circuits series-parallel circuits: series-parallel networks,
Week 4	Stream sources: converting sources - approved and unaccredited sources, Current sources in series - Current sources in parallel - Limiters
Week 5	Analysis methods: sub-stream method Grid current method - node voltage method
Week 6	Arch circles, Transform (delta-star) and (star-delta).
Week 7	Network theories: superposition theory - Thevenin theory Norton's theory - the theory of transfer of greatest ability
Week 8	Melman's theory ,AC circuits and sinusoidal quantities
Week 9	Phase relations - average values and effective values - response (resistance - coil and capacitance) to voltage and alternating current - average power and power factor Complex numbers: representation of complex numbers using the orthogonal system - the polar system - conversion between systems
Week 10	Arithmetic operations using complex numbers - converting electrical quantities from the system of time indication to the phase system AC circuits: Impedance - tolerance - phase diagram - Resistance and capacitance - regression response - inductive yield - capacitive yield - power and power factor
Week 11	Series AC circuits - impedance and phase diagram -, R-L-C, R-C in series - voltage divider law - frequency response Parallel alternating current circuits - tolerance and phase diagram
Week 12	R-L-C, R-C, and R-L circuits in parallel Current bypass law - series circuits - alternating parallel - series and parallel circuits
Week 13	Power in alternating current circuits: resistance circuits - apparent power Circuits of inductors and reactive power - capacitor circuits
Week 14	Power triangle - P, Q, S power factor correction, Magnetic circuits: magnetic field, field intensity, magnetic field strength
Week 15	Permeability coefficient, magnetic force, hysteresis Magnetic circuits in series and parallel

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: Color resistance code
Week 2	Lab 2: Ohm's law
Week 3	Lab 3: Series and Parallel connection
Week 4	Lab 4:Kirchhoff's law
Week 5	Lab 5:Star – Delta connection
Week 6	Lab 6;Supper position theorem
Week 7	Lab 7; Thévenin's / Norton's Theorem and Kirchhoff's Laws
Week 8	Lab 8: : Mesh theorem
Week 9	Lab 9: Nodal theorem
Week 10	Lab 10: Impedance element characteristics
Week 11	Lab 11: A.C Maximum transfer
Week 12	Lab 12:RL series circuit
Week 13	Lab 13:RC series circuit, RLC series circuit
Week 14	Lab 14:RL parallel circuit, RC parallel circuit
Week 15	Lab 15:RLC parallel circuit

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Fundamentals of Electric Circuits, C.K. Alexander and M.N.O Sadiku, McGraw-Hill Education A Textbook of Electrical Technology Volume I, B.L. THERAJA. A.K. THERAJA, 2005 Introductory Circuit Analysis, Volume 10, Boylestad	NO
Recommended Texts	DC Electrical Circuit Analysis: A Practical Approach Copyright Year: 2020, dissidents.	No
Websites	https://www.coursera.org /electrical-engineering	

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.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	Engineering materials			**Module Delivery**	
Module Type	Core			**Theory** **Lecture** **Lab**	
Module Code	STUTTC112				
ECTS Credits	9				
SWL (hr/sem)	225				
Module Level	1		**Semester of Delivery**	1	
Administering Department	ESTE		**College**	TTC	
Module Leader	Ahmed Saheb Mahdi		**e-mail**	ahmed.altaei@stu.edu.iq	
Module Leader's Acad. Title	Assistant professor		**Module Leader's Qualification**	Ph.D.	
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name	Dr. Ahmed Khafeef Obaid		**e-mail**	akoab82@stu.edu.iq	
Scientific Committee Approval Date	25/9/2024		**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. It provides a working knowledge of Material Science. 2. Illustration and discussion the principles of Material structure-selection and description. 3. To select a material for a given use based on considerations of cost and performance. 4. To be able to create a new material that will have some desirable properties. 5. To understand the limits of materials and the change of their properties with use.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. An understanding of Dimensions and units of measurement. 2. List the various terms associated with Engineering Materials . 3. Summarize what is meant by a basic of materials selection. 4. Discuss the structure, properties and application on of different materials. 5. Describe atoms bonding. 6. Define Crystal Structure. 7. Identify the principle of solidification. 8. Discuss the various properties of semiconductors.. 9. Identify the properties of composite materials.

Indicative Contents المحتويات الإرشادية	Indicative content includes the following. <u>Part A –various Materials types , structure and behavior Theory</u> Classification of Materials, Advanced materials, Atomic structure, Crystal structureDefects-types of defect-linear defect- Alloy applications- Types of Ceramics. [15 hrs] Ceramics, Types of Ceramics polymers, Polymers types and properties, Semiconductors, Composite materials phase. [15 hrs] diagram -Carbon steel diagram, Heat treatment , Quenching and Tempering. [10 hrs] Mechanical behavior for metals- elastic and plastic deformation, Mechanical behavior of polymers, Mechanical behavior of Ceramics, Mechanical behavior of Composite materials. [15 hrs] Revision problem classes [6 hrs] <u>Part B –Properties of materials</u> Hardness and other mechanical properties, Physical propertiese. [15 hrs] Thermal properties, Heat capacity, Thermal expansion, Thermal stresses. [7 hrs] Physical and electrical properties, Electrical conductivity of polymers and Ceramics. Semi conductivity Dielectrical properties [15 hrs]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The key strategy for presenting this module will be to stimulate students' engagement in the tasks while also refining and strengthening their critical thinking abilities. This will be accomplished through courses, interactive tutorials, and the consideration of various sorts of experiments incorporating certain sample activities that are attractive to the students.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SSWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	109	**Structured SSWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	7
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	116	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	7
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	225		

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	1	5% (5)	5 and 10	LO #1, #3 and #4, #5
	Assignments	1	5% (5)	3 and 8	LO #6 and #9
	Projects	1	5% (5)	Continuous	All
	Report	1	10% (10)	1-13	LO #5, #8 and #9
	Lab report and Lab exam	امتحان 1 ,تقرير7 عملي	تقارير 1.428 %(10) امتحان عملي 5%(5)	1-15,8	LO #1- #9, LO #1- #8
Summative assessment	**Midterm Exam**	1 hr نظري	10% (10)	7	LO #1 - #7
	Final Exam	3 hr 2 hr نظري 1hr عملي	50% (50) 35% نظري 15% عملي	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction - Classification of Materials.
Week 2	Advanced materials – Atomic structure.
Week 3	Atoms bonding- Crystal structure.
Week 4	Defects-types of defect-linear defect-Principle of solidification.
Week 5	Alloy applications- Types of Ceramics.
Week 6	Polymers, Polymers types and properties.
Week 7	Semiconductors, Composite materials.
Week 8	Phase diagram -Carbon steel diagram.
Week 9	Heat treatment.
Week 10	Mechanical behavior for metals- elastic and plastic deformation.
Week 11	Mechanical behavior for Ceramics, Polymers and composite materials.
Week 12	Hardness and other mechanical properties
Week 13	Physical and electrical properties
Week 14	Electrical conductivity of polymers and Ceramics
Week 15	Thermal properties

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: Introduction to Rockwell Hardness test
Week 2	Lab 2: Brinell Hardness test
Week 3	Lab 3: Vickers Hardness test
Week 4	Lab 4: Sample preparation for Microscopic examination
Week 5	Lab 5: ASTM GRAIN SIZE ANALYSIS
Week 6	Lab 6: Heat Treatment- Quenching and tempering
Week 7	Lab 7: Preparation and study of the Micro Structure of pure metals like Iron, Copper and Aluminum.

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Engineering Materials 1, An introduction to Their Properties and Applications, second edition, M. F. Ashby and D. R. H. Jones, Butterworth-Heinemann, Woburn, UK, 1996.	NO
Recommended Texts	Materials Science and Engineering – An introduction, sixth edition,John Wiley & Sons, Inc. 2004.	No
Websites	https://ftp.idu.ac.id/wp-content/uploads/ebook/tdg/TEKNOLOGI%20REKAYASA%20MATERIAL%20PERTAHANAN/Materials%20Science%20and%20Engineering%20An%20Introduction%20by%20William%20D.%20Callister,%20Jr.,%20David%20G.%20Rethwish%20(z-lib.org).pdf	

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.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	Mathematics			**Module Delivery**	
Module Type	supportive			**Theory** **Lecture** **Tutorial**	
Module Code	STUTTC113				
ECTS Credits	7				
SWL (hr/sem)	175				
Module Level	1		**Semester of Delivery**	1	
Administering Department	ESTE		**College**	TTC	
Module Leader	Shawqi Glalaf		**e-mail**	shawki.muhammad@stu.edu.iq	
Module Leader's Acad. Title	Professor		**Module Leader's Qualification**	Ph.D.	
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name	Assistant professor Dr warid sayel warid		**e-mail**	warid. sayel@stu.edu.iq	
Scientific Committee Approval Date	25/9/2024		**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. To develop problem solving skills and understanding of mathematics through the application of techniques. 2. To understand fundamental functions, differentiation, integration. 3. This course deals with the basic concepts of differentiation of the functions. 4. This is the basic subject for all simple function, polynomials, and power, rational functions. 5. To understand problems like derivatives applications, change rate, draw functions, derivatives of trigonometric functions, natural logarithm and exponential functions, log function and other types of functions. 6. To develop knowledge and techniques to integrate various types of function and integration application, finding area, volumes, methods of integration.

Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Describe elementary functions (e.g. polynomial, power, rational, algebraic, exponential, log, and trigonometric functions) which arise in engineering. 2. Understanding basic functions, Functions graph, and equation of the straight line, Trigonometric functions and their sketches.Define limits, Polar coordinates (general definition). 3. Methods of differentiation, Differentiation of basic functions (e.g. polynomial, power, rational, algebraic). 4. Skills of Some applications of differentiation. Rates of change, Velocity and acceleration, implicit functions. 5. Derivative of Logarithmic function, exponential, natural logarithmic and special function a^x,x^x. 6. Differentiation of hyperbolic functions, inverse trigonometric and hyperbolic functions.Discuss the use of derivatives to find the limit L'Hôpital's rule. 7. Discussion and review of the previous topics. 8. Define the integration. Integration of basic functions e.g. polynomial, power, rational, algebraic) 9. Integration of trigonometric and hyperbolic functions. 10. Applications of definite integration, area and volume. 11. Integration of other functions, Logarithmic function, exponential, natural logarithmic and special function a^x,x^x, inverse trigonometric and hyperbolic functions. 12. Methods of integration, integration by parts, substitution sin and cos function, partial fraction. 13. Methods of integration of special function, of type $\sin^n$, $\cos^n$. 14. Discussion and review of the previous topics.

Indicative Contents المحتويات الإرشادية	<u>Part A – define functions</u> Functions - Describe elementary functions (e.g. polynomial, power, rational, algebraic, exponential, log, and trigonometric functions) which arise in engineering. Understanding basic functions, Functions graph, and equation of the straight line, Trigonometric functions and their sketches.Define limits, Polar coordinates (general definition). [12hrs] <u>Part B – Differentiation functions</u> Differentiation - Methods of differentiation, Differentiation of basic functions (e.g. polynomial, power, rational, algebraic).Skills of Some applications of differentiation. Rates of change, Velocity and acceleration, implicit functions·Derivative of Logarithmic function, exponential, natural logarithmic and special function a^x,x^x.Differentiation of hyperbolic functions, inverse trigonometric and hyperbolic functions.Discuss the use of derivatives to find the limit L'Hôpital's rule. Discussion and review of the previous topics. Define the integration. Integration of basic functions e.g. polynomial, power, rational, algebraic). [24hrs] Revision problems [6 hrs] <u>Part B – Integration functions</u> Define the integration. Integration of basic functions e.g. polynomial, power, rational, algebraic). Integration of trigonometric and hyperbolic functions. Applications of definite integration, area and volume.Integration of other functions, Logarithmic function, exponential, natural logarithmic and special function a^x,x^x, inverse trigonometric and hyperbolic functions.[24hrs] Methods of integration, integration by parts, substitution sin and cos function, partial fraction.Methods of integration of special function, of type $\sin^n$, $\cos^n$.[12hrs] Discussion and review of the problems.[6hrs] Exam preparing. [6 hrs] Exam. [4hrs]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	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 SSWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	94	**Structured SSWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	6
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	81	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	5
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	175		

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	2	5% (10)	5 and 10	LO #1, #3 and #8, #9
	Assignments	2	5% (10)	6 and 13	LO #5 and #7, #12
	Report	1	10% (10)	1-13	LO #5, #8 and #10
	seminars	1	10% (10)	1-13	LO #3, #4 and #8
Summative assessment	**Midterm Exam**	1 hr	10% (10)	7	LO #1 - #7
	Final Exam	3 hr	50% (50)	15	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Describe elementary functions (e.g. polynomial, power, rational, algebraic, exponential, log, and trigonometric functions) which arise in engineering.
Week 2	Understanding basic functions, Functions graph, and equation of the straight line, Trigonometric functions and their sketches.Define limits, Polar coordinates (general definition).
Week 3	Methods of differentiation, Differentiation of basic functions (e.g. polynomial, power, rational, algebraic)
Week 4	Skills of Some applications of differentiation. Rates of change, Velocity and acceleration, implicit functions.
Week 5	Derivative of Logarithmic function, exponential, natural logarithmic and special function a^x,x^x.
Week 6	Differentiation of hyperbolic functions, inverse trigonometric and hyperbolic functions.Discuss the use of derivatives to find the limit L'Hôpital's rule.
Week 7	Mid-term Exam
Week 8	Discussion and review of the previous topics.
Week 9	Define the integration. Integration of basic functions e.g. polynomial, power, rational, algebraic)
Week 10	Integration of trigonometric and hyperbolic functions.
Week 11	Applications of definite integration, area and volume.
Week 12	Integration of other functions, Logarithmic function, exponential, natural logarithmic and special function a^x,x^x, inverse trigonometric and hyperbolic functions.
Week 13	Methods of integration, integration by parts, substitution sin and cos function, partial fraction.
Week 14	Methods of integration of special function, of type $\sin^n$, $\cos^n$.Discussion and review.
Week 15	Final Exam

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Theory of advanced mathematics with application by Thomas Calculus.	No
Recommended Texts	Books and Literatures in different kinds of Advanced Mathematics.	No
Websites	https://www.khanacademy.org/math/calculus-1	

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.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	Computer fundamentals /1			**Module Delivery**	
Module Type	supportive			**Theory** **Lab**	
Module Code	STU103				
ECTS Credits	3				
SWL (hr/sem)	75				
Module Level	1		**Semester of Delivery**	1	
Administering Department	ESTE		**College**	TTC	
Module Leader	Rasheed Hameed Mazid		**e-mail**	rasheed.alhmel@stu.edu.iq	
Module Leader's Acad. Title	Assistant Professor		**Module Leader's Qualification**	Ph.D.	
Module Tutor			**e-mail**	E-mail	
Peer Reviewer Name	Assistant professor Dr warid sayel warid		**e-mail**	warid. sayel@stu.edu.iq	
Scientific Committee Approval Date	25/9/2024		**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. To develop problem-solving skills and an understanding of the computer through the application of techniques 2. 2- To understand the work of the electronic computer and the possibility of dealing with it 3. Developing an understanding of the fundamental concepts of computer science, including programming, algorithms, data structures, computer architecture, operating systems, and networks. 4. Developing practical skills in software development, including programming, debugging, testing, and documentation. 5. Developing problem-solving skills, including the ability to analyze problems, design solutions, and implement them using appropriate programming languages and tools. 6. Developing an understanding of the ethical and social issues related to computing, including privacy, security, intellectual property, and the digital divide. 7. Developing an understanding of the role of computer science in society, including its impact on industry, government, healthcare, and education. 8. Developing an appreciation for the diversity of applications of computer science, including artificial intelligence, machine learning, robotics, and data science

Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Discusses the basic components of a computer system, including hardware, software, and peripherals. 2. Understand basic computer programming concepts such as variables, loops, and conditionals 3. It discusses the basics of computer networking, including the different types of networks, network topologies, and network protocols. 4. Learn about common operating systems, such as Windows, Mac OS, and Linux, including their features, functions, and user interface 5. Learn to use popular productivity software, including word processing, spreadsheet, and presentation applications 6. Understand the importance of computer security and privacy, including risks associated with malware, viruses, and phishing 7. Develop basic troubleshooting skills, including identifying and resolving common hardware and software problems 8. Learn basic computer terms and concepts, including file management, data storage, and computer ethics 9. Familiarize learners with basic computer terms and concepts, such as file management, data storage, and computer ethics. 10. Learners understand different file formats, data storage options, and ethical considerations related to the use of computers and the Internet. 11. Learners understand how to protect their data and devices, including using antivirus software, firewalls, and strong passwords 12. Learners have developed skills in creating, editing and formatting documents, spreadsheets and presentations.

Indicative Contents المحتويات الإرشادية	<u>Part A - Computer Basics</u> - Computer Basics includes, computer life cycle - computer generations - data and information - computer features - areas of use. Computer's components(10 hrs) - The physical parts of the computer - input devices - output devices - computer case Software entity - computer setup systems - personal computer features (8 hrs) - Part review (2hrs) <u>Part B-Computer security and software licenses</u> - Ethics of the electronic world - forms of transgression in the digital world - computer security - computer privacy - computer software licenses - types of licenses - intellectual property - types of electronic penetration (10hrs) - malicious programs Computer viruses - components of the virus - types of viruses - the most common security risk (8hrs) -Part review (2hrs) <u>Part C- Operating Systems</u> -Definition of operating system - Functions of the operating system - Objectives of the operating system - Classification of operating systems (10hrs) - Desktop Components - Start Menu - Taskbar - Notification Area - Folders and Files - Desktop Backgrounds - Control Panel – Help (8hrs) - Part review (2hrs)

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	1. Start with the basics: Begin by introducing learners to the basic components of a computer system, including hardware, software, and peripherals. Use simple, easy-to-understand language and provide visual aids, such as diagrams and images, to help learners grasp the concepts. 2. Use a hands-on approach: Provide learners with opportunities to practice using computers and software applications. Use interactive activities, such as tutorials, quizzes, and games, to engage learners and reinforce their learning. 3. Provide clear instructions: Ensure that instructions are clear and easy to follow. Break down complex tasks into smaller, manageable steps and provide learners with clear guidance on how to complete each step. 4. Use real-world examples: Use real-world examples to illustrate the relevance and practical applications of computer technology. For example, show learners how to create a resume using word processing software or how to create a budget using a spreadsheet application.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SSWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	49	**Structured SSWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	3
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	26	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	1.5
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	75		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	1	5% (5)	7 and 13	LO #2, #3، and #7, #8،
	Assignments	1	5% (5)	3 and 10	LO #1, #4 and #5, #6،#9
	Project	1	5% (5)	Continuous	All
	Report	1	10% (10)	1-14	LO #10, #11 and #12
	Lab Reports and Lap Exam	امتحان 1 ,تقرير15 عملي	تقارير (10)% 0.666 امتحان عملي (5)%5	1-15,8	LO #1- #15, LO #1- #8
Summative assessment	**Midterm Exam**	1 hr نظري	10% (10)	7	LO #1 - #7
	Final Exam	3 hr 2 hr نظري 1hr عملي	50% (50) 35% نظري 15% عملي	15	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Phases of the computer cycle, and its development
Week 2	Electronic computer, data Information and computer features
Week 3	Computer components and types of computers
Week 4	The physical parts of the computer, and the entity software
Week 5	computer setup systems and computer features
Week 6	Factors that must be taken into account when Buying a computer, and the ethics of the world electronic
Week 7	Forms of abuse in the digital world - Computer security and privacy the computer
Week 8	Computer software licenses and types Intellectual property licenses
Week 9	Hack email and its sources
Week 10	Malignant-Types - components
Week 11	Computer risks- Health - psychological - social
Week 12	Operating systems - concept - functions - goals
Week 13	Desktop background, control panel
Week 14	Mouse settings and controls Windows general exercises
Week 15	preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Introduction to Word- Understanding the Word interface- Creating a new document - Saving and opening documents- Basic text editing and formatting
Week 2	Formatting Text- Font type, size, and color- Bold, italic, and underline- Alignment and indentation- Bullets and numbering
Week 3	Page Layout- Margins and orientation- Page size and breaks- Headers and footers - Page numbering
Week 4	Styles and Themes- Creating and modifying styles- Applying themes- Saving and sharing styles and themes
Week 5	Tables- Creating tables- Formatting tables- Merging and splitting cells- Calculating in tables
Week 6	Images and Graphics- Inserting images and graphics- Resizing and cropping images- Adding captions and alt text- Working with shapes and text boxes
Week 7	Document Collaboration- Sharing documents- Tracking changes- Reviewing and accepting changes- Adding comments
Week 8	Mail Merge- Creating a data source- Creating a mail merge document- Previewing and finishing the merge
Week 9	Templates- Using built-in templates- Creating custom templates- Saving and sharing templates - Applying templates
Week 10	Working with Long Documents- Using headings and subheadings- Creating a table of contents - Adding footnotes and endnotes- Creating an index
Week 11	Advanced Formatting- Using styles for formatting- Formatting page numbers and section breaks - Working with columns and breaks- Using line and page breaks

Week 12	Advanced Editing- Using find and replace- Using the thesaurus and dictionary- Creating and modifying autocorrect entries- Using the Clipboard and Smart Cut and Paste
Week 13	Macros and Automation- Recording and running macros- Customizing the Quick Access Toolbar and Ribbon- Using keyboard shortcuts- Automating tasks with Visual Basic for Applications (VBA)
Week 14	Advanced Topics- Creating and editing forms- Protecting documents with passwords and permissions- Using macros to automate tasks- Customizing Word options and settings

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	William Stallings, (2003), Computer Organization & Architecture, Sixth edition, Preson Education	Yes
Recommended Texts	Computer Science Illuminated" by Nell Dale and John Lewis	No
Websites	1. GCF Global - Computer Basics: https://edu.gcfglobal.org/en/computerbasics/ 2. Digital Unite - Computer Basics: https://digitalunite.com/technology-guides/computer-basics	

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.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	حقوق الانسان والديمقراطية			**Module Delivery**	
Module Type	supportive			**Theory**	
Module Code	STU102				
ECTS Credits	2				
SWL (hr/sem)	50				
Module Level	1		**Semester of Delivery**	1	
Administering Department	ESTE		**College**	TTC	
Module Leader	علاء خضير عبد الله		**e-mail**	asmr8414@gmail.com	
Module Leader's Acad. Title	Assistant lecturer		**Module Leader's Qualification**	M.sc	
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date	25/9/2024		**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- المعرفة بحقوق الإنسان. 2- تعرف على حقوق الإنسان الطبيعية والمحمية التي توفرها الحكومات والمجتمع الدولي للناس. 3- الهدف من هذه الوحدة الدراسية هو تعريف الطلاب على ماهية الحق ، وما هي حقوقهم الطبيعية ، وما هي حقوقهم السياسية.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1- اعرف ما هو الحق. 2- معرفة الحقوق الطبيعية. 3- أن يكون الطالب قادراً على التعرف على حقوق الإنسان والحماية التي تمنحها لها الدساتير. 4- معرفة الحقوق السياسية. 5- معرفة دور المنظمات الدولية. 6- معرفة اسس حقوق الانسان في القانون الدولي. 7- معرفة الاعتراف الدولي بحقوق الانسان. 8- معرفة الحقوق المدنية. 9- معرفة حق المساواة امام القانون. 10- معرفة مفهوم الحرية وانواعها . 11- معرفة الانتخابات كمبدأ من مبادئ حقوق الانسان. 12- تأثير ظاهرة الفساد الاداري على حقوق الانسان والمجتمع.

Indicative Contents المحتويات الإرشادية	طبيعة الحق وماهية حقوق الانسان- مفهوم حقوق الانسان - خصائص حقوق الانسان في الاديان - مميزات القانون الطبيعي – الحقوق الطبيعية [9] اهمية حقوق الانسان واسسها – حقوق الانسان في الاديان - حقوق الانسان في الشريعة الاسلاميه : في القرأن الكريم . في السنة النبوية الشريفة - ارتباط الواجبات بالحقوق في الشريعة الاسلامية [9] اسس حقوق الانسان في القانون الدولي – مصادرة– الحق الطبيعي – الدين - العرف العاده –الحقوق اللصيقه الكائن الطبيعي - الاعتراف الدولي بحقوق الانسان – الاعتراف الاقليمي بحقوق الانسان – المنظمات غير الحكومية ودورها في الدفاع عن حقوق الانسان [9] الحقوق المدنية – حق الحياة والحرية وحق الحرية الشخصية – حق التملك – حق التعاقد –حق حرية الاعتقاد حرية الضمير - حق تاسيس الجمعيات والاشتراك فيها –حق تكوين العائلة – حق المساواة امام القانون – ضمانات الحقوق المدنية حقوق الدين - حقوق الابناء - حقوق النساء - حقوق الجوار [9] مفهوم الحرية وانواعها – قيود الحرية - الانتخابات كمبدأ من مبادئ حقوق الانسان -تأثير ظاهرة الفساد الاداري على حقوق الانسان والمجتمع [9]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	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 SSWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	33	**Structured SSWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	17	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	1
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**50**		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	2	5% (10)	5 and 10	LO #1, #2 and #6, #8
	Assignments	2	5% (10)	4 and 12	LO #3 and #9, #10
	Report	1	10% (10)	1-13	All
	seminars	1	10% (10)	1-13	LO #3, #5 and #8
Summative assessment	**Midterm Exam**	1hr	10% (10)	7	LO #1 - #7
	Final Exam	2hr	50% (50)	15	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	طبيعة الحق وماهية حقوق الانسان
Week 2	مفهوم حقوق الانسان - خصائص حقوق الانسان في الاديان
Week 3	مميزات القانون الطبيعي – الحقوق الطبيعية
Week 4	اهمية حقوق الانسان واسسها – حقوق الانسان في الاديان
Week 5	حقوق الانسان في الشريعة الاسلاميه : في القرأن الكريم . في السنة النبوية الشريفة
Week 6	ارتباط الواجبات بالحقوق في الشريعة الاسلامية
Week 7	اسس حقوق الانسان في القانون الدولي – مصادرة– الحق الطبيعي – الدين
Week 8	العرف العاده –الحقوق اللصيقه الكائن الطبيعي
Week 9	الاعتراف الدولي بحقوق الانسان – الاعتراف الاقليمي بحقوق الانسان – المنظمات غير الحكومية ودورها في الدفاع عن حقوق الانسان
Week 10	الحقوق المدنية – حق الحياة والحرية وحق الحرية الشخصية – حق التملك – حق التعاقد –حق حرية الاعتقاد حرية الضمير
Week 11	حق تاسيس الجمعيات والاشتراك فيها –حق تكوين العائلة – حق المساواة امام القانون – ضمانات الحقوق المدنية
Week 12	حقوق الدين - حقوق الابناء - حقوق النساء - حقوق الجوار
Week 13	مفهوم الحرية وانواعها – قيود الحرية
Week 14	الانتخابات كمبدأ من مبادئ حقوق الانسان
Week 15	تأثير ظاهرة الفساد الاداري على حقوق الانسان والمجتمع

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	حقوق الانسان . حافظ علوان حمادي . جامعة بغداد كلية العلوم السياسية . 2009	No

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.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	Electronic Physics			**Module Delivery**	
Module Type	**Core**			**Theory** **Lecture** **Lab**	
Module Code	STUTTC121				
ECTS Credits	**9**				
SWL (hr/sem)	**225**				
Module Level	1		**Semester of Delivery**	2	
Administering Department	ESTE		**College**	TTC	
Module Leader	Shawqi Glalaf		**e-mail**	shawki.muhammad@stu.edu.iq	
Module Leader's Acad. Title	Professor		**Module Leader's Qualification**	Ph.D.	
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name			**e-mail**		
Scientific Committee Approval Date	25/9/2024		**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. To understand the fundamentals of structure of the atom, orbitals in the atom, energy levels connectivity, semiconductors. 2. To have knowledge about the physics of semiconductor materials. 3. To understand the characteristics and theories in semiconductor materials in terms of crystal structures, charge carriers and energy bands. 4. To describe crystalline structures of semiconductors. describe band structures of semiconductors. 5. To explain the properties of n-type and p-type semiconductors.

Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1- Understand the structure of the atom, orbitals in the atom, energy levels. To understand contributory, conductivity, semiconductors. 2- Understand doping, equivalence , diffraction and diffusion , conductors, insulators and semiconductors, connectivity. 3- Understand the structure of PN junction:, the properties of the junction, the operation of diodes in electrical circuits. 4- Learn junction applications like zener diode, half wave rectifier and full wave rectifier filters. 5- Understand the transistor specifications. 6- Recognize saturation and cutoff in the transistor. 7- Understand the operation of transistor as a switch. 8- Understand the operation of transistor as an amplifier. 9- Understand the operation of FET transistor. 10- Understand the operation of JFET transistor and JFET Properties. 11- Understand the circuit analysis of JFET. 12- Understand the properties and circuit analysis of MOS-FET transistor. 13- Understand the operation of FET transistor as an amplifier. 14- Understand the operation of FET transistor as switch.

Indicative Contents المحتويات الإرشادية	semiconductors: - structure of the atom, orbitals in the atom, - energy levels - Contributory and Contributory Links - Conductivity, semiconductors. [7] doping, equivalence -Diffraction and diffusion -Conductors, insulators and semiconductors -connectivity. [7] PN junction: open circuit connection -Bias joint. Pn -The properties of the junction. V-I Diodes in electrical circuits- junction applications- Dual types- Zener diode. Half wave rectifier and full wave rectifier -Filters. [14] three-way transistor- The controlled source- Triple connection- Transistor specifications- saturation and cutoff in the transistor- transistor as a switch- transistor as an amplifier. [28] FET transistor- Voltage controlled power source- JFET transistor- JFET properties- Circuit Analysis of JFET- MOS-FET transistor- properties and circuit analysis- FET transistor as a switch. [42]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	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 SSWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	109	**Structured SSWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	7
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	116	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	7
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	225		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	1	5% (5)	5 and 10	LO #1, #2 and #12, #13
	Assignments	1	5% (5)	4 and 8	LO #3 and #6
	Project	1	5% (5)	Continuous	All
	Report	1	10% (10)	13	LO #3, #8 and #9
	Lab Reports and Lap Exam	امتحان 1 ,تقرير15 عملي	تقارير (10)% 0.666 امتحان عملي (5)%5	1-15, 8	LO #1-15, LO #1-8
Summative assessment	**Midterm Exam**	1 hr نظري	10% (10)	7	LO #1 - #8
	Final Exam	3 hr 2 hr نظري 1hr عملي	50% (50) 35% نظري 15% عملي	15	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	semiconductors: - structure of the atom, orbitals in the atom, - energy levels - Contributory and Contributory Links - Conductivity, semiconductors
Week 2	doping, equivalence -Diffraction and diffusion -Conductors, insulators and semiconductors -Connectivity
Week 3	PN junction: open circuit connection -Bias joint. Pn -The properties of the junction. V-I Diodes in electrical circuits
Week 4	junction applications Dual types. Zener diode. Half wave rectifier and full wave rectifier Filters
Week 5	three-way transistor The controlled source Triple connection. Transistor specifications
Week 6	saturation and cutoff in the transistor
Week 7	transistor as a switch
Week 8	transistor as an amplifier

Week 9	FET transistor Voltage controlled power source
Week 10	JFET transistor JFET Properties
Week 11	JFET circuit analysis
Week 12	MOS-FET transistor Properties and circuit analysis
Week 13	FET transistor as an amplifier
Week 14	FET transistor as a switch
Week 15	Application examples

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	**Characteristics Diode**
Week 2	**Half wave rectifier**
Week 3	**Full wave rectifier**
Week 4	**Clipper Circuit**
Week 5	**Clamper Circuit**
Week 6	**Voltage Multipliers**
Week 7	**Other Diode applications (AND circuit)**
Week 8	**Other Diode applications (OR circuit)**
Week 9	**Zener Diode characteristics**
Week 10	**Zener regulator**
Week 11	**BJT characteristics**
Week 12	**FET characteristics**

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Electronics for Physicists: An Introduction (Undergraduate Lecture Notes in Physics) 1st ed. 2020 Edition by Bryan H. Suits	No
Recommended Texts	fundamental of physics by F.Bush	No
Websites	No	

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.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	Engineering Mechanics			**Module Delivery**	
Module Type	Core			**Theory** **Lecture**	
Module Code	STUTTC122				
ECTS Credits	7				
SWL (hr/sem)	175				
Module Level	1		**Semester of Delivery**	2	
Administering Department	ESTE		**College**	TTC	
Module Leader	Ahmed Saheb Mahdi		**e-mail**	ahmed.altaei@stu.edu.iq	
Module Leader's Acad. Title	Assistant Professor		**Module Leader's Qualification**	Ph.D.	
Module Tutor			**e-mail**		
Peer Reviewer Name	Dr. Ahmed Khafeef Obaid		**e-mail**	akoab82@stu.edu.iq	
Scientific Committee Approval Date	25/9/2024		**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. To develop problem solving skills and understanding of mechanics theory through the application of techniques. 2. To understand force, resultant and vectors from a mechanical devices. 3. This course deals with the basic concept of statics and dynamics mechanics. 4. This is the basic subject for all mechanics parts. 5. To understand force moment, equilibrium, centroid and moment of inertia problems. 6. To know about friction problems perform mechanics dynamics analysis.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Recognize how force resultant works in mechanic parts. 2. Understand the moment associated with force resultant. 3. Explain what is the equilibrium. 4. Discuss the centroid and its types in mechanics. 5. Describe moment of inertia. 6. Define truss concept. 7. Identify the basic friction elements and their applications. 8. Discuss the different types of loads. 9. Discuss the terms of displacement, velocity . 10. Explain the two dynamics. 11. Identify how to find the dynamics components and analysis.

Indicative Contents المحتويات الإرشادية	Introduction to static. Scalar quantity, vector quantity ,standers units. Tow–Tow–dimensional force systems, rectangular components .Moment, principle of moment ,couple ,couple-force system Resultants .Three-dimensional force system, component forces for three dimensions .couple in three-dimensional force system, couple-force system in three-dimensional force system. Resultant in three –dimensional forces. Equilibrium, free body diagram. Structures ,analysis methods. Types of friction, types friction centroid.[10 hrs] Composite bodies &figures Moment of inertia-composite area. [10 hrs] Introductiontodynamic.Kinematicsofparticles,rectilinearmotion.Velocity,acceleration&motionlaws.Plane curvilinear motion(rectangularcoordinate(x-y)).Projectilemotion.Planecurvilinearmotion(normal & tangential coordinates (n-1)).Plane curvilinear motion (polar coordinates (r-Ɵ)).[10 hrs] Kinetics of particles, Newton's second law. Rectilinear motion. Curvilinear motion. Kinetics of particles, work power, Efficiency, principle of work & kinetic energy. Impulse & momentum [15 hrs]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	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 SSWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	94	**Structured SSWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	6
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	81	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	5
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	175		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	2	5% (10)	5 and 10	LO #1, #2 and #6, #8
	Assignments	2	5% (10)	4 and 12	LO #3 and #6, #7
	Projects	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	**Midterm Exam**	1 hr	10% (10)	7	LO #1 - #7
	Final Exam	3 hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction to static. Scalar quantity, vector quantity, standers units. Tow– Tow–dimensional force systems, rectangular components.
Week 2	Moment, principle of moment
Week 3	couple, couple -force system Resultants.
Week 4	Three-dimensional force system, component forces for three dimensions. couple in three-dimensional force system, couple-force system in three-dimensional force system.
Week 5	Resultant in three –dimensional forces. Equilibrium, free body diagram.
Week 6	Structures, analysis methods.
Week 7	Centroid concept
Week 8	Composite bodies &figures Moment of inertia-composite area.
Week 9	Introduction to friction.
Week 10	Introduction to dynamic. Kinematics of particles, rectilinear motion.
Week 11	Velocity, acceleration& motion laws. Plane curvilinear motion (rectangular coordinate(x-y)). Projectile motion.
Week 12	Plane curvilinear motion(normal & tangential coordinates (n-1)). Plane curvilinear motion(polar coordinates (r-Θ)).
Week 13	Kinetics of particles
Week 14	Newton's second law. Rectilinear motion. Curvilinear motion.
Week 15	Kinetics of particles, work power, Efficiency, principle of work& kinetic energy. Impulse & momentum

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Engineering Mechanics,Volume1, Statics &Dynamics , Fifth Edition by J. L. Meriam & L. G. Kraige	No
Recommended Texts		
Websites		

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.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	Engineering and electrical Drawing			**Module Delivery**	
Module Type	core			**Theory**	
Module Code	STUTTC123			**Lecture**	
ECTS Credits	6			**Practical**	
SWL (hr/sem)	150				
Module Level	1		**Semester of Delivery**	2	
Administering Department	ESTE		**College**	TTC	
Module Leader	ameera Tawfiq Musleh		**e-mail**	Ameerat01999@gmail.com	
Module Leader's Acad. Title	Assistant lecturer		**Module Leader's Qualification**	M.sc	
Module Tutor			**e-mail**		
Peer Reviewer Name			**e-mail**		
Scientific Committee Approval Date	25/9/2024		**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. To understand manual drafting and dimensioning of views 2. To perform lines drawing, simple sketches and modify dimensions. 3. This course deals with the basic concept of electrical drawing. 4. To understand sections and isometrics. 5. Explains the principles of orthographic views 6. To understand multi view projection. 7. To understand sectional view drawing
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1- Recognize drawing paper Specification and Kinds of Lines 2- Understand the first angle projection and third angle projection 3- Explain multi view projection and views Distributions. 4- Drawing of side view and drawing of top view . 5- Dimensioning of Drawing and Full Section 6- Understand half Section and offset Section 7- Explain partial section 8- To understand electrical drawing

Indicative Contents المحتويات الإرشادية	Drawing Paper Specification, Kinds of Lines, First Angle Projection [21 hrs] Third Angle Projection, Multi View Projection, Views Distributions [21 hrs] Drawing of Side View, Drawing of Top View, Dimensioning of Drawing, Full Section, Half Section, Offset Section [21 hrs] Partial Section, Pictorial Drawing, Isometric Drawing [21 hrs] Electrical Drawing , Electrical Symbols, Electronic Symbols [21 hrs]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	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 SSWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	110	**Structured SSWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	7
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	40	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	3
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	150		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	2	5% (10)	5 and 8	LO #1, #2 and #5, #6
	seminar	1	10% (10)	14	LO #6 and #8
	project	1	10% (10)	13	LO #4
	Assignments	2	5% (10)	4 and 14	LO #3 and #8
Summative assessment	**Midterm Exam**	2hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي	
	Material Covered
Week 1	Drawing Paper Specification
Week 2	Kinds of Lines
Week 3	First Angle Projection
Week 4	Third Angle Projection
Week 5	Multi View Projection
Week 6	Views Distributions
Week 7	Drawing of Side View, Drawing of Top View
Week 8	Dimensioning of Drawing, Full Section
Week 9	Half Section, Offset Section
Week 10	Partial Section
Week 11	Pictorial Drawing
Week 12	Isometric Drawing
Week 13	Electrical Drawing
Week 14	Electrical Symbols
Week 15	Electronic Symbols

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Engineering Drawing . assistant professor Abed Alrassol AL-Khfaf , UOT , 1990 Electrical Drawing, J. C. Cluley , 1979	No

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.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	English language/1			**Module Delivery**	
Module Type	Supportive			**Theory**	
Module Code	STU101				
ECTS Credits	2				
SWL (hr/sem)	50				
Module Level	1		**Semester of Delivery**	2	
Administering Department	ESTE		**College**	TTC	
Module Leader	ameera tawfiq musleh		**e-mail**	ameerat01999@gmail.com	
Module Leader's Acad. Title	Assistant lecturer		**Module Leader's Qualification**	M.sc	
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name			**e-mail**		
Scientific Committee Approval Date	25/9/2024		**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. Develop students skills in understanding the basic grammars of English. 2. Develop students' speaking skills in English. 3. Develop students' listening skills in English. 4. Develop students' reading skills in English. 5. Develop students' reading skills in English. 6. Study voltage, force, current and power

Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Understand the rule of present simple, numbers as Vocabulary 2. Understand the usage of am / are / is, cities and countries as Vocabulary. 3. Understand the grammars of personal information, social expressions as Vocabulary . 4. Understand the grammars of possessives, word groups as Vocabular . 5. Understand the grammars of present simple, Countries and nationalities as Vocabulary. 6. Understand the grammars of present simple, Your day as Vocabulary. 7. Understand the grammars of Question words, Verb patterns 1, Adjectives as Vocabulary. 8. Understand the grammars of *There is / are*, places and things as Vocabulary. 9. Understand the grammars of Simple irregular, was/were, have, do, go as Vocabulary. 10. Understand the grammars of past simple, work, sports, and leisure as Vocabulary. 11. Understand the voltage definition. 12. Understand the force definition. 13. Understand the current definition. 14. Understand the power definition.

Indicative Contents المحتويات الإرشادية	Indicative content includes the following. The grammars of present simple, am / are / is, personal information. Numbers, cities and countries, social expressions as Vocabulary. [12]. The grammars of possessives, present simple. Word groups, Countries and nationalities, your day as Vocabulary. [12]. The grammars of Question words, *There is / are*, Simple irregular, was/were . Verb patterns 1, adjectives, places and things, have, do, go as Vocabulary. [12]. The grammars of past simple, *can / can't, like / would like*, some / any. Work, sports, and leisure, verbs, in a restaurant as Vocabulary. [12]. Voltage Force current power [8]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	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 SSWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	34	**Structured SSWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	16	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	1
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**50**		

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	2	5% (10)	3, 8 and 12	LO #1and #5 and #11
	Assignments	2	5% (10)	4, 9 and 14	LO #3, #8 and #13
	Report	1	10% (10)	13	LO #4, #8 and #12
	seminar	1	10% (10)	14	LO #3, #5 and #8
Summative assessment	**Midterm Exam**	2hr	10% (10)	7	LO #1 - #7
	Final Exam	2hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Unit one : At a party Grammar: Present Simple Vocabulary: Numbers
Week 2	Unit two : Going sightseeing Grammar: am / are / is Vocabulary: Cities and countries
Week 3	Unit three: In a cafe Grammar: Personal information Vocabulary: Social expressions
Week 4	Unit four : In a chemist's Grammar: Possessives Vocabulary: Word groups
Week 5	Unit Five : In a post office Grammar: present simple Vocabulary: Countries and nationalities
Week 6	Unit six : In a railway station Grammar: present simple Vocabulary: Your day
Week 7	Unit seven : On the phone Grammar: Question words, Verb patterns 1 Vocabulary: Adjectives
Week 8	Unit eight : Personal questions Grammar: Questions and answers, ***There is / are*** Vocabulary: Places and things

Week 9	Unit nine : What's the matter? Grammar: Past Simple irregular, was/were Vocabulary: have, do, go
Week 10	Unit ten: What's the problem? Grammar: Past Simple 1 Vocabulary: Work, sports, and leisure
Week 11	Unit eleven: voltage
Week 12	Unit twelve: force
Week 13	Unit thirteen: current
Week 14	power
Week 15	assessment

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	New headway, Liz and John Soars, OXFORD	No
Recommended Texts	English Grammar in Use, 5th Edition by Raymond Murphy.	No
Websites	https://elt.oup.com/student/headway/beg/?cc=global&selLanguage=en	

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.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	workshops			**Module Delivery**	
Module Type	basic			Practical	
Module Code	STUTTC125				
ECTS Credits	6				
SWL (hr/sem)	150				
Module Level	1		**Semester of Delivery**	2	
Administering Department	ESTE		**College**	TTC	
Module Leader	Yaseen Ali Sahood		**e-mail**	yaseen.sahood@stu.edu.iq	
Module Leader's Acad. Title	Assist lecturer		**Module Leader's Qualification**	M.SC.	
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name			**e-mail**		
Scientific Committee Approval Date	25/9/2024		**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. Enable the student to know and understand the theoretical and practical principles of the plumbing workshop. 2. Enable the student to know and understand the theoretical and practical principles of the electrical workshop. 3. Enable the student to know and understand the theoretical and practical principles of the blacksmithing workshop. 4. Enable the student to know and understand the theoretical and practical principles of the turning workshop. 5. Enable the student to know and understand the theoretical and practical principles of the automobile workshop. 6. Design of various models and Manufacture of some simple products.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Understand the types of fillings 2. Understand the types of blacksmithing. 3. Understand the types of Turning. 4. Understand the types of Welding. 5. Understand about plumbing. 6. Understand about electricity.

Indicative Contents المحتويات الإرشادية	Indicative content includes the following. <u>Part A -Tools</u> Include recognition of different tools. Employed for surface preparation and methods of application correctly, Devices of measuring dimensions, Calipers, types and uses, drill types and dimensions.[12hrs] Measuring toolsSteel miler, Veneer, Micrometer, Height & height gauge hand tools, Saws, Hammers, Files, Scriber, Chisels, Taps and dies, Surface plate, Bench working. [18 hrs] <u>Part B – filings</u> The coolant used for wood, the coolant used for iron, the cutting edge, and the means of joining work pieces How to process refrigerators and their types, taking care of the refrigerator when using it, the proper use of refrigerators and methods of maintaining them[12hrs] <u>Part C- blacksmithing</u> Saw, drill, welding machine, cutting rocket, concrete shot gun[12 hrs] <u>Part D-LathingWorkshop</u> lathe machine – Parts – Operation - Practice on longitudinal lathing – Making center – Puncturing – Making external teeth – Practice - Employing measuring tools – internal & external lath machining.[12 hrs] <u>Part E–WeldingWorkshop</u> Include recognition of tools and materials employed – A gas cylinder of oxy – Acetylene welding of surface – Electrical welding exercise – Welding spot.[12hrs] <u>Part F–plumbing</u> Characteristics of the casting process, casting defects, sand casting, sand casting steps, preparation and shaping, the necessary processes for sand casting, other casting methods, casting in permanent molds under pressure, lost wax casting (melted)[12hrs]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	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 SSWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	94	**Structured SSWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	6
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	56	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	4
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	150		

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	5% (10)	8 and 12	LO #1, #4 and #5, #6
	Assignments	2	5% (10)	5 and 12	LO #3, #5 and #6, #12
	Projects	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #2, #4 and #6
Summative assessment	Midterm Exam	1 hr	10% (10)	8	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly work shop. Syllabus) المنهاج الاسبوعي للورشة	
	Material Covered
Week 1,2, 3	Include recognition of different tools. Employed for surface preparation and methods of application correctly, Devices of measuring dimensions, Calipers , types and uses , drill types and dimensions
Week 4,5	Steel miler , Veneer , Micrometer , Height & height gauge hand tools , Saws, Hammers , Files , Scriber , Chisels , Taps and dies , Surface plate , Bench working.
Week 6,7	blacksmithing saw, drill, welding machine, cutting rocket, concrete shot gun
Week 8,9	Lathing Workshoplathe machine – Parts – Operation - Practice on longitudinal lathing – Making center – Puncturing – Making external teeth – Practice - Employing measuring tools – internal & external lath machining
Week 10 ,11	Welding Workshop Include recognition of tools and materials employed – A gas cylinder of oxy – Acetylene welding of surface – Electrical welding exercise – Welding spot.
Week 12, 13	Part F – plumbing characteristics of the casting process, casting defects, sand casting, sand casting steps, preparation and shaping, the necessary processes for sand casting, other casting methods, casting in permanent molds under pressure, lost wax casting (melted)
Week 14, 15	electricity, Electrical insulation, insulation materials, winding methods, some practical examples, electrical contacts, diagrams, some practical examples

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Engineering workshop chairs	NO
Recommended Texts		No
Websites		

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.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	Electrical Machines			**Module Delivery**	
Module Type	core			**Theory** **Lecture** **Lab**	
Module Code	STUTTC231				
ECTS Credits	7				
SWL (hr/sem)	175				
Module Level	2		**Semester of Delivery**	3	
Administering Department	ESTE		**College**	TTC	
Module Leader	warid sayel warid		**e-mail**	warid.sayel@stu.edu.iq	
Module Leader's Acad. Title	Assistant Professor		**Module Leader's Qualification**	Ph.D.	
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name	Yaseen Ali Sahood		**e-mail**	yaseen.sahood@stu.edu.iq	
Scientific Committee Approval Date	25/9/2024		**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. To understand the construction and operation of DC generators. 2. To understand the construction and operation of DC motors. 3. To understand the construction and operation of single phase transformers. 4. To understand the construction and operation of Three phase transformers. 5. To understand the construction and operation induction motor
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Recognize the construction and principle of DC generator. 2. Know the lap and wave winding, EMF and torque equation 3. Understand armature reaction and commutation, types of generators. 4. Understand equivalent circuit of DC generators. 5. Know the construction and principle of DC motor, types of motors, armature torque characteristics. 6. Recognize the equivalent circuit of the motor, torque speed characteristics 7. Estimate Losses and efficiency of the DC motors, and understand starting and braking. 8. Explain speed control methods of DC motors. 9. Understand the Construction and principle of single phase transformer, Equivalent circuit and phasor digram, Voltage and current ratio Open ,short and polarity tests. 10. Understand Voltage regulation, losses and efficiency of single phase transformer. Know parallel operation, the operation of auto transformer and instrumental transformers. 11. Understand the Construction and principle of 3- phase transformer, transformer connection group. 12. Understand the parallel operation of 3- phase transformer. 13. Understand the construction and principle of induction motor, equivalent circuit and phasor diagram, Power flow diagram. 14. Understand the losses and efficiency of induction motor, open and short circuit tests, torque speed characteristics. 15. Understand the method of starting induction motor , method of speed control of induction motor.

Indicative Contents المحتويات الإرشادية	Part A - DC generators construction and principle of DC generator - lap and wave winding, EMF and torque equation-armature reaction and commutation- types of generators- equivalent circuit of DC generators. [hrs 28] Part b - DC motors construction and principle of DC motor-types of motors- armature torque characteristics- equivalent circuit of the motor- torque speed characteristics- Losses and efficiency of the DC motors- starting and braking- speed control methods of DC motors [hrs28] Part c - transformers Construction and principle of single phase transformer- Equivalent circuit and phasor digram-Voltage and current ratio- Open ,short and polarity tests- Voltage regulation, losses and efficiency of single phase transformer-parallel operation- the operation of auto transformer and instrumental transformers- Construction and principle of 3- phase transformer- transformer connection group- parallel operation of 3-phase transformer [28 hrs] Part d - Induction motors construction and principle of induction motor- equivalent circuit and phasor diagram-Power flow diagram- losses and efficiency of induction motor- open and short circuit tests- torque speed characteristics- starting induction motor , method of speed control of induction motor [21 hrs]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	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 SSWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	109	**Structured SSWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	7
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	66	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	4
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	175		

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	1	5% (5)	3 and 8	LO #1, #2 and #6
	Assignments	1	5% (5)	10 and 14	LO #8, #9 and #11, #12, #13
	Project	1	5% (5)	continuous	All
	Report	1	10% (10)	13	LO #1, #2 and #3
	Lab Reports and Lap Exam	امتحان 1 ,تقرير15 عملي	تقارير (10)% 0.666 امتحان عملي (5)%	1-15, 8	All, 1-7
Summative assessment	Midterm Exam	1 hr نظري	10% (10)	7	LO #1 - #7
	Final Exam	4 hr 3 hr نظري 1hr عملي	50% 35% نظري 15% عملي	15	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction, Construction and principle of DC generator
Week 2	Lap and wave winding, EMF and torque equation
Week 3	Armature reaction and commutation, Types of generators
Week 4	Equivalent circuit of DC generators
Week 5	Construction and principle of DC motor, Types of motors, armature torque characteristics
Week 6	Equivalent circuit of the motor, Torque speed characteristics
Week 7	Losses and efficiency of the DC motors, Starting and braking
Week 8	Speed control methods of DC motors
Week 9	Construction and principle of single phase transformer, Equivalent circuit and phasor digram, Voltage and current ratio Open ,short and polarity tests
Week 10	Voltage regulation, Losses and efficiency of single phase transformer, parallel operation Auto transformer and Instrumental transformers
Week 11	Construction and principle of 3- phase transformer, Transformer connection group
Week 12	Parallel operation of 3- phase transformer
Week 13	Construction and principle of induction motor, Equivalent circuit and phasor diagram, Power flow diagram
Week 14	Losses and efficiency of induction motor, open and short circuit tests, Torque speed characteristics

Week 15	Method of starting induction motor , method of speed control of induction motor

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Operation of the Separately Excited DC shunt Generator Loaded Operation of the Separately Excited DC Shunt Generator
Week 2	No-Load operation of the self excited DC shunt Generator Loaded Operation of the Self Excited DC Shunt Generator
Week 3	Swinburne's Test on a DC Shunt generator No-Load Operation of the DC Series Generator
Week 4	Loaded Operation of the DC Series Generator Load Characteristics of a DC cumulatively Compound Generator
Week 5	Load Characteristics of a DC differentially Compound Generator
Week 6	Study of Operational Working and Principle of DC Shunt Motor
Week 7	Study of running and reversing phenomenon of DC Shunt Motor Study of No Load Characteristic of DC Shunt Motor
Week 8	Study of Load Characteristic of DC Shunt Motor Brake Test on a DC Shunt Motor
Week 9	Brake Test on a DC Series Motor
Week 10	Retardation test on a DC machine
Week 11	Study of speed control of DC Shunt Motor using armature voltage control and flux field control method

Week 12	Study and Determine the losses of DC shunt motor and correspondingly calculate the efficiency of DC Motor by Swinburn's Test Method
Week 13	Hopkinson's test on a pair of DC machines OC & SC Tests on a Single Phase Transformer
Week 14	Direct Load Test on a Single Phase Transformer Separation of Constant losses of a Single Phase Transformer
Week 15	Sumpner's Test Parallel Operation of two dissimilar Single Phase Transformers OC & SC Tests on a Three Phase Transformer

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	A Textbook of Electrical Technology Volume II, AC and DC machines, B.L. THERAJA. A.K. THERAJA, 2006	No

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.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	Thermodynamic and fluid			**Module Delivery**	
Module Type	core			**Theory**	
Module Code	STUTTC232			**Lecture**	
ECTS Credits	7			**Lab**	
SWL (hr/sem)	175				
Module Level	2		**Semester of Delivery**	3	
Administering Department	ESTE		**College**	TTC	
Module Leader	Hayder M Hasan		**e-mail**	hayder.mohammad@stu.edu.iq	
Module Leader's Acad. Title	Lecturer		**Module Leader's Qualification**	Ph.D.	
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name	Dr. Ahmed Khafeef Obaid		**e-mail**	akoab82@stu.edu.iq	
Scientific Committee Approval Date	25/9/2024		**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. To provide a knowledge of thermodynamics and energy concept. 2. Illustration and discussion the principles of heat engine principles and description. 3. To understand a cycles for a given use based on energy and heat generation and performance. 4. To be able to know aentropy concept that will have some desirable properties. 5. To understand the fluid and flow types which limit of fluid properties.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. An understanding of definition of work ,heat ,system ,type of system ,energy, temperature, pressure ,and show the SI unit and its conservations. 2. List the various terms associated with Properties of a Pure Substance Definition of pure substance ,The Phase Boundaries , show phase change on P-h diagram. 3. Understand tables of thermodynamic properties. 4. Discuss the thermal properties of The Superheated Vapor States Examples for the using steam and R134a Tables. 5. Describe the Ideal Gas States Charles law , Boyles law , Equations of State ,specific heat capacity at constant pressure and at constant volume definition only. 6. Define first Law of Thermodynamics Zero law of thermodynamic ,The Definition of Work, energy equation for open system ,mass conservation. 7. Identify the engineering Applications of energy equation on open system Boiler, compressor ,pump, turbine, and throttling device. 8. Discuss the thermodynamic reversible process (pure substance and Ideal gas) Constant pressure process Constant volume process Constant temperature process Hyperbolic process Adiabatic process ,polytrobic process 9. Identify the thermodynamic irreversible process (pure substance and Ideal gas) Adiabatic Mixing Heat exchanger Separator Throttling.

Indicative Contents المحتويات الإرشادية	Part A –1. An understanding of Definition of work ,heat ,system ,type of system ,energy, temperature, pressure ,and show the SI unit and its conservations. 2. List the various terms associated with Properties of a Pure Substance Definition of pure substance ,The Phase Boundaries , show phase change on P-h diagram. 3. understand tables of Thermodynamic Properties. 4. Discuss the thermal properties of The Superheated Vapor States Examples for the using steam and R134a Tables.. [15 hrs] 5. Describe the Ideal Gas States Charles law , Boyles law , Equations of State ,specific heat capacity at constant pressure and at constant volume definition only. 6. Define first Law of Thermodynamics Zero law of thermodynamic ,The Definition of Work, energy equation for open system ,mass conservation. 7. Identify the engineering Applications of energy equation on open system Boiler, compressor ,pump, turbine, and throttling device. [15 hrs] Part B –8. Discuss the thermodynamic reversible process (pure substance and Ideal gas) Constant pressure process Constant volume process Constant temperature process Hyperbolic process Adiabatic process ,polytrobic process 9. Identify the thermodynamic irreversible process (pure substance and Ideal gas) Adiabatic Mixing Heat exchanger Separator Throttling.[15 hrs]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The key strategy for presenting this module will be to stimulate students' engagement in the tasks while also refining and strengthening their critical thinking abilities. This will be accomplished through courses, interactive tutorials, and the consideration of various sorts of experiments incorporating certain sample activities that are attractive to the students.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SSWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	109	**Structured SSWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	7
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	66	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	4
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	175		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	1	5% (5)	5 and 8	LO # 3 and #6
	Assignments	1	5% (5)	4 and 12	LO #3 and # 8
	Project	1	5% (5)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #10
	Lab Reports and Lap Exam	امتحان 1 ,تقرير15 عملي	تقارير (10)% 0.666 امتحان عملي (5)%5	1-7, 8	All, 1-4
Summative assessment	**Midterm Exam**	1 hr نظري	10% (10)	7	LO #1 - #7
	Final Exam	4 hr 3 hr نظري 1hr عملي	50% (50) 35% نظري 15% عملي	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	dimensions, energies, phases of matter and units of measurement and fluids and thermodynamics properties
Week 2	definition of work ,heat ,system ,type of system ,energy, temperature, pressure ,and show the SI unit and its conservations
Week 3	properties of a Pure Substance Definition of pure substance ,The Phase Boundaries , show phase change on P-h diagram and tables of Thermodynamic Properties "steam and R134a"Thermal
Week 4	the Ideal Gas States Charles law , Boyles law , Equations of State ,specific heat capacity at constant pressure and at constant volume definition only
Week 5	first Law of Thermodynamics Zero law of thermodynamic ,The Definition of Work, energy equation for open system ,mass conservation
Week 6	engineering Applications of energy equation on open system Boiler, compressor ,pump, turbine, and throttling device
Week 7	thermodynamic reversible process (pure substance and Ideal gas) Constant pressure process Constant volume process Constant temperature process Hyperbolic process Adiabatic process , polytrobic process
Week 8	thermodynamic irreversible process (pure substance and Ideal gas) Adiabatic Mixing Heat exchanger Separator Throttling
Week 9	constant volume process representation on P-V,T-S and P-h Diagrams Constant temperature process representation on PV,T-S and P-h Diagrams Hyperbolic process representation on P-V,T-S and P-h Diagrams Adiabatic process ,polytrobic process representation on PV,T-S and P-h Diagrams
Week 10	Principle of fluid motional flow classification
Week 11	bernoulli's equation
Week 12	Entropy concept
Week 13	Conservation of energy and conservation of mass
Week 14	Entropy production
Week 15	Nozzle and Boundary layer kinds

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Introduction to thermodynamics experiment
Week 2	carnnot cycle test
Week 3	energy test
Week 4	ideal gaslaw test
Week 5	bernoulli's analysis
Week 6	flow types
Week 7	entropy test

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Advances of thermodynamics 1, An introduction to Their Properties and Applications, second edition, M. F. Ashby and D. R. H. Jones, Butterworth-Heinemann, Woburn, UK, 1996.	Yes
Websites	https://ftp.idu.ac.id/wp-content/uploads/ebook/tdg/TEKNOLOGI%20REKAYASA%20MATERIAL%20PERTAHANAN/Materials%20Science%20and%20Engineering%20An%20Introduction%20by%20William%20D.%20Callister,%20Jr.,%20David%20G.%20Rethwish%20(z-lib.org).pdf	

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.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	Electrical and Electronic Circuits			**Module Delivery**	
Module Type	core			**Theory** **Lecture** **Lab** **Tutorial**	
Module Code	STUTTC233				
ECTS Credits	7				
SWL (hr/sem)	175				
Module Level	2		**Semester of Delivery**	3	
Administering Department	ESTE		**College**	TTC	
Module Leader	بشرى طالب هاشم		**e-mail**	meme90dodo@gmail.com	
Module Leader's Acad. Title	Assistant lect**urer**		**Module Leader's Qualification**	M.SC.	
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name			**e-mail**		
Scientific Committee Approval Date	25/9/2024		**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. Understand the dimensional Analysis of Electrical and electronic circuits. 2. At the end of the year the student should be able demonstrate knowledge and understanding of the concepts, theory, and application of Electrical and electronic circuits. 3. To analysis of Electrical and electronic circuits. 4. To select and apply the appropriate analysis techniques. 5. Know the engineering methodologies.

Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Able to recognize the First Order Circuit the Source-free RC Circuit. Understand the Source-free RL Circuit – Singularity Functions. 2. Able to recognize the Step Response of an RC Circuit and Understand Step Response of an RL circuit 3. Able to recognize the Second Order Circuit: - Finding Initial and Final Values understand the source-free series RLC circuit. 4. Discuss the source -Free Parallel RLC Circuit and unaccredited Step Response of a Series RLC Circuit 5. Discuss step Response of a parallel RLC circuit and general second-0rder circuits. 6. Able to recognize the operation of magnetically Coupled Circuits: - Mutual Inductance. Understand Energy in a Coupled Circuit – Linear Transformers. 7. Discuss the Ideal Transformers. 8. Able to Recognize the three -Phase Transformers. Understand Frequency Response: - Transfer Function 9. Discuss the Decibel Scale - Bode Plots. Understand Series Resonance. 10. Explain the parallel Resonance. Understand Active Filters. 11. Identify the Two Port Networks: - Impedance Parameters. Understand Admittance Parameters. 12. Explain the hybrid Parameters Understand Transmission Parameters. 13. Able to Recognize the Three-Phase Circuits: -Balanced Three-Phase Voltages. Understand Balanced wye-wye connection – Balanced Wye-delta Connection. 14. Able to Recognize the Balanced Delta-Delta Connection. Understand Balanced Delta-Wye Connection - Power in a Balanced System. 15. Able to Recognize the unbalanced three Phase Systems. Understand Three-Phase Power Measurement

Indicative Contents المحتويات الإرشادية	Part A -The Source of circuits First Order Circuit: -The Source-free RC Circuit, The Source-free RL Circuit – Singularity Functions, Step Response of an RC Circuit, Step Response of an RL circuit, Second Order Circuit:- Finding Initial and Final Values, The Source-Free Series RLC Circuit, The Source-Free parallel RLC Circuit, Step Response of a Series RLC Circuit, General Second-Order Circuits [35 hrs] Part B - Magnetic circuits Magnetically Coupled Circuits: - Mutual Inductance. Energy in a Coupled Circuit– Linear Transformers, Ideal Transformers, Ideal Autotransformers, Three-Phase Transformers, Frequency Response:- Transfer Function [21hrs] The Decibel Scale -Bode Plots. Series Resonance, Parallel Resonance, Active Filters [21hrs] Part C Two Port Networks Two Port Networks: -Impedance Parameters. Admittance Parameters, Hybrid Parameters, Transmission Parameters [21hrs] Three-Phase Circuits: -Balanced Three-Phase voltages, balanced wye-Wye Connection – balanced wye-delta Connection. Balanced Delta-Delta Connection, Balanced Delta-Wye Connection - Power in a Balanced System, unbalanced three phase systems, Three-Phase Power Measurement [21hrs]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	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 SSWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	124	**Structured SSWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	8
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	51	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	3
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	175		

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	1	5% (5)	9 and 12	LO #1, #8 and #8, #11
	Assignments	1	5% (5)	5 and 13	LO #3, #5 and #6, #9
	Project	1	5% (5)	Continuous	All
	Report	1	10% (10)	13	LO #3, #4 and #5
	Lab Reports and Lap Exam	امتحان 1 ,تقرير15 عملي	تقارير 0.666 %(10) امتحان عملي 5%(5)	1-15,8	LO #1- #15, LO #1- #8
Summative assessment	Midterm Exam	1 hr نظري	10% (10)	8	LO #1 - #7
	Final Exam	4 hr 3 hr نظري 1hr عملي	50% (50) 35% نظري 15% عملي	15	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
Week 1	First Order Circuit: -The Source-free RC Circuit, the Source-free RL Circuit – Singularity Functions
Week 2	Step Response of an RC Circuit, Step Response of an RL circuit
Week 3	Second Order Circuit:- Finding Initial and Final Values, the Source-Free Series RLC Circuit
Week 4	The Source-Free Parallel RLC Circuit, Step Response of a series RLC Circuit
Week 5	Step Response of a Parallel RLC Circuit, general Second-order circuits
Week 6	Magnetically Coupled Circuits: - Mutual Inductance, Energy in a Coupled Circuit – Linear Transformers
Week 7	Ideal Transformers, Ideal Autotransformers
Week 8	Three-Phase Transformers ,Frequency Response:- Transfer Function
Week 9	The Decibel Scale -Bode Plots, Series Resonance
Week 10	Parallel Resonance, Active Filters. Two Port Networks: -Impedance Parameters
Week 11	Admittance Parameters, Hybrid Parameters
Week 12	Transmission Parameters, Three -Phase Circuits: -Balanced Three-Phase voltages
Week 13	Three-phase Circuits: -balanced Three-phase voltages, balanced delta-delta connection
Week 14	Balanced Delta-Delta Connection, Balanced Delta-Wye Connection - Power in a Balanced System
Week 15	Unbalanced Three Phase Systems ,Three-Phase Power Measurement

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Nodal Theorem
Week 2	Series RL Circuits
Week 3	Series Rc Circuits
Week 4	Natural Response of a Series RLC Circuit
Week 5	Step Response of a Series RLC Circuit
Week 6	parallel RLC Natural responses Circuits
Week 7	parallel RLC step responses Circuits
Week 8	Low-pass Filters
Week 9	High -pass Filters
Week 10	power factor correction
Week 11	Transformer
Week 12	Transformer
Week 13	Transformer
Week 14	Transformer
Week 15	Transformer

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Fundamentals of Electric Circuits, C.K. Alexander and M.N.O Sadiku, McGraw-Hill Education A Textbook of Electrical Technology Volume I, B.L. THERAJA. A.K. THERAJA, 2005 Electronic Circuits - Fundamentals and Applications" by Mike Tooley BA	NO

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.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	Advance Mathematics			**Module Delivery**	
Module Type	Supportive			**Theory** **Lecture** **Tutorial**	
Module Code	STUTTC234				
ECTS Credits	4				
SWL (hr/sem)	100				
Module Level	2		**Semester of Delivery**	3	
Administering Department	ESTE		**College**	TTC	
Module Leader	زهراء سعد عبد العالي		**e-mail**	zahraasaadzahraa668@gmail.com	
Module Leader's Acad. Title	lecturer		**Module Leader's Qualification**	M.sc	
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name			**e-mail**		
Scientific Committee Approval Date	25/9/2024		**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. To understand fundamental of partial functions, partial differentiation of two and three variables, understanding the chain rule principles. 2. To understand the ordinary differential equations, first and order and their solutions 3. The use of Laplace transforms of various functions and invers of Laplace transforms. Then extending to the use of that technique for solving differential equations. 4. To develop knowledge of understanding vectors and basic mathematical procedure of vectors, adding, subtracting, dot product, cross product and applications. 5. To understand the sequence and series of Taylor and maclaurin for functions and their presentations. 6. To understand the Fourier series for functions and their presentations. Knowing odd and even function and their graphs.

Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Describe elementary of functions with two and more variables. 2. Understanding of partial derivatives and the chain rule principles. 3. Understanding of principles of the ordinary differential equations, first order type.Skills ofsolving first order differential equations, separation of variables and the use of integration factor. 4. Understanding of principles of the ordinary differential equations, second order type. 5. Skills of solving second order differential equations, homogenous and non-homogenous types. 6. Developing knowledge of Laplace transforms and anti-Laplace transforms. 7. Applications of Laplace transforms in solving differential equations. 8. Discussion and review of the previous topics. 9. Define the vectors term and its mathematical procedures. 10. The use of dot product and cross product. 11. Define the sequence term and solving the related problems. 12. Define the Taylor and Maclaurin series for the functions and solving related problems. 13. Define the Fourier series for the functions and solving related problems. 14. Discussion and review of the previous topics.

Indicative Contents المحتويات الإرشادية	Part A – define functions of two and three variables Describe elementary of functions with two and more variables. Understanding of partial derivatives and the chain rule principles. [10hrs] Part B – Differential equations Understanding of principles of the ordinary differential equations, first order type. Skills of solving first order differential equations, separation of variables and the use of integration factor.Understanding of principles of the ordinary differential equations, second order type. Skills of solving second order differential equations, homogenous and non-homogenous types. [15hrs] Part C – Laplace transforms Developing knowledge of Laplace transforms and anti-Laplace transforms. Applications of Laplace transforms in solving differential equations.[10hrs] Revision problems [5hrs] Part D – Vectors Define the vectors term and its mathematical procedures. The use of dot product and cross product. [10hrs] Part E – Sequences and series Define the sequence term and solving the related problems.Define the Taylor and Maclaurin series for the functions and solving related problems. Define the Fourier series for the functions and solving related problems. [15hrs] Discussion and review of the problems. [6 hrs]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	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 SSWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	79	**Structured SSWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	21	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	1
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	100		

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	2	5% (10)	5 and 13	LO #3, #4 and #6, #8
	Assignments	2	5% (10)	4 and 9	LO #5 and # 6
	Report	1	10% (10)	15	LO #3, #5 and #14
	seminar	1	10% (10)	13	LO #6 and # 8
Summative assessment	**Midterm Exam**	1 hr	10% (10)	7	LO #1 - #7
	Final Exam	3 hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Partial differentiation Function with two independent variables or more Partial differentiation for first and higher order of derivatives.
Week 2	Change of variables (Chain rule) of two independent variables or more.
Week 3	Understanding of principles of the ordinary differential equations, first order type. Skills of solving first order differential equations, separation of variables and the use of integration factor.
Week 4	Understanding of principles of the ordinary differential equations, second order type.
Week 5	Skills of solving second order differential equations, homogenous and non-homogenous types.
Week 6	Developing knowledge of Laplace transforms and anti-Laplace transforms.
Week 7	Applications of Laplace transforms in solving differential equations.
Week 8	Mid-term Exam
Week 9	Define the vectors term and its mathematical procedures.

Week 10	The use of dot product and cross product.
Week 11	Define the sequence term and solving the related problems.
Week 12	Define the Taylor and Maclaurin series for the functions and solving related problems.
Week 13	Define the Fourier series for the functions and solving related problems.
Week 14	Discussion and review of the previous topics.
Week 15	Final Exam

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Theory of advanced mathematics with application by Thomas Calculus.	Yes
Recommended Texts	Books and Literatures in different kinds of Advanced Mathematics.	No
Websites	https://www.khanacademy.org/math/calculus-1	

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.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	Fundamentals of computer/2			**Module Delivery**	
Module Type	supportive			Theory Lab	
Module Code	STU201				
ECTS Credits	3				
SWL (hr/sem)	75				
Module Level	2		**Semester of Delivery**	3	
Administering Department	ESTE		**College**	TTC	
Module Leader	Rasheed Hameed Mazid		**e-mail**	rasheed.alhmel@stu.edu.iq	
Module Leader's Acad. Title	Assistant Professor		**Module Leader's Qualification**	Ph.D.	
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name			**e-mail**		
Scientific Committee Approval Date	25/9/2024		**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-To develop problem-solving skills and an understanding of the computer through the application of techniques 2- To understand the work of the electronic computer and the possibility of dealing with it 3- To develop and understand of the fundamental concepts of computer science, including programming, algorithms, data structures, computer architecture, operating systems, and networks. 3- To develop practical skills in software development, including programming, debugging, testing, and documentation. 4- To develop problem-solving skills, including the ability to analyze problems, design solutions, and implement them using appropriate programming languages and tools. 5- To develop and understand of the ethical and social issues related to computing, including privacy, security, intellectual property, and the digital divide. 6- To develop and understand of the role of computer science in society, including its impact on industry, government, healthcare, and education. 7- To understand the diversity of applications of computer science, including artificial intelligence, machine learning, robotics, and data science

Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Understand the fundamentals of networking protocols and technologies, such as TCP/IP, DNS, DHCP, Ethernet, and wireless networking. 2. Know how to design, implement, and troubleshoot computer networks, including local area networks (LANs), wide area networks (WANs), and wireless networks. 3. Understand network security concepts, such as firewalls, intrusion detection/prevention systems, and virtual private networks (VPNs). 4. Understand the principles of network management and be able to configure and manage network devices, such as routers, switches, and access points. 5. Understand the basics of network administration, including user and group management, file sharing, and printer sharing. 6. Be able to diagnose and troubleshoot common network problems, including connectivity issues, slow performance, and security breaches. 7. Understand the importance of network monitoring and be able to use network monitoring tools to identify and resolve network issues. 8. Understand the role of networking in cloud computing and be able to design and implement cloud-based networks. 9. Understand the principles of virtualization and be able to implement virtualized networks using technologies such as VMware and Hyper-V. 10. Be able to communicate effectively with other IT professionals and non-technical stakeholders about networking concepts and issues. 11. Learners understand how to protect their data and devices, including using antivirus software, firewalls, and strong passwords 12. develop skills in creating, editing and formatting documents, spreadsheets and presentations.

Indicative Contents المحتويات الإرشادية	Indicative content includes the following. <u>Part A - Fundamentals of networks and the Internet</u> - Introduction to networks- Define networks. Network components - Types of networks The Internet - Extranet.(8 hrs) - E-mail - E-mail features - Create an e-mail account Skype chat program - program installation - program features(8hrs) - Skype chat program - program installation - program features Internet law and types of infringements in the digital world(8hrs) - Part review (2hrs) <u>Part B-the internet and its ethics</u> - Internet Information Security - Security Problems - - Weaknesses in the Internet - computer fragility–(8hrs) - Computer and information protection - The negative effects of using the Internet on health and society–(8hrs) -Part review (3hrs)

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	1. Supervised learning: This is a commonly used technique in which the neural network is trained on a labeled dataset. The network is fed input data, and the corresponding output is also provided as a label. The network adjusts its weights and biases to minimize the difference between its output and the actual label. 2. Unsupervised learning: This technique involves training a neural network on an unlabeled dataset. The network tries to find patterns and relationships in the data without any supervision. Clustering, dimensionality reduction, and generative models are some examples of unsupervised learning. 3. Reinforcement learning: This technique involves training a neural network to take actions in an environment to maximize a reward signal. The network learns from feedback in the form of rewards or penalties based on its actions. 4. Transfer learning: This refers to using a pre-trained neural network to solve a new task. The pre-trained network is used as a starting point, and its weights and biases are fine-tuned to the new task.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SSWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	49	**Structured SSWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	3
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	26	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	2
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	75		

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	1	5% (5)	7 and 13	LO #2, #3، and #7, #8،
	Assignments	1	5% (5)	3 and 10	LO #1, #4 and #5, #6،#9
	Project	1	5% (5)	Continuous	All
	Report	1	10% (10)	14	LO #8, #9 and #11
	Lab Reports and Lap Exam	امتحان 1 ,تقرير15 عملي	تقارير (10)% 0.666 امتحان عملي (5)5%	1-15, 8	All, 1-7
Summative assessment	Midterm Exam	1 hr نظري	10% (10)	7	LO #1 - #7
	Final Exam	4 hr 3 hr نظري 1hr عملي	50% 35% نظري 15% عملي	15	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction to networks- Define networks
Week 2	Network components - Types of networks
Week 3	The Internet - Extranet
Week 4	Cloud Computing - Cloud computing applications
Week 5	Types of cloud computing - Areas of using the Internet
Week 6	Web browsers - Internet Explorer browser
Week 7	Search on the Internet - use search engines - advanced search
Week 8	E-mail - E-mail features - Create an e-mail account
Week 9	Skype chat program - program installation - program features
Week 10	Internet law and types of infringements in the digital world
Week 11	Internet Information Security - Security Problems
Week 12	Weaknesses in the Internet - computer fragility
Week 13	Computer and information protection
Week 14	The negative effects of using the Internet on health and society
Week 15	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Introduction to Excel 1- Spreadsheet - A grid of cells used to organize, analyze and manipulate data. 2. Workbook - A file containing one or more worksheets. 3. Worksheet - A single sheet within a workbook where data is entered and analyzed. 4. Cell - The intersection of a row and a column in a worksheet where data is entered.
Week 2	: Basic Excel Functions SUM 1- A function used to add up a range of values in a worksheet. 2. AVERAGE - A function used to calculate the average of a range of values in a worksheet. 3. MAX - A function used to find the highest value in a range of values in a worksheet
Week 3	Formatting in Excel 1. Cell formatting - Changing the appearance of a cell, including font, color, and alignment. 2. Number formatting - Changing the way numbers are displayed, such as currency or percent. 3. Conditional formatting - Formatting cells based on certain criteria, such as highlighting cells that contain a certain value.
Week 4	Data Analysis in Excel 1. Sorting - Arranging data in a specific order, such as from highest to lowest. 2. Filtering - Hiding certain rows or columns based on specific criteria

Week 5	Advanced Functions in Excel 1. VLOOKUP - A function used to search for a value in a table and return a corresponding value from another column in the same table. 2. IF - A function used to perform a calculation based on a logical condition
Week 6	Advanced Data Analysis in Excel 1. Goal Seek - A tool used to find the input value needed to achieve a specific output value in a formula. 2. Scenario Manager - A tool used to analyze how changing certain variables affects the outcome of a formula.
Week 7	What-if Analysis in Excel 1. Data Tables - A tool used to compare different sets of data by substituting different variables. 2. Scenario Analysis - A tool used to analyze how changing different variables affects the outcome of a formula.
Week 8	: Macros in Excel 1. Macro - A set of instructions used to automate repetitive tasks in Excel. 2. VBA - Visual Basic for Applications, a programming language used to create macros in Excel.
Week 9	Working with Large Data Sets in Excel 1. Tables - A range of data that can be sorted, filtered, and analyzed as a single unit in Excel. 2. Data Validation - A tool used to control what data can be entered into a cell or range of cells.
Week 10	Advanced Charting Techniques in Excel 1. Combo Chart - A chart that combines two or more chart types to display different data sets. 2. Sparkline - A small chart that provides a visual representation of data in a single cell.

Week 11	: Advanced Formatting in Excel 1. Custom Number Formats - A tool used to display numbers in a specific format, such as phone numbers or social security numbers. 2. Conditional Formatting - Formatting cells based on certain criteria, such as highlighting cells that contain a certain value.
Week 12	Collaboration in Excel 1. Sharing - A tool used to share a workbook with other users and allow them to edit it simultaneously. 2. Track Changes - A tool used to track changes made to a workbook by different users.
Week 13	Excel Add-Ins and Customization 1. Add-Ins - Additional programs or features that can be added to Excel to extend its functionality. 2. Ribbon - The toolbar at the top of the Excel window that contains commands and options.
Week 14	Data Import and Export in Excel 1. Data Import - Bringing data from external sources into Excel, such as from a database or text file. 2. Data Export - Saving data from Excel to external sources, such as a database or text file.

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	William Stallings, (2003), Computer Organization & Architecture, Sixth edition, Preson Education	Yes
Recommended Texts	1. "Networks, Crowds, and Markets: Reasoning About a Highly Connected World" by David Easley and Jon Kleinberg.	No
Websites	Nothing	

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.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	جرائم نظام البعث في العراق			**Module Delivery**	
Module Type	supportive			**Theory**	
Module Code	STU203				
ECTS Credits	2				
SWL (hr/sem)	50				
Module Level	2		**Semester of Delivery**	3	
Administering Department	هندسه تقنيات النظم الكهروميكانيكيه		**College**	الكليه التقنيه ذي قار	
Module Leader	علاء خضير عبد الله ماجستير قانون		**e-mail**	asmr8414@gmail.com	
Module Leader's Acad. Title	Assistant lecturer		**Module Leader's Qualification**	M. sc	
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date	25/9/2024		**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. المعرفة بجرائم نظام البعث وفق قانون المحكمة الجنائية العراقية العليا عام ٢٠٠٥ م 2. المعرفة بالجرائم النفسية والاجتماعية وأثارها، وأبرز انتهاكات النظام البعثي في العراق 3. المعرفة بالجرائم البيئية لنظام البعث في العراق 4. المعرفة بجرائم المقابر الجماعية
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1- معرفة مفهوم الجرائم واقسامها 2- معرفة جرائم نظام البعث وفق توثيق قانون المحكمة الجنائية العراقية العليا عام ٢٠٠٥ م. 3- معرفة أنواع الجرائم الدولية 4- معرفة القرارات الصادرة من المحكمة الجنائية العليا 5- معرفة الجرائم النفسية لحزب البعث 6- معرفة الجرائم الاجتماعية لحزب البعث 7- معرفة مفهوم عسكرة المجتمع 8- معرفة انتهاكات القوانين العراقية 9- معرفة قرارات الانتهاكات السياسية والعسكرية لنظام البعث 10- معرفة الجرائم البيئية لنظام البعث في العراق 11- معرفة تدمير المدن والقرى من قبل حزب البعث 12- معرفة جرائم المقابر الجماعية

Indicative Contents المحتويات الإرشادية	جرائم نظام البعث وفق قانون المحكمة الجنائية العراقية العليا عام ٢٠٠٥ م مفهوم الجرائم وأقسامها - تعريف الجريمة لغة واصطلاحا- .أقسام الجرائم- جرائم نظام البعث وفق توثيق قانون المحكمة الجنائية العراقية العليا عام ٢٠٠٥ م - .أنواع الجرائم الدولية- القرارات الصادرة من المحكمة الجنائية العليا [8] الجرائم النفسية والاجتماعية وأثارها، وأبرز انتهاكات النظام البعثي في العراق الجرائم النفسية- الية الجرائم النفسية- اثار الجرائم النفسية- الجرائم الاجتماعية- عسكرة المجتمع- موقف النظام البعثي من الدين- انتهاكات القوانين العراقية- صور انتهاكات حقوق الإنسان وجرائم السلطة- بعض قرارات الانتهاكات السياسية والعسكرية لنظام البعث- أماكن السجون والاحتجاز لنظام البعث [8] الجرائم البيئية لنظام البعث في العراق التلوث الحربي والإشعاعي وانفجار الألغام- تدمير المدن والقرى (سياسة الأرض المحروقة) - تجفيف الأهوار- تجريف بساتين النخيل والأشجار والمزروعات [8] جرائم المقابر الجماعية أحداث مقابر الإبادة الجماعيةّ المرتكبة من النظام البعثي في العراق - التصنيف الزمني لمقابر الإبادة الجماعيةّ في العراق للمدة ١٩٦٣ م – ٢٠٠٣ م [4]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	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 SSWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	33	**Structured SSWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	17	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	1
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	50		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	2	5% (10)	5 and 11	LO #1, #3 and #8, #9
	Assignments	2	5% (10)	4 and 7	LO #3 and #5
	Projects	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #6, #8 , #9
Summative assessment	**Midterm Exam**	1hr	10% (10)	7	LO #1 - #7
	Final Exam	2hr	50% (50)	15	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	جرائم نظام البعث وفق قانون المحكمة الجنائية العراقية العليا عام ٢٠٠٥ م مفهوم الجرائم وأقسامها
Week 2	تعريف الجريمة لغة واصطلاحا- .أقسام الجرائم- جرائم نظام البعث وفق توثيق قانون المحكمة الجنائية العراقية العليا عام ٢٠٠٥ م
Week 3	أنواع الجرائم الدولية
Week 4	القرارات الصادرة من المحكمة الجنائية العليا
Week 5	الجرائم النفسية والاجتماعية وأثارها، وأبرز انتهاكات النظام البعثي في العراق الجرائم النفسية- الية الجرائم النفسية- اثار الجرائم النفسية
Week 6	الجرائم الاجتماعية- عسكرة المجتمع- موقف النظام البعثي من الدين
Week 7	انتهاكات القوانين العراقية- صور انتهاكات حقوق الإنسان وجرائم السلطة
Week 8	بعض قرارات الانتهاكات السياسية والعسكرية لنظام البعث- أماكن السجون والاحتجاز لنظام البعث
Week 9	الجرائم البيئية لنظام البعث في العراق التلوث الحربي والإشعاعي وانفجار الألغام
Week 10	تدمير المدن والقرى (سياسة الأرض المحروقة)
Week 11	تجفيف الأهوار
Week 12	تجريف بساتين النخيل والأشجار والمزروعات
Week 13	جرائم المقابر الجماعية
Week 14	أحداث مقابر الإبادة الجماعيةّ المرتكبة من النظام البعثي في العراق
Week 15	التصنيف الزمني لمقابر الإبادة الجماعيةّ في العراق للمدة ١٩٦٣ م – ٢٠٠٣ م

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	منهاج جرائم نظام البعث في العراق 2023- وزارة التعليم العالي والبحث العلمي – دائرة الدراسات والتخطيط والمتابعة	No

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.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	Electrical devices and measurements			**Module Delivery**	
Module Type	core			**Theory** **Lecture** **Lab**	
Module Code	STUTTC241				
ECTS Credits	7				
SWL (hr/sem)	175				
Module Level	2		**Semester of Delivery**	4	
Administering Department	ESTE		**College**	TTC	
Module Leader	warid sayel warid		**e-mail**	warid.sayel@stu.edu.iq	
Module Leader's Acad. Title	Assistant Professor		**Module Leader's Qualification**	Ph.D.	
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name	Yaseen Ali Sahood		**e-mail**	yaseen.sahood@stu.edu.iq	
Scientific Committee Approval Date	25/9/2024		**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. Illustration and discussion the theory of measurement including static characteristics of instruments, various standards, error analysis, classifications and statistical analysis. 2. Illustrate the principles design theory of various dc and ac analogue voltmeters, Ammeters Watt meters, and single phase energy meter. 3. Discuss and analyze various dc and ac bridges used for the measurement of resistances, impedances and associated parameters like inductance, capacitance and frequency. 4. Explain the various active and passive transducers; also it includes a detail discussion of the theory and application of some transducers for example, strain gauges, LVDT, thermister, piezoelectric, etc. 5. Illustration and discussion of CRT and the various parts of CRO. And the theory of operation of the instrument. 6. Giving knowledge and unfolds the details of various signal analyzers such as distortion, waveform and spectrum analyzers. 7. Illustrate the certain advantages of electronic meters as compared to analogue.

Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1- Enable a starting back ground to the students aquatinting them with various electrical and electronic instruments for their principle, operation, calibration and application 2- Enable student to get the knowledge and understanding of the basic measurement techniques such as accuracy, precision, standards which is absolute necessary for the use of sophisticated systems 3- Enable student to become aware how to operate and develop various electrical and electronic systems 4- Enable student to understand the measuring technique, construction and working principle of various measuring instruments 5- The student will understand the working principles of electrical devices and measurements 6- Recognize types of errors and their calculations 7- Understand theory of analogue measuring instruments 8- Understand Bridges and their applications: dc bridges 9- Identify the construction and operation of Cathode Ray Oscilloscope (CRO) 10- Know primary sensing elements 11- Learn Signal analysis 12- Recognize the construction and operation of spectrum analyzer 13- Realize the construction and operation of Digital instruments

Indicative Contents المحتويات الإرشادية	Introduction to measurements: elements of measurement system; static characteristics, accuracy, precision, resolution, linearity, sensitivity-Measuring units, dimensions and standards: introduction to MKS system, system of units of measurements, SI units- fundamental and derived units, electric and magnetic units- Measurement errors-Absolute error - types of errors and their calculations- limiting error, random error [21 hrs] General theory of analogue measuring instruments- indicating type; PMMC-moving iron electrodynamometer- thermal instrument- Watt meters-integrating type (energy kWh meter) [21 hrs] Recording type; self balancing strip chart recorder- X-Y recorder- Bridges and their applications: dc bridges (Wheatstone)- Kelvin, Kelvin double bridge); ac bridges(Maxwell, Hay's, Schering, Wien)- Cathode Ray Oscilloscope (CRO)-CRT, block diagram [21 hrs] vertical and horizontal Reports deflection systems; applications-Transducers-primary sensing elements (displacement, LVDT)-strain gauge, piezoelectric, acceleration, thermo electric- Signal analysis -wave analyzer, harmonic distortion analyzer [21 hrs] spectrum analyzer- Electronic analogue measuring instruments- direct coupled, FET bridge type, dc &ac voltagecurrent, and power and resistance measurement- Digital instruments: D/A &A/D, voltage, current and resistance measurements- digital display sensitivity of DMM (digital multimeter), resolution of decimal display [21 hrs]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	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 SSWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	109	**Structured SSWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	7
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	66	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	4
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	175		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	1	5% (5)	5 and 10	LO #3 and #6, #8
	Assignments	1	5% (5)	4 and 13	LO #3 and #12
	Project	1	5% (5)	Continuous	All
	Report	1	10% (10)	13	LO #1,#2, #3, #4 and #5

	Lab Reports and Lap Exam	امتحان 1 ,تقرير15 عملي	تقارير (10)% 0.666 امتحان عملي (5)%5	1-15, 8	All, 1-7
Summative assessment	**Midterm Exam**	1 hr نظري	10% (10)	7	LO #1 - #7
	Final Exam	4 hr 3 hr نظري 1hr عملي	50% 35% نظري 15% عملي	15	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction to measurements: elements of measurement system; static characteristics, accuracy, precision, resolution, linearity, sensitivity……etc Measuring units, dimensions and standards: introduction to MKS system, system of units of measurements, SI units
Week 2	fundamental and derived units, electric and magnetic units. Measurement errors: Absolute error
Week 3	types of errors and their calculations limiting error, random error
Week 4	General theory of analogue measuring instruments indicating type; PMMC
Week 5	moving iron electrodynamometer thermal instrument

Week 6	Watt meters integrating type (energy kWh meter)
Week 7	Recording type; self balancing strip chart recorder (pot. Bridge, LVDT) X-Y recorder
Week 8	Bridges and their applications: dc bridges (Wheatstone) Kelvin, Kelvin double bridge); ac bridges(Maxwell, Hay's, Schering, Wien)
Week 9	Cathode Ray Oscilloscope (CRO) CRT, block diagram
Week 10	vertical and horizontal Reports deflection systems; applications Transducers: classification and selection
Week 11	primary sensing elements (displacement, LVDT) strain gauge, piezoelectric, acceleration, thermo electric
Week 12	Signal analysis wave analyzer, harmonic distortion analyzer
Week 13	spectrum analyzer Electronic analogue measuring instruments
Week 14	direct coupled, FET bridge type, dc &ac voltage current, and power and resistance measurement
Week 15	Digital instruments: D/A &A/D, voltage, current and resistance measurements digital display sensitivity of DMM (digital multimeter), resolution of decimal display

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Introduction to electrical devices & measurements How to use (the oscilloscope , function generator , Dc powers supply , digital multimeter)
Week 2	How to test (Diode , LED Diode , Zener diode) How to test a fuse
Week 3	Passive and Active filters
Week 4	low & high pass filters
Week 5	Band pass filter
Week 6	Using Of Kilvanometer
Week 7	Transducers (sensors and actuators)
Week 8	Relay using and testing
Week 9	Calibration of Ammeter
Week 10	Tungsten Filament
Week 11	incandescent Lamp
Week 12	D.C. Bridge Measurement
Week 13	Wheatstone bridge
Week 14	Design and construction of analogue multimeter
Week 15	Calibration of Voltmeter

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	"Electrical and Electronics Measurements and Instrumentation" by Prithwiraj Purkait and Budhaditya Biswas	No
Recommended Texts	Electronic Instrumentation and Measurements" by David A Bell	No

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.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	Electronics			**Module Delivery**	
Module Type	Core			**Theory** **Lecture** **Lab**	
Module Code	STUTTC242				
ECTS Credits	8				
SWL (hr/sem)	200				
Module Level	2		**Semester of Delivery**	4	
Administering Department	ESTE		**College**	TTC	
Module Leader	To be assigned		**e-mail**		
Module Leader's Acad. Title			**Module Leader's Qualification**		
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name	Assistant professor dr Warid sayel warid		**e-mail**	warid.sayel@stu.edu.iq	
Scientific Committee Approval Date	25/9/2024		**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. To provides a knowledge of electronic circuits. 2. Illustration and discussion the principles of electronics structure-selection and description. 3. To select an electronics circuit for a given use based on considerations of cost and performance. 4. The ability to analyze and solve problems.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1- Able to tell the structure and the operation of transistors and recognize the different types of transistors. 2- Recognizes the different configurations of circuits with transistors and the characteristics of these circuits and compares these circuits. 3- Analyzes transistor dc biasing. 4- Explains the operation of transistor dc biasing circuits. 5- Able to explain different circuits with transistors. 6- Explains the amplification in amplifier circuits with transistors. 7- Analyzes and performs measurements in different amplifier circuits. 8- Calculates the hybrid parameters of the equivalent circuit of a transistor. 9- Explains cascade amplifier circuits 10- Calculates parameters in cascade amplifier circuits.

Indicative Contents المحتويات الإرشادية	Part A –various Electronics_ccttypes, structure and analyses Theory Bipolar Transistor, Basic constriction ,Biasing& stability study for different circuit models of a transistor ,Plot Discrete-Time Signal In Matlab ,Transistor as switch Two port network analysis. [15 hrs] Transistor model with parameter, Π-equivalent circuit using two port network ideas T-Equivalent circuit of C, B. transistor ,h- Parameter uses to find out input impedance, output impedance, current voltage gain ,Relationship of h-parameter for different circuit modes. [15 hrs] Overall voltage gain, overall current modes, Transistor amplifier, small signal analysis Low frequency / high frequency circuit analysis using Equivalent circuit to get high cutoff frequency. [15 hrs] Revision problem classes [6 hrs] Part B –Properties of electronic cct Power amplifiers, class A, class B, class AB, class C power amplifiers ,Feedback, positive & negative feedback studies ,Oscillators: R-C oscillator, phase shift oscillator, Wine Bridge oscillator, Hartley oscillator Colpitts oscillator, Crystal oscillator, Frequency stability. [15hrs] Differential amplifiers, common mode rejection ratio ,Operational amplifiers with their applications ,Implementation of LP FIR Filters ,Timer "555" and its applications Implementation of HP FIR Filters. [15 hrs] Active filters, Basic filter responses for different modes. [7 hrs]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The key strategy for presenting this module will be to stimulate students' engagement in the tasks while also refining and strengthening their critical thinking abilities. This will be accomplished through courses, interactive tutorials, and the consideration of various sorts of experiments incorporating certain sample activities that are attractive to the students.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SSWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	109	**Structured SSWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	7
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	91	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	6
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	175		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	1	5% (5)	5 and 10	LO #3, #4 and #8
	Assignments	1	5% (5)	4 and 8	LO #2 and #6
	Project	1	5% (5)	Continuous	All
	Report	1	10% (10)	13	LO #8

	Lab Reports and Lap Exam	امتحان 1 ,تقرير15 عملي	تقارير (10)% 0.666 امتحان عملي (5)%5	1-15, 8	All, 1-7
Summative assessment	**Midterm Exam**	1 hr نظري	10% (10)	7	LO #1 - #7
	Final Exam	4 hr 3 hr نظري 1hr عملي	50% 35% نظري 15% عملي	15	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Bipolar Transistor, Basic constriction ,Biasing & stability study for different circuit models of a transistor
Week 2	Plot Discrete-Time Signal In Matlab ,Transistor as switch
Week 3	Two port network analysis , Transistor model with hparameter, Π-equivalent circuit using two port network ideas
Week 4	T-Equivalent circuit of C, B. transistor , h- Parameter uses to find out input impedance, output impedance, current&voltage gain
Week 5	Relationship of h- parameter for different circuit modes ,Overall voltage gain, overall current modes, Transistor amplifier, small signal analysis
Week 6	Low frequency / high frequency circuit analysis using Π equivalent circuit to get high cutoff frequency
Week 7	Power amplifiers, class A, class B, class AB, class C power amplifiers
Week 8	Feedback, positive & negative feedback studies

Week 9	Oscillators: R-C oscillator, phase shift oscillator, Wine Bridge oscillator, Hartley oscillator Colpitts oscillator, Crystal oscillator, Frequency stability
Week 10	Differential amplifiers, common mode rejection ratio ,
Week 11	Operational amplifiers with their applications
Week 12	Implementation of LP FIR Filters
Week 13	Timer "555" and its applications
Week 14	Implementation of HP FIR Filters
Week 15	Active filters, Basic filter responses for different modes

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Input and output Characteristics BJT transistor common Emitter , BJT transistor as switch
Week 2,3,4	Input and output Characteristics BJT transistor common Emitter , Characteristics FET transistor , Characteristics JFET transistor
Week 5,6,7	Characteristics MOSFET transistor , BJT Amplifier common Emitter , BJT Amplifier common Base
Week 8,9	BJT Amplifier common collector , BJT Amplifier common Emitter with voltage divider
Week 10,11	Operation Amplifier IC-741 non inverting , Operation Amplifier IC-741 inverting
Week 12,13	Operation Amplifier IC-741 summing , Operation Amplifier IC-741 integral
Week 14	Operation Amplifier IC-741 differential

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Electronic Devices and Circuit Theory , 11 edition , Boylested, 2013.	Yes
Recommended Texts	- Power Electronics , K. B. Khanchandani, second edition, 2008	No
Websites	https://mohamadramdhani.staff.telkomuniversity.ac.id/files/2016/08/Electronic-Devices-and-Circuit-Theory-11th-Edition-Ebook.pdf	

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.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	Strength of Materials			**Module Delivery**	
Module Type	core			**Theory** **Lecture** **Lab**	
Module Code	STUTTC243				
ECTS Credits	8				
SWL (hr/sem)	200				
Module Level	2		**Semester of Delivery**	4	
Administering Department	ESTE		**College**	TTC	
Module Leader	To be assigned		**e-mail**		
Module Leader's Acad. Title	Lecturer		**Module Leader's Qualification**	Ph.D.	
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name	Dr. Ahmed Khafeef Obaid		**e-mail**	akoab82@stu.edu.iq	
Scientific Committee Approval Date	25/9/2024		**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. It provides the main features of the strength materials. 2. Illustration and discussion the stress concept as well as types of stresses. 3. Illustrated the Internal forces in beams, how to draw shear force and bending moment diagrams. 4. Understanding of stress strain relationship and solving relevant problems. 5. To understand the limits of materials and the change of their properties with use.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. An understanding of stresses concept 2. An understanding of beam, stresses in beams beam theory and shear 3. An understanding of torsion in shafts 4. determination of shear stresses and twisting. 5. Discuss the buckling in colums. 6. Describe Mohr's Circle. 7. Define thermal stresses. 8. Identify the principle stresses. 9. Can know how to employ the understanding od strength of material to analysis the stress on different sections.

Indicative Contents المحتويات الإرشادية	Part A –various stresses Concept of stress(Tension and compression)- poison's ratio Hook's low, Application ofPoison's ratio onbiaxial stresses- Joint stress- Statically indeterminate problems. [15 hrs] Impact load, elastic and plastic deformation-The torsion formula for the solid circular shaft, Shear stress, Strain and twisting, [15 hrs] Stresses and bending stress – Stress Transformation and Mohr's Circle. [10 hrs] Stresses on thinwall vessels - Stresses on thik wall vessels. [15 hrs] Revision problem classes [6 hrs] Part B –Beam and bending moment and bending streses Beams, deflection of Beams - Stress on beams. [15 hrs] Shear force diagram in beams- Beams loading. [7 hrs] Bending stresses of beams-Failer theory [15 hrs]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The key strategy for presenting this module will be to stimulate students' engagement in the tasks while also refining and strengthening their critical thinking abilities. This will be accomplished through courses, interactive tutorials, and the consideration of various sorts of experiments incorporating certain sample activities that are attractive to the students.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SSWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	109	**Structured SSWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	7
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	91	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	6
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	200		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	1	5% (5)	5 and 8	LO #3 and #6
	Assignments	1	5% (5)	4 and 6	LO #3and #5
	Project	1	5% (5)	Continuous	All
	Report	1	10% (10)	13	LO #4

	Lab Reports and Lap Exam	امتحان 1 ,تقرير15 عملي	تقارير (10)% 0.666 امتحان عملي (5)%5	1-7, 8	All, 1-4
Summative assessment	**Midterm Exam**	1 hr نظري	10% (10)	7	LO #1 - #7
	Final Exam	4 hr 3 hr نظري 1hr عملي	50% 35% نظري 15% عملي	15	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Concept of stress(Tension and compression)-Poison's ratio Hook’s low
Week 2	Application of Poison's ratio on biaxial stresses– Axial load on composite bar.
Week 3	Thermal stresses- Composite rodand pipes.
Week 4	Stresses on thin wall vessels- Stresses on thick wall vessels.
Week 5	Joint stress- Statically indeterminate problems.
Week 6	Impact load, elastic and plastic deformation-The torsion formula for the solid circular shaft.
Week 7	Shear stress, strain and twisting.
Week 8	Maximum shear stress and Torque-Bending moment diagram and shear force diagram.
Week 9	Beams, deflection of Beams - Stress on beams
Week 10	Shear force diagram in beams- Beams loading
Week 11	Stresses and bending stress – Stress Transformation and Mohr's Circle.

Week 12	Mohr's Circle -axial stress and strain theory
Week 13	Columns-Buckling of columns.
Week 14	Moment area method-Theory of shear stress and strain
Week 15	Bending stresses of beams-failer theory

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1-2	Tensile test
Week 3-5	compression test
Week 6-8	Impact test
Week 9-10	Torsion test
Week 11	Spring test
Week 12	Fatigue test
Week 13-15	Bending test – Deflection test

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Strength of Materials (Fourth Edition) Ferdinand L. Singer , Andrew Pytel Mechanics of Materials (sixth Edition) Ferdinand P. Beer, E. Russell Johnston, Jr.	Yes
Recommended Texts	Mechanics of Materials (Seventh Edition) R.C. Hibbeler.	No
Websites	https://www.amazon.com/Mechanics-Materials-7th-Russell-Hibbeler/dp/0132209918	

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.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	Advanced Programming			**Module Delivery**	
Module Type	supportive			**Theory** **Lab**	
Module Code	STUTTC244				
ECTS Credits	5				
SWL (hr/sem)	125				
Module Level	2		**Semester of Delivery**	4	
Administering Department	ESTE		**College**	TTC	
Module Leader	Ali Hasan		**e-mail**	ali.alsaadawi@stu.edu.iq	
Module Leader's Acad. Title	Assistant lecturer		**Module Leader's Qualification**	Master	
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date	25/9/2024		**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. Understanding and knowing how programming languages work 2. Dealing with problems and analyzing them logically. 3. Problem-solving using programming. 4. Choose the best way to perform the tasks programmatically. 5. Implementation and translation of ideas appropriately to meet my needs and the needs of others from the program.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1- Knowing how the program works and how the program is translated from natural languages into machine language. 2- The ability to deal with program inputs and outputs. 3- The ability to understand the different types of data and how to manage them during the implementation of the program. 4- The ability to perform various mathematical and logical operations on variables and constants. 5- The ability to control the progress of the program according to the status of the variables, depending on the conditions. 6- The ability to repeat certain operations according to the change in the state of the variables. 7- The ability to manage a sequential set of data in arrays and perform various operations on them.

Indicative Contents المحتويات الإرشادية	Introduction –[History Of Programming Languages, Editors, Compilers, Write First Program][5Hrs]. Input And Output Operator – Comments[Cout Statements ,Cin Statement, Single And Multi Line Comments, CHARACTERS AND LITERALS][5Hrs]. Data Type – Variables And Constants[Variables And Their Declarations, Initializing Variables, Objects, Variables, And Constants, Numeric Data Types, The Boolean Type, Character Types, Integer Types][5Hrs] Operators[Arithmetic Operators, The Increment And Decrement Operators, Composite Assignment Operators][10 Hrs] Selection[The If Statement, The If..Else Statement, Comparison Operators, Boolean Expressions, Nested Selection Statements, The Else If Construct, The Switch Statement][15 Hrs] Loop[The While Statement, Terminating A Loop, The Do..While Statement, The For Statement, The Break Statement, The Continue Statement, The Goto Statement][20 Hrs]. Array[Introduction, Initializing An Array, The Linear Search Algorithm, The Bubble Sort Algorithm, The Binary Search Algorithm][10 Hrs]. String[INTRODUCTION, C-STRINGS, STRING I/O][5hrs]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The key strategy for presenting this module will be to stimulate students' engagement in the tasks while also refining and strengthening their critical thinking abilities. This will be accomplished through courses, interactive tutorials, and the consideration of various sorts of experiments incorporating certain sample activities that are attractive to the students.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SSWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	79	**Structured SSWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	46	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	3
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**	1	5% (5)	5 and 12	LO #1, #2,#3 and #6, #7
	Assignments	1	5% (5)	4 and 10	LO #3, #4 and #6, #7
	Project	1	5% (5)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #10
	Lab Reports and Lap Exam	امتحان 1 ,تقرير15 عملي	تقارير (10)% 0.666 امتحان عملي (5)%	1-15, 8	All, 1-7
Summative assessment	**Midterm Exam**	1 hr نظري	10% (10)	7	LO #1 - #4
	Final Exam	4 hr 3 hr نظري 1hr عملي	50% 35% نظري 15% عملي	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction
Week 2	Input and output operator - comments
Week 3	Data type – Variables and constants
Week 4	Operators
Week 5	Increment and decrement
Week 6	Selection
Week 7	Selection
Week 8	Selection
Week 9	Loop
Week 10	Loop
Week 11	Loop
Week 12	Loop
Week 13	Array
Week 14	Array
Week 15	**String**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Introduction -
Week 2	Input and output operator - comments
Week 3	Data type – Variables and constants
Week 4	Operators
Week 5	Increment and decrement
Week 6	Selection
Week 7	Selection
Week 8	Selection
Week 9	Loop
Week 10	Loop
Week 11	Loop
Week 12	Loop
Week 13	Array
Week 14	Array
Week 15	**String**

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	SCHAUM'S OUTLINE OF THEORY AND PROBLEMS of PROGRAMMING WITH C++ Second Edition	No

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.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	English language/2			**Module Delivery**	
Module Type	support			**Theory**	
Module Code	STU202				
ECTS Credits	2				
SWL (hr/sem)	50				
Module Level	2		**Semester of Delivery**	4	
Administering Department	ESTE		**College**	TTC	
Module Leader	Ahmed Alhchaimi		**e-mail**	ahmed.alhchaimi@stu.edu.iq	
Module Leader's Acad. Title	lecturer		**Module Leader's Qualification**	Ph.D.	
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name			**e-mail**		
Scientific Committee Approval Date	25/9/2024		**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. Develop students' skills in understanding the basic grammar of English. 2. Develop students' speaking skills in English. 3. Develop students' listening skills in English. 4. Develop students' reading skills in English. 5. Develop students' writing skills in English. 6. Enhance students' vocabulary through practical usage in various contexts. 7. Improve students' ability to form questions and answers in English. 8. Foster students' understanding of conversational English. 9. Prepare students to discuss everyday topics, such as shopping and dining. 10. Introduce students to ethical considerations related to AI and technology.

Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Understand the rule of possessive 's, verbs, and conversations as vocabulary. 2. Understand the usage of questions and answers, Present Simple 1, and times as vocabulary. 3. Understand the grammar of Present Simple 2, Present Simple 3, adverbs of frequency, and words that go together as vocabulary. 4. Understand the grammar of some/any, there is/are, adjectives, and numbers as vocabulary. 5. Understand the grammar of can/could, was/were, present simple, past simple, and noun + noun as vocabulary. 6. Understand the grammar of past simple 1, past simple 2, and adjectives as vocabulary. 7. Understand the grammar of past simple 3, adverbs, and the prepositions in, at, or on as vocabulary. 8. Understand the grammar of like and would like, some, any, much, many, and food and drink as vocabulary. 9. Understand the grammar of directions, comparatives, superlatives, and places as vocabulary. 10. Understand the grammar of Present Continuous and social expressions as vocabulary. 11. Understand the grammar of going to, past simple, suggestions, and the weather as vocabulary. 12. Understand the grammar of Present Perfect 1, and the verbs take, get, and go as vocabulary. 13. Understand the grammar of anything, something, nothing, everything, and months of the year as vocabulary. 14. Understand the grammar of Present Perfect 2 and verb + noun as vocabulary. 15. Understand how AI enhances travel experiences through facial recognition and language translation (Unit 1). 16. Understand AI's role in retail, including recommendation systems and virtual shopping assistants (Unit 2). 17. Understand how AI is utilized in cafe ordering systems and customer service (Unit 3). 18. Understand AI's impact on decision-making and suggestions in various scenarios (Unit 4). 19. Understand how AI personalizes learning experiences in educational platforms (Unit 7). 20. Understand ethical considerations and responsibilities in AI development and use (Unit 14).

Indicative Contents المحتويات الإرشادية	Possessive 's, Verbs, and Conversations: Understanding the use of possessive 's to indicate ownership, common verbs for everyday use, and forming conversations. Present Simple 1, Questions, and Times: Introduction to the Present Simple tense for regular actions, formulating and answering basic questions, and vocabulary related to telling time. Present Simple 2 & 3, Adverbs of Frequency, and Words that Go Together: Advanced uses of the Present Simple tense, using adverbs of frequency to describe routine actions, and learning words that commonly appear together (collocations). Some/Any, there is/Are, Adjectives, and Numbers: Understanding the use of some and any in positive, negative, and question forms, expressing existence using there is/are, and vocabulary expansion with adjectives and numbers. Can/Could, Was/Were, and Noun + Noun Combinations: Learning to express ability and permission using can/could, introduction to past forms of the verb to be (was/were), and using noun + noun combinations to describe objects and concepts. Past Simple 1 & 2, and Adjectives: Introduction to the Past Simple tense for regular and irregular verbs, expanding the use of adjectives for descriptions. Past Simple 3, Adverbs, and Prepositions of Time: Further exploration of the Past Simple, using adverbs to describe how actions are performed, and understanding in, at, or on in relation to time. Like/Would Like, Some/Any, Much/Many, and Food & Drink: Expressing preferences using like and would like, differentiating between some/any and much/many, and vocabulary related to food and drink. Directions, Comparatives and Superlatives, and Places: Giving and understanding directions, comparing things using comparatives and superlatives, and vocabulary related to locations and places. Present Continuous and Social Expressions: Introduction to the Present Continuous for ongoing actions, and common social expressions for everyday interactions. Going To, Past Simple, Suggestions, and The Weather: Expressing future plans using going to, using the Past Simple in different contexts, making suggestions in conversations, and vocabulary for discussing weather. Present Perfect 1, Take/Get/Go: Introduction to the Present Perfect tense, using take, get, and go in practical contexts. Indefinite Pronouns and Months of the Year: Using anything, something, nothing, and everything in conversations, and vocabulary related to months and time references. Present Perfect 2, Verb + Noun, and AI Ethics: Advanced uses of the Present Perfect tense, learning verb + noun combinations for specific contexts, and introduction to AI ethics, biases, and responsibilities.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	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 SSWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	34	**Structured SSWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	16	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	1
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	50		

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	3	5% (15)	3, 8 and 12	LO #1and #5 and #10
	Assignments	3	5% (15)	4, 9 and 12	LO #3, #8 and #11
	Report	1	5% (5)	14	LO #4, #9 and #13
	seminar	1	5% (5)	13	LO # 4 and # 6
Summative assessment	Midterm Exam	1hr	10% (10)	7	LO #1 - #7
	Final Exam	3 hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Unit one: At the airport Grammar: Possessive 's Vocabulary: Verbs, Conversations
Week 2	Unit two : Going shopping Grammar: Questions and answers, Present Simple 1 Vocabulary: Times
Week 3	Unit three: In a cafe Grammar: Present Simple 2, Present Simple 3, Adverbs of frequency Vocabulary: Words that go together

Week 4	Unit four : Making suggestions Grammar: some / any, There is / are Vocabulary: Adjectives, Numbers
Week 5	Unit Five : Social expressions Grammar: can / could, was / were, Present Simple and Past Simple Vocabulary: Noun + noun
Week 6	Unit six : What time is it? Grammar: Past Simple 1, Past Simple 2 Vocabulary: Adjectives
Week 7	Unit seven : Understanding prepositions of time Grammar: Past Simple 3, Adverbs Vocabulary: in, at, or on?
Week 8	Unit eight : Talking about preferences Grammar: like and would like, some, any, much, many Vocabulary: Food and drink
Week 9	Unit nine : Describing places Grammar: Directions, Comparatives and superlatives, Superlatives Vocabulary: Places
Week 10	Unit ten: Describing actions Grammar: Present Continuous Vocabulary: Social expressions
Week 11	Unit eleven: Future plans and weather - AI in Weather Forecasting Grammar: going to and Past Simple, Suggestions Vocabulary: The weather
Week 12	Unit twelve: Achievements - AI in Automation and Achievements Grammar: Present Perfect 1 Vocabulary: take, get, go
Week 13	Unit thirteen: Indefinite pronouns - AI in Personal Assistants Grammar: anything, something, nothing, everything Vocabulary: Months of the year

Week 14	Unit fourteen: More Present Perfect - AI Ethics and Bias Grammar: Present Perfect 2 Vocabulary: Verb + noun
Week 15	assessment

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	New headway, Liz and John Soars, OXFORD	No
Recommended Texts	Artificial Intelligence in English Language Teaching (ELT): Revolutionizing and Enhancing ELT with AI	No
Websites	https://www.amazon.com/Artificial-Intelligence-English-Language Teaching/dp/B0CRP242G1	

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.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	Electric Power Systems			**Module Delivery**	
Module Type	core			**Theory** **Lab**	
Module Code	STUTTC351				
ECTS Credits	6				
SWL (hr/sem)	150				
Module Level	3		**Semester of Delivery**	5	
Administering Department	ESTE		**College**	TTC	
Module Leader	warid sayel warid		**e-mail**	warid.sayel@stu.edu.iq	
Module Leader's Acad. Title	Assistant Professor		**Module Leader's Qualification**	Ph.D.	
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name			**e-mail**		
Scientific Committee Approval Date	25/9/2024		**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- To introduce the students to the general structure of the network for transferring power from generating stations to the consumers. 2- To expose the students to the different electrical & mechanical aspects of the power network along with its environmental and safety constraints. 3- To know solution and analysis of power systems using digital computers

Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Ability to design and analyze the real time electrical transmission system with respect to various electrical parameters considering environmental and economic obligations. 2. Develop the ability to implement the appropriate safety equipments for design of electrical power system with enhancing the efficiency of the transmission and distribution system with environment friendly technology. 3. Ability to implement the knowledge of basic mathematical ,physical and electrical principles to formulate significant electrical hazards. 4. Judge the suitability of installing overhead and underground power transmission strategies considering electrical, mechanical, environmental, performance, safety and economic constraints. 5. Chose the appropriate type of power generating station following norms and guidelines related to cost, environment, societal and ethical issues. Also review the different tariff systems available and determine the one most appropriate for a given scenario to optimize the revenue earned. 6. Recognize the need to continuously follow the advancements in technology and incorporating them in the present system to improve efficiency.

Indicative Contents المحتويات الإرشادية	GENERATION OF ELECTRICAL ENERGY- SOURCES OF ENERGY- GENERATING STATIONS- TYPES OF GENERATING STATIONS- ECONOMICAL CONSIDERATION OFGENERATING STATIONS - RECENT DEVELOPMENT IN METHODS OF ELECTRICAL POWER GENERATION- LOAD CURVES AND LOAD FACTORS- BASE LOAD AND PEAK LOAD ON POWER STATION [28 hrs] Over head transmission lines PERFORMANCE OF TRANSMISSION LINES- TRANSMISSION LINE REPRESENTATION (SHORT LENGTH TL, MEDIUM LENGH TL, LONG LENGTH TL)-TRANSMISSION LINE REPRESENTATION (SHORT LENGTH TL, MEDIUM LENGH TL, LONG LENGTH TL)-GENERALIZED CONSTANTS OF OTHER ELEMENTS CONNECTED TO TRANSMISSION LINE- MECHANICAL DESIGN OF TRANSMISSION LINE TRANSIENTS IN TRANSMISSION LINE- TRANSMISSION LINE POWERFLOW AND POWER CIRCLE- INSULATORS (PIN INSULATOR, STRAIN TYPE, SUSPENSION) –SUPPORTS [28 hrs] DISTRIBUTION SYSTEM GENERAL DISTRIBUTION SYSTEM CONFIGURATION- VARIOUS DISTRIBUTION SYSTEM CIRCUIT COMPONENTS- DISTRIBUTION SYSTEM REPRESENTTATION AND PARAMETERS-DISTRIBUTION PARAMETRS ((RADIAL,RING)-DISTRIBUTION PARAMETRS SPIKE, SPINDLE AND INTERCONNECTED SYSTEMS- CALCULATION OF VOLTAGE DROPACROSS DISTRIBUTORS- CALCULATION OF CROSS SECTIONAL AREA OF CONDUCTORS [28 hrs] Cables COSTRUCTION OF CABLES-INSULATING MATERERIALS FOR CABLES- UNDER GROUND CABLES, TYPE OF CABLES- UNDER GROUND CABLES, TYPE OF CABLES [14 hrs] ELECTRICAL SUBSTATION

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	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 SSWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	94	**Structured SSWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	6
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	56	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	3
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	150		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	1	5% (5)	8 and 13	LO #3 and #4
	Assignments	1	5% (5)	12 and 14	LO#5 and #6
	Project	1	5% (5)	Continuous	All
	Report	1	10% (10)	13	LO #3, #4 and #5

	Lab Reports and Lap Exam	امتحان 1 ,تقرير15 عملي	تقارير (10)% 0.666 امتحان عملي (5)%5	1-15, 8	All, 1-6
Summative assessment	**Midterm Exam**	1 hr نظري	10% (10)	7	LO #1 - #6
	Final Exam	4 hr 3 hr نظري 1hr عملي	50% 35% نظري 15% عملي	15	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	GENERATION OF ELECTRICAL ENERGY SOURCES OF ENERGY
Week 2	GENERATING STATIONS, TYPES OF GENERATING STATIONS
Week 3	ECONOMICAL CONSIDERATION OFGENERATING STATIONS - RECENT DEVELOPMENT IN METHODS OF ELECTRICAL POWER GENERATION
Week 4	LOAD CURVES AND LOAD FACTORS BASE LOAD AND PEAK LOAD ON POWER STATION
Week 5	PERFORMANCE OF TRANSMISSION LINES OVERHEAD TRANSMISSION LINES
Week 6	TRANSMISSION LINE REPRESENTATION (SHORT LENGTH TL, MEDIUM LENGH TL, LONG LENGTH TL) TRANSMISSION LINE REPRESENTATION (SHORT LENGTH TL, MEDIUM LENGH TL, LONG LENGTH TL)

Week 7	GENERALIZED CONSTANTS OF OTHER ELEMENTS CONNECTED TO TRANSMISSION LINE MECHANICAL DESIGN OF TRANSMISSION LINE TRANSIENTS IN TRANSMISSION LINE
Week 8	TRANSMISSION LINE POWERFLOW AND POWER CIRCLE INSULATORS (PIN INSULATOR, STRAIN TYPE, SUSPENSION) –SUPPORTS
Week 9	DISTRIBUTION SYSTEM GENERAL DISTRIBUTION SYSTEM CONFIGURATION
Week 10	VARIOUS DISTRIBUTION SYSTEM CIRCUIT COMPONENTS DISTRIBUTION SYSTEM REPRESENTTATION AND PARAMETERS
Week 11	DISTRIBUTION PARAMETRS ((RADIAL,RING) DISTRIBUTION PARAMETRS SPIKE, SPINDLE AND INTERCONNECTED SYSTEMS
Week 12	CALCULATION OF VOLTAGE DROPACROSS DISTRIBUTORS CALCULATION OF CROSS SECTIONAL AREA OF CONDUCTORS
Week 13	COSTRUCTION OF CABLES INSULATING MATERERIALS FOR CABLES
Week 14	UNDER GROUND CABLES, TYPE OF CABLES UNDER GROUND CABLES, TYPE OF CABLES
Week 15	ELECTRICAL SUBSTATION

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Short power transmission line model study in MATLAB/SIMULINK
Week 2	Medium power transmission line model study in MATLAB/SIMULINK
Week 3	Long power transmission line model study in MATLAB/SIMULINK
Week 4-6	Load flow analysis in MATLAB/SIMULINK
Week 7	Voltage distribution and string efficiency of model suspension insulator in MATLAB/SIMULINK
Week 8-9	Electrical Distribution System Modeling and Analysis in MATLAB and Simulink
Week 10-13	Power Factor Correction Improvement in Electrical Distribution System in MATLAB and Simulink
Week 14	DISTRIBUTION SYSTEM POWER QUALITY IMPROVEMENT USING D-STATCOM-MATLAB SIMULINK
Week 15	Power Cables structure, operation, and faults in MATLAB SIMULINK

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	M.E. El-Hawary, "Electrical Energy Systems",1st Ed., CRC, 2000 Hadi, Saadat, "Power System Analysis", 2nd Ed., McGraw-Hill 2002 Electrical power systems. {Weedy, B.M. }	No

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.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	Heat transfer and Hydraulic systems			**Module Delivery**	
Module Type	core				
Module Code	STUTTC352			**Theory** **Lab**	
ECTS Credits	6				
SWL (hr/sem)	150				
Module Level	3		**Semester of Delivery**	5	
Administering Department	ESTE		**College**	TTC	
Module Leader	Ahmed Khafeef Obaid		**e-mail**	akoab82@stu.edu.iq	
Module Leader's Acad. Title	lecturer		**Module Leader's Qualification**	Ph.D	
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name			**e-mail**		
Scientific Committee Approval Date	25/9/2024		**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- To define the heat transfer modes concepts. 2- To define the theoretical basics of the conduction heat transfer Coincided with a laboratory experiment. 3- To define the theoretical basics of the forced and free convective heat transfer Coincided with a laboratory experiment. 4- To define the theoretical basics of the radiation heat transfer. 5- To define the theoretical basics of the heat exchangers Coincided with a laboratory. 6- To define the theoretical basics of the mixed modes of heat transfer.

Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1- Able for solving the heat conduction questions through different geometrical shapes (plane wall, cylinder, sphere) 2- Able for solving the questions deals with extended surfaces 3- Able for solving the questions deals with conduction through two dimensional fields analytically and numerically 4- Able for solving the questions deals with conduction through one and two dimensional fields analytically and numerically in unsteady state conditions 5- Introduce the basics of fluid flow and the related equations 6- Introduce the temperature distribution through the boundary layer and calculating the heat transfer by forced convection 7- Introduce the temperature distribution through the boundary layer and calculating the heat transfer by free convection 8- Introduce the calculating approach of the heat radiated and exchanged from different bodies temperatures 9- Introduce the student to the main equations for designing heat exchangers

Indicative Contents المحتويات الإرشادية	Conduction heat transfer (1D) [21 hrs] Heat transfer through fins- Two dimensional steady state heat conduction- One and Two dimensional unsteady state heat conduction [21hrs] Convective heat transfer- Forced convection- Natural convection- Thermal radiation [35 hrs] Heat exchangers [28 hrs]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	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 SSWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	94	**Structured SSWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	6
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	56	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	3

Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	150

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	1	5% (5)	8 and 13	LO #3 and #4
	Assignments	1	5% (5)	12 and 14	LO#5 and #6
	Project	1	5% (5)	Continuous	All
	Report	1	10% (10)	13	LO #3, #4 and #5
	Lab Reports and Lap Exam	امتحان 1 ,تقرير15 عملي	تقارير (10)% 0.666 امتحان عملي (5)% 5	1-15, 8	All, 1-6
Summative assessment	**Midterm Exam**	1 hr نظري	10% (10)	7	LO #1 - #6
	Final Exam	4 hr 3 hr نظري 1hr عملي	50% 35% نظري 15% عملي	15	All
Total assessment			100% (100 Marks)		

\

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1- Week 3	Conduction heat transfer (1D)
Week 4	Heat transfer through fins
Week 5	Two dimensional steady state heat conduction
Week 6	One and Two dimensional unsteady state heat conduction
Week 7	Convective heat transfer
Week 8	Forced convection
Week 9	Natural convection
Week 10- 11	Thermal radiation
Week 12- 15	Heat exchangers

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	linear Heat Conduction
Week 2	
Week 3	
Week 4	
Week 5	Radial Heat Conduction
Week 6	
Week 7	
Week 8	
Week 9	calibration of Thermocouple
Week 10	Cross-Flow Heat Exchanger
Week 11	Gear Trains Radiation Heat Transfer
Week 12	Boiling Heat Transfer
Week 13	
Week 14	
Week 15	

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Heat Transfer, ten edition,(J, P.Holman,2002). -Fundamental of heat and mass transfer,(F.P.Incropera,1981).	No

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.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	communications			**Module Delivery**	
Module Type	Core			**Theory** **Lab**	
Module Code	STUTTC353				
ECTS Credits	5				
SWL (hr/sem)	125				
Module Level	3		**Semester of Delivery**	5	
Administering Department	ESTE		**College**	TTC	
Module Leader	To be assigned		**e-mail**		
Module Leader's Acad. Title			**Module Leader's Qualification**		
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name			**e-mail**		
Scientific Committee Approval Date	29/9/2024		**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. To provide a knowledge of communications. 2. Illustration and discussion the principles of communications system, description of type of signals , filters and modulation(AM,FM and PM) as well as transportation lines with basic equations and analysis. 3. To understand the components of signals, their types, and the operations that are performed on them. 4. To understand the analysis of communication systems and how to obtain the best designs.

Module Learning Outcomes مخرجات التعلم للمادة الدراسية	a. 2. Able to Recognize Signal analysis. Understand the Types of signs and their a. Classification. **3.** Able to Recognize the Fourier series and understand the spectrum. 4. Able to Recognize the Complex Fourier series. Understand Fourier integration. 5. Discuss the power and spectrum power and understand modulation and demodulation. 6. Describe Amplitude modulation frequency analysisAM wave generation Detect amplitude-modulated signals. Understand Frequency modulation frequency analysis FM wave generation Detect Frequency modulation signals. 7. Identify the Segmentation by using time distribution. UnderstandSegmentation by usingfrequency. 8. Discuss Digital modulation and demodulation.Understandmodeling. 9. Able to Recognize PPM and understand PWM. 10. Discuss the PAM and understandPCM. 11. Explain the DM and understand FSK. 12. Identify the ASK and understandPSK. 13. Explain the transportation lines and basic equations and analysis. Understand Impedance. 14. Able to recognize the propagation constant. Understand standing waves. 15. Able to Recognize the Compatible lines. Understand Smith chart. 16. Able to recognize the antennas. Understand coding and decoding.

Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Part A -Signal analysis Types of signs and theirclassification,Fourier series,discrete spectrum,Complex Fourier series,Fourier integration, power and spectrum power[24hrs] Modulation and demodulation,Amplitude modulationfrequency analysisAM wave generationDetect amplitude modulatedsignals,Frequency modulationfrequency analysisFM wave generationDetect Frequency modulationsignals,Segmentation by using timedistribution,Segmentation by usingfrequency. [25hrs] Part B - Digital modulation anddemodulation Digital modulation anddemodulation,modeling,PPM,PWM,PAM,PCM,DM,FSK,ASK,PSK. [35hrs] transportation lines andbasic equations and analysis,Impedance,propagation constant,standing waves,Compatible lines,Smith chart,The antennas,coding and decoding. [28hrs]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	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 SSWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	94	**Structured SSWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	6
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	31	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	2
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**	1	5% (5)	5 and 12	LO #1, #3 and #6, #8
	Assignments	1	5% (5)	8 and 13	LO #5 and #6, #12
	Project	1	5% (5)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #10
	Lab Reports and Lap Exam	امتحان 1 ,تقرير15 عملي	تقارير (10)% 0.666 امتحان عملي (5)% 5	1-15,8	LO #1- #15, LO #1- #8
Summative assessment	**Midterm Exam**	1 hr نظري	10% (10)	8	LO #1 - #7
	Final Exam	4 hr 3 hr نظري 1hr عملي	50% 35% نظري 15% عملي	15	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Signal analysis, Types of signs and theirclassification
Week 2	Fourier series, discrete spectrum, Complex Fourier series
Week 3	Fourier integration, Fourier integration
Week 4	power and spectrum power, modulation and demodulation
Week 5	Amplitude modulationfrequency analysis, AM wave generationDetect amplitude modulatedsignals , Frequency modulationfrequency analysisFM wave generationDetect Frequency modulationsignals
Week 6	Segmentation by using timedistribution, Segmentation by usingfrequency,
Week 7	Digital modulation anddemodulation, modeling
Week 8	PPM, PWM.
Week 9	PAM, PCM.
Week 10	DM, FSK
Week 11	ASK, PSK.
Week 12	Transportation lines andbasic equations and analysis, Impedance.
Week 13	Propagation constant, standing waves.
Week 14	Compatible lines, Smith chart.
Week 15	The antennas, coding and decoding.

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Introduction &sampling
Week 2	Introduction to digital signaling
Week 3	Amplitude modulation
Week 4	Amplitude modulation
Week 5	Double side band modulation
Week 6	Single side band modulation
Week 7	Pulse width modulation
Week 8	Pulse position modulation
Week 9	Sampling theorem
Week 10	Delta modulation
Week 11	Adaptive delta
Week 12	Pulse code modulation(Multiplexer/Demultiplexer)
Week 13	Pulse Code Modulation (PCM)
Week 14	Amplitude Shift Keying
Week 15	Filters

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	1.M. Schwartz, Information Transmission, Modulation, and Noise, 4/e,McGraw- Hill, 1990. 2.P. H. Young, Electronic Communication Techniques, 4/e, Prentice-Hall,1998. 3. L. W. Couch II, Digital and Analog Communication Systems, 5/e, PrenticeHall,1997.	NO
Recommended Texts	H. P. Hsu, Analog and Digital Communications, McGraw-Hill, 1993.	No
Websites		

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.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	theory of machines			**Module Delivery**	
Module Type	core			**Theory** **Lab**	
Module Code	STUTTC354				
ECTS Credits	5				
SWL (hr/sem)	125				
Module Level	3		**Semester of Delivery**	5	
Administering Department	ESTE		**College**	TTC	
Module Leader	Ahmed Khafeef Obaid		**e-mail**	akoab82@stu.edu.iq	
Module Leader's Acad. Title	lecturer		**Module Leader's Qualification**	Ph.D.	
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name			**e-mail**		
Scientific Committee Approval Date	25/9/2024		**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. To understand fundamental of the static and dynamic problem Static method - dynamic method. 2. To understand the linear and angular velocity, Velocity and acceleration problems. 3. The use of Spur gear theory, Parameters of the spur gear. 4. To evaluate the Gear train theory, Theory of belt drives. 5. To develop knowledge of balancing theory, Turning moment diagram and flywheel. 6. To understand the Theory of friction clutch, Theory used in the analysis of friction clutch, Cone clutch, Centrifugal clutches.

Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Interview of the static and dynamic problem, Static method - dynamic method, Slider Crank Mechanism. 2. Linear and angular velocity - power, torque, moment of inertia and acceleration. 3. Understanding of Velocity and acceleration diagram, Velocity and acceleration problem. 4. Spur gear theory, Direct Methods-Involute of the spur gear.The Governor Parameters of the spur gear. 5. Review of all the application and different problem of the spur gear. 6. Gear train theory, compound gear train, inverted gear train,relevant problems. 7. Theory of belt drives, Modification for V – grooved pulley, Examples and problem. 8. Discussion and review of the previous topics. 9. Balancing theory, Static and dynamic balance- Balancing of masses rotating in the same plane. 10. Balancing of masses rotating in the different planes –Dalby's method - Dynamic forces at bearings - Examples and problem. 11. Turning moment diagram and flywheel, Single cylinder double acting - Four stroke cycle. Max fluctuation of energy, Dimensions of the flywheel rim. 12. Theory of friction clutch, Plate clutches, Theory used in the analysis of friction clutch. 13. Adjustment of toggle mechanism, Cone clutch, Centrifugal clutches. 14. Discussion and review of the previous topics.

Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Part A – define of velocity and acceleration Interview of the static and dynamic problem, Static method - dynamic method, Linear and angular velocity - power, torque, moment of inertia and acceleration.Understanding of Velocity and acceleration diagram, Velocity and acceleration problem.Slider Crank Mechanism. [21hrs] Part B – Spur Gear Spur gear theory, Direct Methods-Involute of the spur gear.The Governor Parameters of the spur gear.Review of all the application and different problem of the spur gear.[14hrs] Part C – Gear Train and belts Gear train theory, compound gear train, inverted gear train, relevant problems.Theory of belt drives, Modification for V – grooved pulley, Examples and problem.[14hrs] Revision problems [7hrs] Part D – Balancing theory Balancing theory, Static and dynamic balance- Balancing of masses rotating in the same plane.Balancing of masses rotating in the different planes –Dalby's method - Dynamic forces at bearings - Examples and problem.[14hrs] Part D – Theory of flywheel clutches Turning moment diagram and flywheel, Single cylinder double acting - Four stroke cycle. Max fluctuation of energy, Dimensions of the flywheel rim.Theory of friction clutch, Plate clutches, Theory used in the analysis of friction clutch.Adjustment of toggle mechanism, Cone clutch, Centrifugal clutches. [21 hrs] Discussion and review of the problems. [7hrs]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	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 SSWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	94	**Structured SSWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	6
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	31	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	2
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	1	5% (5)	5 and 13	LO #1, #2 and #6, #8
	Assignments	1	5% (5)	4 and 12	LO #3, #4 and #6, #7
	Project	1	5% (5)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #10
	Lab Reports and Lap Exam	امتحان 1 ,تقرير15 عملي	تقارير (10)% 0.666 امتحان عملي (5)% 5	1-15, 8	All, 1-7
Summative assessment	Midterm Exam	1 hr نظري	10% (10)	7	LO #1 - #7
	Final Exam	4 hr 3 hr نظري 1hr عملي	50% 35% نظري 15% عملي	15	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Interview of the static and dynamic problem, Static method - dynamic method, Slider Crank Mechanism
Week 2	Linear and angular velocity - power, torque, moment of inertia and acceleration.
Week 3	Understanding of Velocity and acceleration diagram, Velocity and acceleration problem.
Week 4	Spur gear theory, Direct Methods-Involute of the spur gear.
Week 5	The Governor Parameters of the spur gear.

Week 6	Review of all the application and different problem of the spur gear.
Week 7	Gear train theory, compound gear train, inverted gear train, relevant problems.
Week 8	Theory of belt drives, Modification for V – grooved pulley, Examples and problem.
Week 9	Balancing theory, Static and dynamic balance
Week 10	- Balancing of masses rotating in the same plane
Week 11	Balancing of masses rotating in the different planes –Dalby's method - Dynamic forces at bearings - Examples and problem.
Week 12	Turning moment diagram and flywheel, Single cylinder double acting - Four stroke cycle. Max fluctuation of energy, Dimensions of the flywheel rim.
Week 13	Theory of friction clutch, Plate clutches, Theory used in the analysis of friction clutch.
Week 14	Adjustment of toggle mechanism, Cone clutch, Centrifugal clutches.
Week 15	Discussion and review of the previous topics.

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Slider Crank Mechanism.
Week 2	Rope Belt Friction.
Week 3	The Governor.
Week 4	Balancing of Rotating Masses.
Week 5	Gear Trains.
Week 6	Fly Wheel.

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Theory of Machines and Mechanisms idu.ac.id *https://ftp.idu.ac.id* › uploads › ebook › tdg › The... John J. Uicker, Emeritus Dean of ... Kinematics and Dynamics of Machine Systems	No
Recommended Texts	Books and Literatures in different kinds of theory of machines.	No

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.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	Control Theory			**Module Delivery**	
Module Type	Core			**Theory** **Lecture** **Tutorial**	
Module Code	STUTTC355				
ECTS Credits	4				
SWL (hr/sem)	100				
Module Level	3		**Semester of Delivery**	5	
Administering Department	ESTE		**College**	TTC	
Module Leader	Ahmed Khafeef Obaid		**e-mail**	akoab82@stu.edu.iq	
Module Leader's Acad. Title	Lecturer		**Module Leader's Qualification**	Ph.D.	
Module Tutor			**e-mail**		
Peer Reviewer Name			**e-mail**		
Scientific Committee Approval Date	25/9/2025		**Version Number**	1	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	• Mathematics through differential equations, Laplace transforms and linear algebra. • Electrical Circuits.	**Semester**	
Co-requisites module	• Vibration Theory	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1- To introduce different types of system and identify a set of algebraic equations to represent and model a complicated system into a more simplified form to interpret different physical and mechanical systems in terms of electrical system to construct equivalent electrical models for analysis. 2- To employ time domain analysis to predict and diagnose transient performance parameters of the system for standard input functions and identify the needs of different types of controllers and compensator to ascertain the required dynamic response from the system 3- Formulate different types of analysis in frequency domain to explain the nature of stability of the system.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	After completing this course, a student will be able to: 1- Categorize different types of system and identify a set of algebraic equations to represent and model a complicated system into a more simplified form. 2- Characterize any system in Laplace domain to illustrate different specification of the system using transfer function concept. 3- Interpret different physical and mechanical systems in terms of electrical system to construct equivalent electrical models for analysis. 4- Employ time domain analysis to predict and diagnose transient performance parameters of the system for standard input functions. 5- Formulate different types of analysis in frequency domain to explain the nature of stability of the system.
Indicative Contents المحتويات الإرشادية	Open and closed loop control, Laplace transform, transfer function and block diagrams, system modelling, time response and stability criteria.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The key strategy for presenting this module will be to stimulate students' engagement in the tasks while also refining and strengthening their critical thinking abilities. This will be accomplished through courses, interactive tutorials, and the consideration of various sorts of experiments incorporating certain sample activities that are attractive to the students.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SSWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	64	**Structured SSWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	4
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	36	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	2
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	100		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	1	5% (5)	5 and 8	LO #3 and #5
	Assignments	1	5% (5)	4 and 6	LO #3, and #4
	Project	1	5% (5)	Continuous	All
	Report	1	10% (10)	13	LO #4
	Lab Reports and Lap Exam	امتحان 1 ,تقرير15 عملي	تقارير (10)% 0.666 امتحان عملي (5)% 5	1-15, 5	All, 1-5
Summative assessment	**Midterm Exam**	1 hr نظري	10% (10)	7	LO #1 - #5
	Final Exam	4 hr 3 hr نظري 1hr عملي	50% 35% نظري 15% عملي	15	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction and definitions
Week 2	Laplace transform: Review and examples
Week 3	Inverse Laplace transform: Partial-Fraction Expansion
Week 4	Transfer functions, Block diagram and Rules of block diagram reduction
Week 5	Block diagram reduction: Examples
Week 6	Electrical Network Transfer Functions
Week 7	Electrical Network Transfer Functions
Week 8	Translational Mechanical System Transfer Functions
Week 9	Rotational Mechanical System Transfer Functions
Week 10	Thermal System Transfer Functions
Week 11	Hydraulic System Transfer Functions
Week 12	Response of first order system
Week 13	Response of second order system
Week 14	Stability: Routh-Hurwitz Criterion
Week 15	Routh-Hurwitz Criterion: Examples

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Verifying the behavior of closed-loop systems using LabView.
Week 2	Using MATLAB and the Symbolic Math Toolbox to find Laplace transforms for time functions.
Week 3	Using MATLAB and the Symbolic Math Toolbox to find time functions from Laplace transforms.
Week 4	Using LabVIEW to generate and manipulate polynomials and transfer functions.
Week 5	Using the various functions within LabVIEW's Control Design and Simulation Module to implement block diagram reduction.
Week 6	Using MATLAB to model electrical systems.
Week 7	Using MATLAB to model electrical systems.
Week 8	Using MATLAB to model mechanical systems.
Week 9	Using MATLAB to model mechanical systems.
Week 10	Using MATLAB to model thermal systems.
Week 11	Using MATLAB to model hydraulic systems.
Week 12	Using MATLAB to model the response of the first order systems.
Week 13	Using MATLAB to model the response of the Second order systems.
Week 14	Using MATLAB to verify the effect of pole location upon stability.
Week 15	Using the LabVIEW Control Design and Simulation Module for stability analysis.

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	• Control System Engineering 7th Ed. by Norman S. Nise Wiley. • Katsuhiko Ogata, "Modern Control Engineering", 5th Edition, Prentice Hall, 2010.	Yes
Websites	http://www.uotechnology.edu.iq/dep-MechanicsandEquipment/index.htm	

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.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	control systems			**Module Delivery**	
Module Type	Core			**Theory**	
Module Code	STUTTC356			**Lecture**	
ECTS Credits	4			**Tutorial**	
SWL (hr/sem)	100				
Module Level	3		**Semester of Delivery**	5	
Administering Department	ESTE		**College**	TTC	
Module Leader	To be assigned		**e-mail**		
Module Leader's Acad. Title			**Module Leader's Qualification**		
Module Tutor			**e-mail**		
Peer Reviewer Name			**e-mail**		
Scientific Committee Approval Date	25/9/2024		**Version Number**	1	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module		**Semester**	
Co-requisites module		**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1. To introduce different types of system and identify a set of algebraic equations to represent and model a complicated system into a more simplified form to interpret different physical and mechanical systems in terms of electrical system to construct equivalent electrical models for analysis. 2. To employ time domain analysis to predict and diagnose transient performance parameters of the system for standard input functions and identify the needs of different types of controllers and compensator to ascertain the required dynamic response from the system 3. Formulate different types of analysis in frequency domain to explain the nature of stability of the system
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Categorize different types of system and identify a set of algebraic equations to represent and model a complicated system into a more simplified form. 2. Characterize any system in Laplace domain to illustrate different specification of the system using transfer function concept. 3. Interpret different physical and mechanical systems in terms of electrical system to construct equivalent electrical models for analysis. 4. Employ time domain analysis to predict and diagnose transient performance parameters of the system for standard input functions. 5. Formulate different types of analysis in frequency domain to explain the nature of stability of the system. 6. Identify the needs of different types of controllers and compensator to ascertain the required dynamic response from the system

Indicative Contents المحتويات الإرشادية	Introduction to control system: Concept of feedback and Automatic control, Effects of feedback, Objectives of control system, Definition of linear and nonlinear systems, Elementary concepts of sensitivity and robustness. Types of control systems, Servomechanisms and regulators, examples of feedback control systems. Transfer function concept. Pole and Zeroes of a transfer function. Properties of Transfer function. Mathematical modeling of dynamic systems: Translational systems, Rotational systems, Mechanical coupling, Liquid level systems, Electrical analogy of Spring– Mass-Dashpot system. Block diagram representation of control systems. Block diagram algebra. Signal flow graph. Mason's gain formula. Control system components: Potentiometer, Synchros, Resolvers, Position encoders. DC and AC tacho-generators. Actuators. Block diagram level description of feedback control systems for position control, speed control of DC motors, temperature control, liquid level control, voltage control of an Alternator. Time domain analysis: Time domain analysis of a standard second order closed loop system. Concept of undamped natural frequency, damping, overshoot, rise time and settling time. Dependence of time domain performance parameters on natural frequency and damping ratio. Step and Impulse response of first and second order systems. Effects of Pole and Zeros on transient response. Stability by pole location. Routh-Hurwitz criteria and applications. Error Analysis: Steady state errors in control systems due to step, ramp and parabolic inputs. Concepts of system types and error constants Stability Analysis: Root locus techniques, construction of Root Loci for simple systems. Effects of gain on the movement of Pole and Zeros. Frequency domain analysis of linear system: Bode plots, Polar plots, Nichols chart, Concept of resonance frequency of peak magnification. Nyquist criteria, measure of relative stability, phase and gain margin. Determination of margins in Bode plot. Nichols chart. M-circle and M-Contours in Nichols chart. Control System performance measure: Improvement of system performance through compensation. Lead, Lag and Lead- lag compensation, PI, PD and PID control.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The key strategy for presenting this module will be to stimulate students' engagement in the tasks while also refining and strengthening their critical thinking abilities. This will be accomplished through courses, interactive tutorials, and the consideration of various sorts of experiments incorporating certain sample activities that are attractive to the students.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SSWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	64	**Structured SSWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	4
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	36	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	2
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	100		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	2	5% (10)	5 and 10	LO #1, #3 and #8, #9
	Assignments	2	5% (10)	6 and 13	LO #5 and #7, #12
	Report	1	10% (10)	1-13	LO #5, #8 and #10
	seminars	1	10% (10)	1-13	LO #3, #4 and #8
Summative	**Midterm Exam**	1 hr	10% (10)	7	LO #1 - #7

assessment	**Final Exam**	3 hr	50% (50)	15	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Concept of feedback and Automatic control, Effects of feedback, Objectives of control system Examples of feedback control systems, transfer function concept. Pole and Zeroes of a transfer function. Properties of Transfer function
Week 2	Definition of linear and nonlinear systems, Elementary concepts of sensitivity and robustness. Types of control systems Block diagram representation of control systems. Block diagram algebra
Week 3	Signal flow graph. Mason's gain formula Translational systems, Rotational systems, Mechanical coupling, Electrical analogy of Spring– Mass-Dashpot system. Time domain analysis of a standard second order closed loop system
Week 4	Concept of undamped natural frequency, damping, overshoot, rise time and settling time. Dependence of time domain performance parameters on natural frequency and damping ratio Step and Impulse response of first and second order systems.
Week 5	Effects of Pole and Zeros on transient response. Stability by pole location. Steady state errors in control systems due to step, ramp and parabolic inputs. Concepts of system types and error constants.
Week 6	Root locus techniques Construction of Root Loci for simple systems

Week 7	Effects of gain on the movement of Pole and Zeros Bode plots
Week 8	Determination of margins in Bode plot Polar plots
Week 9	Nyquist criteria Measure of relative stability, phase andgain margin
Week 10	Nichols chart, Concept of resonance frequency of peak magnification M-circle and M-Contours inNichols chart
Week 11	Improvement of system performance through compensation Lead, Lag and Lead- lag compensation,
Week 12	PI, PD control PID control
Week 13	Servomechanisms and regulators, examples of feedback control systems
Week 14	Potentiometer, Synchros, Resolvers, Position encoders. DC and ACtacho-generators. Actuators.
Week 15	Block diagram level description of feedback control systems for position control, speed control of DC motors, temperature control, liquid level control, voltage control of an Alternator

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	1. Automatic Control Systems (With Matlab Programs), HASAN SAEED, S. K. Kataria& Sons 2. Control systems, K.R. Varmah, McGraw hill 3. Control System Engineering, D. Roy Chowdhuri, PHI 4. Digital Control system, B.C. Kuo, Oxford University Press. 5. Control System Engineering, I. J. Nagrath& M. Gopal. New AgeInternational Publication 6. Modern Control Engineering, K. Ogata, 4th Edition, Pearson Education	Yes
Websites		

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.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	Synchronous and special Machines			**Module Delivery**	
Module Type	core			**Theory** **Lecture** **Lab** **Tutorial**	
Module Code	STUTTC361				
ECTS Credits	7				
SWL (hr/sem)	175				
Module Level	3		**Semester of Delivery**	6	
Administering Department	ESTE		**College**	TTC	
Module Leader	To be assigned		**e-mail**		
Module Leader's Acad. Title			**Module Leader's Qualification**		
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name	Assistant prof Dr warid sayel warid		**e-mail**	warid.sayel@stu.edu.iq	
Scientific Committee Approval Date	25/9/2024		**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. To provide a knowledge of synchronous & special machines. 2. Illustration and discussion the principles of synchronous & special machines, description of the machine, as well as its operation in synchronous & special machines. 3. To analyses existing of synchronous & special machines and contribute to new designs.

Module Learning Outcomes مخرجات التعلم للمادة الدراسية	a. 2- Able to recognize synchronous generators Composition and working principle Ways to stir coils. Understand Equivalent circuit and phase diagram Armature reaction-Voltage regulation. 3- Able to recognize the E.M.F. Understand open and short circuit Characteristics, generators work in parallel, load angle control. 4- Discuss the characteristics of the power angle of the machines with prominent cylindrical rotor and understand the conditions for generators to work in parallel, transient stability of synchronous generators work with infinite bars. 5- Describe the synchronous motor's composition and working principle. Understand the Equivalent circuit and phase diagram principle of a DC motor. 6- Identify the Steady-state properties. Understand synchronous motor ratings. 7- Discuss the power angle curve. Understand the Velocity-torque curve. 8- Able to recognize the effect of field current change on the properties of synchronous motors and understand synchronous capacitors. 9- Discuss the special machines, single phase induction motors' composition and working principle and understand of equivalent circuit and phase diagram, positive and negative sequence analysis. 10- Explain the split phase motor 11- Identify the universal motors' composition, working principle, equivalent circuit and phase diagram. understand the repulsion motor's composition, working principle equivalent circuit and phase diagram properties. 12- Explain the step motors' composition, working principle, equivalent circuit and phase diagram. Understand variable impedance motors. 13- Able to recognize the Linear and nonlinear analysis of Market circles - characteristics. 14- Able to Recognize the permanent magnet synchronous motors, composition , working principle, equivalent circuit and phase diagram. Understand DC motors with permanent magnets composition, working principle, equivalent circuit and phase diagram. 15- Able to recognize the brushless DC motors composition, working principle, equivalent circuit and phase diagram. 16- Understand servo 'motors composition, working principle, equivalent circuit and phase diagram. 17- Able to recognize the synchronizers composition, working principle, equivalent circuit and phase diagram 18- Understand modern technologies to control the speed of electric motors.

Indicative Contents

المحتويات الإرشادية

Part A –synchronous generators

Synchronous generators composition and working principle. Ways to stir coils- Equivalent circuit- phase diagram- armature reaction- voltage regulation-

.open and short circuit characteristics- Generators work in parallel- Load angle control- The Characteristics of the power angle of the machines with prominent cylindrical rotor- Voltage ratings, speed, frequency, power, and power factor Direct-orthogonal axes theory and understand the Conditions for generators to work in parallel Transient stability of synchronous generators work with infinite bars. [24hrs]

Synchronous motor's Composition and working principle. Equivalent circuit and phase diagram principle of a DC motor. Steady-state properties. Synchronous motor ratings. The power angle curve. The Velocity-torque curve. Effect of field current change on the properties of synchronous motors,and synchronous capacitors. Special machines Single phase induction motors' Composition and working principle, of Equivalent circuit and phase diagram, positive and negative sequence analysis. Split phase motor permanent expansion motor starting capacitor Motor shaded pole motor, Speed control methods. universal motors' Composition and working principle Equivalent circuit and phase diagram Properties Speed control methods the Repulsion motor's Composition and working principle Equivalent circuit and phase diagram properties. [56hrs]

Part B - step motors' Composition

Step motors' Composition and working principle Equivalent circuit and phase diagram. Variable impedance motors permanent magnet motors hybrid engines Different stirring methods Momentum prediction theory. Linear and nonlinear analysis of Market circles -characteristics, Speed control methods, Impedance motors Composition and working principle Torque prediction ability controllers motors characteristics. Types of impedance motors variable impedance keyed impedance Speed control methods. [16hrs]

Permanent magnet synchronous motors Composition and working principle Equivalent circuit and phase diagram Magnetic circuit analysis. DC motors with permanent magnets Composition and working principle Equivalent circuit and phase diagram Magnetic circuit analysis. Brushless DC motors Composition and working principle Equivalent circuit and phase diagram Magnetic circuit analysis. Servo motors' Composition and working principles Equivalent circuit and phase diagram AC and DC servo motors Speed control methods. Synchronizers Composition and working principle Equivalent circuit and phase diagram Speed control methods. Modern technologies to control the speed of electric motors digital signal processor technology Programmable field gate array technology Hybrid technology. [24hrs]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	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 SSWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	124	**Structured SSWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	8
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	51	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	3
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	175		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	1	5% (5)	5 and 8	LO #1, #3 and #6
	Assignments	1	5% (5)	4 and 14	LO #3 and #6, #13
	Project	1	5% (5)	Continuous	All

	Report	1	10% (10)	13	LO #5, #8 and #10
	Lab Reports and Lap Exam	امتحان 1 ,تقرير15 عملي	تقارير (10)% 0.666 امتحان عملي (5)% 5%	1-15,8	LO #1- #15, LO #1- #8
Summative assessment	**Midterm Exam**	1 hr نظري	10% (10)	8	LO #1 - #7
	Final Exam	4 hr 3 hr نظري 1hr عملي	50% 35% نظري 15% عملي	15	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Synchronous generators Composition and working principle- ways to stir coils- Equivalent circuit and phase diagram-Armature reaction-Voltage regulation.
Week 2	E.M.F- Open and short circuit characteristics- generators work in parallel -Load angle control.
Week 3	Characteristics of the power angle of the machines with prominent cylindrical rotor- Voltage ratings, speed, frequency, power, and power factor Direct-orthogonal axes theory, conditions for generators to work in parallel- Transient stability of synchronous generators work with infinite bars.
Week 4	Synchronous motor's Composition and working Principle-Equivalent circuit and phase diagram-principle of a DC motor. The Special machines- single phase induction motors'- composition and working principle- Equivalent circuit and phase diagram, positive and negative sequence analysis.
Week 5	Steady-state properties, synchronous motor ratings.
Week 6	Power angle curve. Velocity-torque curve
Week 7	The Effect of field current change on the properties of synchronous motors, and synchronous capacitors.

Week 8	Special machines- single phase induction motors'- composition and working principle- equivalent circuit and phase diagram, positive and negative sequence analysis.
Week 9	Split phase motor permanent expansion motor starting capacitor motor shaded pole motor ,speed control methods.
Week 10	the universal motors' Composition and working principle Equivalent circuit and phase diagram Properties Speed control methods , Repulsion motor's Composition and working principle Equivalent circuit and phase diagram properties.
Week 11	Step motors' Composition and working principle Equivalent circuit and phase diagram. Variable impedance motors permanent magnet motors hybrid engines Different stirring methods Momentum prediction theory.
Week 12	Linear and nonlinear analysis of Market circles -characteristics Speed control methods Impedance motors Composition and working principle Torque prediction ability controllers motors characteristics. Types of impedance motors variable impedance keyed impedance Speed control methods.
Week 13	Permanent magnet synchronous motors Composition and working principle Equivalent circuit and phase diagram Magnetic circuit analysis. DC motors with permanent magnets composition and working principle Equivalent circuit and phase diagram Magnetic circuit analysis.
Week 14	Able to recognize the Brushless DC motors Composition and working principle Equivalent circuit and phase diagram Magnetic circuit analysis .Servo 'motors Composition and working principles Equivalent circuit and phase diagram AC and DC servo motors Speed control methods.
Week 15	Synchronizers Composition and working principle Equivalent circuit and phase diagram Speed control methods. Modern technologies to control the speed of electric motors digital signal processor technology Programmable field gate array technology Hybrid technology

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Alternator Regulation
Week 2	Alternator Characteristics
Week 3	Load Test on a Three Phase Induction Motor

Week 4	Open Circuit and Short Circuit Test on a Three Induction Motor
Week 5	Synchronous Motor Operation
Week 6	Load Test on Synchronous Motor and Measurement of Power Angle
Week 7	Determination of Parameters of Synchronous Machine
Week 8	NO load operation of 3 phase synchronous machine as generator
Week 9	Short circuit test of the three-phase synchronous generator
Week 10	Connecting the three-phase synchronous alternator in parallel with network
Week 11	Obtaining the V curve of the synchronous motor operating it at load
Week 12	Short circuit test for the 3-phasesynchronous generator
Week 13	Power factor correction in three-phase circuit
Week 14	Power factor correction using 3 phase synchronous motor
Week 15	discussion

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	1- A Textbook of Electrical Technology Volume II, AC and DC machines,B.L. THERAJA. A.K. THERAJA, 20062. 2- Electrical Machines and Transformers –Principles and Applications, P. F. Ryff, D.Platnick and J. A. Karnas, Printice Hall	NO
Recommended Texts	Electrical Machinery_Dr. P S Bimbhra	No
Websites		

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.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	vibration theory			**Module Delivery**	
Module Type	core			**Theory** **Lecture** **Lab**	
Module Code	STUTTC362				
ECTS Credits	6				
SWL (hr/sem)	150				
Module Level	3		**Semester of Delivery**	6	
Administering Department	ESTE		**College**	TTC	
Module Leader	Ahmed Khafeef Obaid		**e-mail**	akoab82@stu.edu.iq	
Module Leader's Acad. Title	Lecturer		**Module Leader's Qualification**	Ph.D.	
Module Tutor			**e-mail**		
Peer Reviewer Name			**e-mail**		
Scientific Committee Approval Date	25/9/2024		**Version Number**	1	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Mathematics Engineering mechanics	**Semester**	
Co-requisites module	Control theory	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1- Calculating the natural frequencies and their mode shapes to avoid resonance locations within the range of the system operating speeds, especially at the design stage. 2- Studying the means of vibration minimizing and isolation and controlling the transmissibility of vibration to the floor or base. 3- Simulating the mechanical system of 1st, 2nd degree of freedom.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1- Ability to apply knowledge of mathematics, science, and engineering: The subject of vibration, as provided in this course, applies knowledge of mathematics (differential equations, matrix algebra, vector methods, and complex numbers) and science (statics and dynamics) to solve engineering vibration problems. 2- Ability to identify, formulate, and solve engineering problems: The illustrative examples help the student identify various types of practical vibration problems and develop mathematical models, analyze, solve to find the response, and interpret the results.
Indicative Contents المحتويات الإرشادية	***1-*** **Vibration of a Single-degree-of-freedom System** - Free vibration of particles, equation of motion, damping effects, forced vibration of particles, vibration of rigid bodies, energy methods, natural frequency, computer simulations of the free and forced vibration response of a single-degree-of-freedom system. ***2-*** **Vibration of a Two-degree-of-freedom System** - Free vibration of particles, equation of motion, vibration of rigid bodies, mode shape and natural frequency.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The key strategy for presenting this module will be to stimulate students' engagement in the tasks while also refining and strengthening their critical thinking abilities. This will be accomplished through courses, interactive tutorials, and the consideration of various sorts of experiments incorporating certain sample activities that are attractive to the students.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SSWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	109	**Structured SSWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	7
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	41	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	2
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	150		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	1	5% (5)	5 and 8	LO #1 and #2
	Assignments	1	5% (5)	4 and 6	LO #1 and #2
	Project	1	5% (5)	Continuous	All
	Report	1	10% (10)	13	LO #1
	Lab Reports and Lap Exam	امتحان 1 ,تقرير15 عملي	تقارير (10)% 0.666 امتحان عملي (5)%5	1-15, 8	All, 1-
Summative assessment	**Midterm Exam**	1 hr نظري	10% (10)	7	LO #1 - #2
	Final Exam	4 hr 3 hr نظري 1hr عملي	50% 35% نظري 15% عملي	15	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Basic concepts of vibration
Week 2	Free Vibration of an Undamped single-degree-of- freedom System: Equation of motion.
Week 3	Free Vibration of an Undamped single-degree-of- freedom System: Examples.
Week 4	Free Vibration of a damped single DOF System: Viscous damping.
Week 5	Free Vibration of a damped single DOF System: Friction damping.
Week 6	Logarithmic decrement.
Week 7	Forced Vibration of Single DOF systems: Constant Amplitude.
Week 8	Forced Vibration of Single DOF systems: Rotating unbalance.
Week 9	Forced Vibration of Single DOF systems: Excitation of support.
Week 10	Vibration Isolation & Transmissibility
Week 11	Two-DOF Systems: Equations of Motion for Forced Vibration.
Week 12	Two-DOF Systems: Free Vibration Analysis of an Undamped System.
Week 13	Two-DOF Systems: Free Vibration Analysis of an Undamped System: Examples
Week 14	Two-DOF Systems: Torsional System.
Week 15	Two-DOF Systems: Torsional System: Examples.

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Simple Pendulum.
Week 2	Simple Pendulum.
Week 3	Mass –Spring Systems.
Week 4	Mass –Spring Systems.
Week 5	Torsion Vibration.
Week 6	Torsion Vibration.
Week 7	Transverse Vibrations of a beam with one or more bodies attached.
Week 8	Transverse Vibrations of a beam with one or more bodies attached.
Week 9	Forced Vibrations – Rigid Body – Mass Spring System.
Week 10	Forced Vibrations – Rigid Body – Mass Spring System.
Week 11	Forced damped Vibrations – Rigid Body – Mass Spring System.
Week 12	Forced damped Vibrations – Rigid Body – Mass Spring System.
Week 13	Two Degree of Freedom Torsion vibration.
Week 14	Two Degree of Freedom Torsion vibration.
Week 15	Review week

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	1- S. Graham Kelly, Fundamentals of Mechanical Vibrations, McGraw Hill, latest edition. 2- W.T. Thomson, Theory of Vibration with Applications, Prentice Hall, latest edition.	Yes
Websites		

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.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	Industrial Engineering			**Module Delivery**	
Module Type	core			**Theory** **Lecture**	
Module Code	STUTTC363				
ECTS Credits	6				
SWL (hr/sem)	150				
Module Level	3		**Semester of Delivery**	6	
Administering Department	ESTE		**College**	TTC	
Module Leader	To be assigned		**e-mail**		
Module Leader's Acad. Title			**Module Leader's Qualification**		
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name			**e-mail**		
Scientific Committee Approval Date	25/9/2024		**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. To provide a knowledge of Industrial engineering. 2. Illustration and discussion the principles of the scope of Industrial Engineering and the Management Process. 3. To understand of the fundamentals of production and the productivity.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1- Recognize solving minimization problems 2- Recognize graphical Solution 3- Recognize assignment Model 4- Recognize maximization problems 5- Recognize assignment Model 6- Recognize d Vogal's Approximation Method - 7- Recognize stone Method 8- Recognize spanning Tree Technique 9- Recognize sequencing Models 10- Recognize processing N Jobs through One Machine 11- Recognize processing N Jobs through Two Machines 12- Recognize processing N Jobs through Three machines- inventory control models & material requirement planning 13- Recognize quality control

Indicative Contents المحتويات الإرشادية	The production and the productivity -Computing Productivity Factors that affect Productivity-Productivity Improvement Break Even Analysis [20 hrs] Solving Minimization Problems-Solving Maximization Problems Assignment Model [15 hrs] Transportation Model- Setting up Transportation Problem - Developing an Initial Solution- Northwest Corner Method- Least–Cost Method [15 hrs] Vogal's Approximation Method -Stepping Stone Method Network Models - Minimal – Spanning Tree Technique- Sequencing Models -Processing N Jobs through One Machine Processing N Jobs through Two Machines- Processing N Jobs through Three Machines- Inventory Control Models & Material Requirement Planning [15 hrs] Reliability- Quality Control -Statistical Concepts in Quality Control- Statistical Limit Theorem and Quality Control- Control Charts- Control Charts for Variables- Six Sigma, ISO,TQM [5 hr]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	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 SSWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	78	**Structured SSWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	72	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	4
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	150		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	2	5% (10)	8 and 13	LO #3 and #4
	Assignments	2	5% (10)	12 and 14	LO#5 and #6
	Projects	1	10% (10)	Continuous	All

	Report	1	10% (10)	13	LO #3, #4 and #5
Summative assessment	**Midterm Exam**	1hr	10% (10)	7	LO #1 - #6
	Final Exam	2hr	50% (50)	15	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	The production and the productivity
Week 2	Computing Productivity
Week 3	Factors that affect Productivity
Week 4	Productivity Improvement Break Even Analysis
Week 5	Solving Minimization Problems
Week 6	Solving Maximization Problems
Week 7	Solving maximization problems
Week 8	Assignment Model
Week 9	Transportation Model- Setting up Transportation Problem
Week 10	Developing an Initial Solution
Week 11	Northwest Corner Method- Least–Cost Method
Week 12	Vogal's Approximation Method -Stepping Stone Method

Week 13	Network Models - Minimal – Spanning Tree Technique- Sequencing Models - Processing N Jobs through One Machine
Week 14	Processing N Jobs through Two Machines- Processing N Jobs through Three Machines- Inventory Control Models & Material Requirement Planning
Week 15	Reliability- Quality Control -Statistical Concepts in Quality Control- Statistical Limit Theorem and Quality Control- Control Charts-Control Charts for Variables- Six Sigma, ISO,TQM

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Hamdy A. Taha " Operations Research : an introduction" 6th edition (1997), Prentice-Hall.	No

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.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	Electromechanical designs			**Module Delivery**	
Module Type	core			**Theory** **Lecture**	
Module Code	STUTTC364				
ECTS Credits	6				
SWL (hr/sem)	150				
Module Level	3		**Semester of Delivery**	6	
Administering Department	ESTE		**College**	TTC	
Module Leader	To be assigned		**e-mail**		
Module Leader's Acad. Title			**Module Leader's Qualification**		
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name			**e-mail**		
Scientific Committee Approval Date	25/9/2024		**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- Cover the basics of machine design, including the design process, engineering mechanics and materials, failure prevention under static and variable loading, and Characteristics of the principal types of mechanical elements. 2- Offer a practical approach to the subject through a wide range of real-world applications and examples. 3- Identify appropriate analytical models to describe and predict the behavior of standard machine components;
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1- Make appropriate use of available computer aided design software for Electromechanical designs. 2- Understand measurement and instrumentation in modern electro-mechanical systems 3- Conceptualise, design and evaluate an electro-mechanical systems. 4- Apply stress analysis theory, fatigue theory and appropriate criteria of failure to the design of simple machine elements; 5- Select appropriate mechanical components from manufacturers' catalogues. 6- Apply codes and standards to machine component design. 7- Understand safety and reliability concepts in the design of machine elements. 8- Communicate the results of a design assignment by means of drawings and a design report.

Indicative Contents المحتويات الإرشادية	Materials in electromechanical design- Design for different types of loading- Electromotor and controls [15 hrs] Shaft design- Key- Rolling control Bearing [15 hrs] Belt drives chain drives- pulleys- Gears [15 hrs] Bolted connections- riveted connections- welded joints[15 hrs] Clutches- Brakes- couplings[15 hrs]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	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 SSWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	78	**Structured SSWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	72	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	4
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	150		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	2	5% (10)	3 and 8	LO #1, #2 and #6
	Assignments	2	5% (10)	4 and 13	LO#3, #5 and #6
	Projects	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #1, #2 and #3
Summative assessment	**Midterm Exam**	1hr	10% (10)	7	LO #1 - #7
	Final Exam	2hr	50% (50)	15	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Materials in electromechanical design
Week 2	Design for different types of loading
Week 3	Electromotor and controls
Week 4	Shaft design
Week 5	Key
Week 6	Rolling control Bearing
Week 7	Belt drives chain drives
Week 8	pulleys
Week 9	Gears
Week 10	Bolted connections
Week 11	riveted connections
Week 12	welded joints
Week 13	Clutches
Week 14	Brakes
Week 15	couplings

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Joseph E. Shigley, STANDARD HANDBOOK OF MACHINE DESIGN, 2nd Edition , McGraw Hill, 1996 Richard G. Budynas, J. Keith Nisbett, Shigley's Mechanical Engineering Design, 8th Edition , McGraw Hill, 2006	No

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.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	Engineering and Numerical Analysis			**Module Delivery**	
Module Type	core			**Theory** **Tutorial**	
Module Code	STUTTC365				
ECTS Credits	5				
SWL (hr/sem)	125				
Module Level	3		**Semester of Delivery**	6	
Administering Department	ESTE		**College**	TTC	
Module Leader	To be assigned		**e-mail**		
Module Leader's Acad. Title			**Module Leader's Qualification**		
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name			**e-mail**		
Scientific Committee Approval Date	25/9/2024		**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- An understanding of engineering and numerical analysis. 2- understanding of the concept engineering and numerical analysis 3- Solution of problems involving engineering and numerical analysis. 4- Selection and application of appropriate analysis techniques. 5- Solution of problems involving engineering and numerical analysis. 6- At the end of the year the student should be able demonstrate knowledge and understanding of the concept engineering and numerical analysis.

Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1- Able to recognizethesolution of non-LinearEquations byNumerical MethodsClosed Methods(Bracketing methods)Searching method Bisection methods.UnderstandOpen Methods (iterative methods) Newton – Raphson Secant method. 2- Able to Recognize Curves Fitting the Least square method linear regression - Polynomial regression.Understand the Linearization of nonlinear models. 3- Discuss the Interpolation Gregory – Newton interpolation formula Forward difference backward difference Center difference Gauss forward-Gauss backwardandUnderstandLagrange Interpolation. 4- Describe the Numerical Solution of linear equations systems Direct Methods-Gauss show elimination method Gauss – Jordan method.Indirect Methods Gauss - Jacobi method Gauss – Siedel method. 5- Identify the Numerical Differentiation Derivatives based on Newton'sforward interpolation Derivatives based on Newton's backward interpolation. UnderstandNumerical integration Midpoint rule-Trapezoidal rule-Simpson's (1/3) rule.. 6- Discuss Simpson's (3/8) rule of Double Integration.Understandthe Numerical solution of ordinary differential equations (1st order) Euler's method-Modified Euler's method. 7- Able to Recognize the Runge-Kutta method 2 nd order 4 th order and understand Partial DifferentialEquationsClassification of PDESolution of PDE byseparation of variables. 8- Discuss the Wave Equation and understandHeat Equation. 9- Explain the Laplace Equation and understand the Solution of Ordinary Differential Equations by Power seriesClassification of ODE. 10- Identify the Solution Methods Undetermined Coefficients Method. And understand the Fresenius Method Case I. 11- Explain the Fresenius Method Case IIand Case III. 12- Able to recognize Z transform Sequences- Table of Z – Transform andUnderstand Properties of Z – Transform. 13- Able to Recognize the Inverse Z – Transform. Understand solving the recurrence relations. 14- Able to recognize theFourier transform Complex Fourier series.Understandsome special functions and their transforms even functions- Odd functions- Top-hat function. 15- Able to recognize the Properties of Fourier transform Linearity. UnderstandTime shaftingFrequency shafting

Indicative Contents المحتويات الإرشادية	Part A –Numerical Methods Solution of non-LinearEquations byNumerical MethodsClosed Methods(Bracketing methods)Searching methods Bisection methods.Open Methods (iterative methods) Newton – Raphson Secant method.Curves Fitting the Least square method linear regression -Polynomial regression. Linearization of nonlinear models. Interpolation Gregory – Newton interpolation formula Forward difference backward difference Center difference Gauss forward-Gauss backward and Lagrange Interpolation. Numerical Solution of linear equations systems Direct Methods- Gauss show elimination method Gauss – Jordan method. Indirect Methods Gauss - Jacobi method Gauss – Siedel method. Numerical Differentiation Derivatives based on Newton'sforward interpolation Derivatives based on Newton's backward interpolation. Numerical integration Midpoint rule-Trapezoidal rule-Simpson's (1/3) rule [20hrs] Simpson's (3/8) rule Double Integration. Numerical solution of ordinary differential equations (1st order) Euler's method-Modified Euler's method. Able to Recognize the Runge-Kutta method 2 nd order 4 th order[6hrs] Part B –DifferentialEquations Differential Equations Classification of PDESolution of PDE by separation of variables. Wave Equation and understandHeat Equation. Laplace Equation Solution of Ordinary Differential Equations by Power seriesClassification of ODE. Solution Methods Coefficients Method. And understand the Fresenius Method Case I. Fresenius Method Case II and Case III. [18hrs] Z transform Sequences- Table of Z – Transform and Understand Properties of Z – Transform, Inverse Z – Transform. Understand solving the recurrence relations. Fourier transforms Complex Fourier series.Some special functions and their transforms even functions- Odd functions- Top-hat function. Properties of Fourier transform Linearity,Time shaftingFrequency shafting[16hrs]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	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 SSWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	63	**Structured SSWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	4
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	62	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	4
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	2	5% (10)	5 and 12	LO #1, #3 and #8
	Assignments	2	5% (10)	13 and 15	LO #12 and #14
	Projects	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #4, #8 and #12
Summative assessment	Midterm Exam	1 hr	10% (10)	8	LO #1 - #7
	Final Exam	2 hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	solution of non-Linear Equations by Numerical Methods. Closed Methods (Bracketing methods)- Searching method Bisection methods. Open Methods (iterative methods) Newton – Raphson Secant method.
Week 2	Curves Fitting- the Least square method -linear regression -Polynomial regression. Linearization of nonlinear models.
Week 3	Interpolation Gregory – Newton interpolation formula- Forward difference- backward difference- Center difference- Gauss forward-Gauss backward and Lagrange Interpolation.
Week 4	The Numerical Solution of linear equations systems- Direct Methods- Gauss show elimination method Gauss – Jordan method. Indirect Methods Gauss - Jacobi method Gauss – Siedel method.
Week 5	Numerical Differentiation- Derivatives based on Newton's forward interpolation- Derivatives based on Newton's backward interpolation- Numerical integration- Midpoint rule- Trapezoidal rule-Simpson's (1/3) rule.

Week 6	Simpson's (3/8) rule of Double Integration, Numerical solution of ordinary differential equations (1st order) Euler's method-Modified Euler's method.
Week 7	Runge-Kutta method 2 nd order 4 th order, Partial Differential Equations Classification of PDESolution of PDE by separation of variables.
Week 8	Wave Equation,Heat Equation.
Week 9	The Laplace Equation, the Solution of Ordinary Differential Equations by Power seriesClassification of ODE.
Week 10	Solution Methods Undetermined Coefficients Method, Fresenius Method Case I.
Week 11	Fresenius Method Case II and Case III.
Week 12	Z transform Sequences- Table of Z – Transform, Properties of Z – Transform.
Week 13	Inverse Z – Transform, solving the recurrence relations.
Week 14	The Fourier transform Complex Fourier series,some special functions and transforms even function-Odd functions- Top-hat function.
Week 15	Able to recognize the Properties of Fourier transform Linearity,Time shaftingFrequency shafting

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Moin, P. (2010). Frontmatter. In Fundamentals of Engineering Numerical Analysis (pp. I-Iv).Cambridge: Cambridge University Press	NO
Recommended Texts		No
Websites		

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.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	power electronics and drive			**Module Delivery**	
Module Type	core			**Theory** **Lab**	
Module Code	STUTTC471				
ECTS Credits	7				
SWL (hr/sem)	175				
Module Level	4		**Semester of Delivery**	7	
Administering Department	ESTE		**College**	TTC	
Module Leader	Yaseen ali sahood		**e-mail**	yaseen.sahood@stu.edu.iq	
Module Leader's Acad. Title			**Module Leader's Qualification**		
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name			**e-mail**		
Scientific Committee Approval Date	25/9/2024		**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- To provide a knowledge of Power electronics and drive. 2- Illustration and discussion the principles of power electronics and drive. 3- To select a suitable electronics and drive for a given use based on considerations of application and performance 4- To be able to create a new power electronics and drive system model that will have some desirable properties. 5- To acquire in-depth knowledge of power electronic circuits for real-time applications. 6- To solve problems in power electronics. 7- To analyze power electronics using existing modern tools for enhancement of knowledge.

Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Describe the role of Power Electronics as an enabling technology in various applications such as flexible production systems, energy conservation, renewable energy, transportation etc. 2. Identify a switching power-pole as the basic building block and to use pulse Width Modulation to synthesize the desired output. 3. Design the switching power-pole using the available power semiconductor devices, their drive circuitry. 4. Learn the basic concepts of operation of dc-dc converters in steady state in continuous and discontinuous modes and be able to analyze basic converter topologies. 5. Using the average model of the building block, quickly simulate the dynamic performance of dc-dc converters and compare them with their switching counterparts. 6. Design controllers for dc-dc converters in voltage and peak-current mode. 7. Design, using simulations, the interface between the power electronics equipment and single-phase and three-phase utility using diode rectifiers and analyze the total harmonic distortion. 8. Design the single-phase power factor correction (PFC) circuits to draw sinusoidal currents at unity power factor. 9. Learn basic magnetic concepts, analyze transformer-isolated switch-mode power supplies and design high-frequency inductors and transformers. 10. Learn basic concepts of soft-switching and their applications to dc-dc converters, compact fluorescent lamps (CFL) and induction heating. 11. Learn the requirements imposed by electric drives (dc and ac) on converters and synthesize these converters using the building block approach. 12. Understand, simulate and design single-phase and three-phase thyristor converters. 13. Learn the role of Power Electronics in utility-related applications which are becoming extremely important.

Indicative Contents المحتويات الإرشادية	Part A –various Power electronics and drivetypes, structure and Theory of representation Introduction to power semiconductor devices and their applications, single phase and three phase ACDC converter (Rectifier) ,DC-AC converter (Inverter). [15 hrs] DC-DC converter (DC chopper) ,AC-AC converter (AC voltage regulator and cycloconverter). [15 hrs] Revision problem classes [6 hrs] Part B –Speed control of DC motors ,Second semester exam-1 st attempt [15 hrs] Speed control of AC motors (Induction and Synchronous motors),Second semester exam-2nd attempt ,General review[15 hrs]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The key strategy for presenting this module will be to stimulate students' engagement in the tasks while also refining and strengthening their critical thinking abilities. This will be accomplished through courses, interactive tutorials, and the consideration of various sorts of experiments incorporating certain sample activities that are attractive to the students.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SSWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	94	**Structured SSWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	6
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	81	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	5
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	175		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	1	5% (5)	5 and 8	LO #3 and #6
	Assignments	1	5% (5)	8 and 14	LO #4 and #13
	Project	1	5% (5)	Continuous	All
	Report	1	10% (10)	13	LO #3, #4 and #5
	Lab Reports and Lap Exam	امتحان 1 ,تقرير15 عملي	تقارير (10)% 0.666 امتحان عملي (5)%5	1-15, 8	All, 1-6
Summative assessment	**Midterm Exam**	1 hr نظري	10% (10)	7	LO #1 - #7
	Final Exam	4 hr 3 hr نظري 1hr عملي	50% 35% نظري 15% عملي	15	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction to power semiconductor devices and their applications
Week 2	Single phase and three phase ACDC converter (Rectifier)
Week 3	
Week 4	
Week 5	DC-AC converter (Inverter)
Week 6	DC-DC converter (DC chopper)
Week 7	AC-AC converter (AC voltage regulator and cyclo converter)
Week 8	
Week 9	Speed control of DC motors
Week 10	
Week 11	
Week 12	Speed control of AC motors (Induction and Synchronous motors)
Week 13	
Week 14	
Week 15	

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Single phase half wave uncontrolled rectifier R-load & RL-load
Week 2	Single phase full wave (mid-point) or center tap uncontrolled rectifier R-load
Week 3	Single phase full wave uncontrolled rectifier (bridge) R-load &RL-load
Week 4	Three phases half wave uncontrolled rectifier R-load & RL-load
Week 4	Three phases full wave uncontrolled rectifier (bridge) R-load &RL-load
Week 5	Characteristics of (SCR) Thyristor
Week 6	R-trigger circuit of (SCR) ,UJT trigger circuit of (SCR)
Week 7	Single phase full wave (mid-point) or center tap controlled rectifier R-load ,
Week 8	Single phase full wave controlled rectifier (bridge) R-load &RL-load
Week 9	Three phases half wave controlled rectifier , R-load & RL-load
Week 10	Three phases full wave controlled rectifier (bridge) R-load &RL-load
Week 11	Characteristics of DIAC ,
Week 12	Characteristics of TRIAC
Week 13	Characteristics of MOSFET
Week 14	Characteristics of MOSFET
Week 15	Characteristics of IGBT

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Power Electronics and Motor Drive Systems 1st Edition - November 8, 2016 Author: Stefanos Manias	No
Recommended Texts	Power Electronics in Motor Drives (E-book)	No
Websites	https://shop.elsevier.com/books/power-electronics-and-motor-drive-systems/rogers/978-0-12-811798-9	

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.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	Electromechanical devices			**Module Delivery**	
Module Type	core			**Theory** **Lab**	
Module Code	STUTTC472				
ECTS Credits	7				
SWL (hr/sem)	175				
Module Level	4		**Semester of Delivery**	7	
Administering Department	ESTE		**College**	TTC	
Module Leader	To be assigned		**e-mail**		
Module Leader's Acad. Title			**Module Leader's Qualification**		
Module Tutor			**e-mail**	E-mail	
Peer Reviewer Name			**e-mail**		
Scientific Committee Approval Date	25/9/2024		**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. To provide a knowledge of electromechanical devices. 2. Illustration and discussion the principles of electromechanical devices. 3. The student should be able demonstrate knowledge and understanding of the concepts, theory and application of electromechanical devices
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Upon completion of the course, the student will be able to demonstrate a proficiency in basic electromechanical devices with strong emphasis on motors. 1- understand the Components of Servo-Mechanisms. 2- understand the working concept of Transducers 3- understand Reduction Rules 5- understand the operation of Sensors 6- understand Industrial Detection Sensor 7- understand the operation of Relays 8- understand Pressure Control Systems 9- understand Flow Rate Control Systems
Indicative Contents المحتويات الإرشادية	Components of Servo-Mechanisms- Transducers- Reduction Rules. [21 hrs] Sensors- Industrial Detection Sensor- Gears. [21 hrs] Relays- Theoretical and Experimental- Pressure Control Systems. [21 hrs] Flow Rate Control Systems- Level Control Systems- PLC Applications [42 hrs]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	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 SSWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	94	**Structured SSWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	6
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	81	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	5
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	175		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	1	5% (5)	8 and 13	LO #3 and #4
	Assignments	1	5% (5)	12 and 14	LO#5 and #6
	Project	1	5% (5)	Continuous	All
	Report	1	10% (10)	13	LO #3, #4 and #5

	Lab Reports and Lap Exam	امتحان 1 ,تقرير15 عملي	تقارير (10)% 0.666 امتحان عملي (5)%5	1-15, 8	All, 1-6
Summative assessment	**Midterm Exam**	1 hr نظري	10% (10)	7	LO #1 - #6
	Final Exam	4 hr 3 hr نظري 1hr عملي	50% 35% نظري 15% عملي	15	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Components of Servo-Mechanisms
Week 2	Transducers
Week 3	Reduction Rules
Week 4	Sensors
Week 5	Industrial Detection Sensor
Week 6	Gears
Week 7	Relays
Week 8	Theoretical and Experimental
Week 9	Pressure Control Systems
Week 10	Flow Rate Control Systems
Week 11	Level Control Systems

Week 12	
Week 13	
Week 14	
Week 15	PLC Applications

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Characteristics of a Signal Conditioning Circuits
Week 2	Characteristics of a Signal Converter Circuits
Week 3	Temperature Characteristics of the LM 35 Integrated Circuit
Week 4	Pneumatic system control
Week 5	SELF – HOLDING CIRCUIT
Week 6	CLOSED LOOP ON-OFF CONTROL OFTHE LEVELWITH PRESSURE SENSOR
Week 7	Open loop and Closed loop control for D.C motor
Week 8	Speed and Position Control by using Thyristor
Week 9	Stepper Motor Operation and Control Mode

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Electromechanical Devices & Components Illustrated Sourcebook 1st Edition by Brian Elliott (Author)	No

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.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	Automation and Control			**Module Delivery**	
Module Type	core			**Theory** **Lecture**	
Module Code	STUTTC473				
ECTS Credits	5				
SWL (hr/sem)	125				
Module Level	4		**Semester of Delivery**	7	
Administering Department	ESTE		**College**	TTC	
Module Leader	To be assigned		**e-mail**		
Module Leader's Acad. Title	Lecturer		**Module Leader's Qualification**		
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name			**e-mail**		
Scientific Committee Approval Date	25/9/2024		**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- It provides a working knowledge of control systems. 2- Illustration and discussion the principles of control systems and system description. 3- To select a suitable control system for a given use based on considerations of application and performance. 4- To be able to create a new control system model stable that will have some desirable properties. 5- To understand the limits of control systems and the change of their properties with use.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1- An understanding of automation control and representation. 2- List the various techniques associated with automation control and representation. 3- Summarize what is meant by a basic of automation control and systems. 4- Discuss the structure, properties and application on of different automation control. 5- It provides a working knowledge of Automation and control. 6- Illustration and discussion the principles of Automation and control. 7- The ability to analyze and Solve problems of control systems .

Indicative Contents المحتويات الإرشادية	Part A –various automation and control types, structure and Theory of representation classification of automation and control, Advanced of control system , applications-Types. [15 hrs] Basic elements of automation and production control system- types of Advanced automation function and industry levels types and properties, Hardware components to control the automation process. [15 hrs] Intelligent control systems (artificial neural network). Effective functions used in artificial networks ,Topology of neural networks ,Types of neural networks Neural network controller models [15 hrs] ,Implementation of fuzzy groups-Fuzzy inference systems ,The control infrastructure is fuzzy -Genetic algorithm (introduction and biological background) [15 hrs] Genetic algorithm steps, Genetic algorithm operator ,Microprocessor (brief description and definition). [15 hrs] Revision problem classes [6 hrs] Part B –PLC Characteristics, uses, and programming of the microprocessor Microcontroller ,Differences between microprocessor and microcontroller [15 hrs] ,Microcontroller chip ,Introduction to PLC Definitions Functions and features of PLC Basics of plc block diagram . [7 hrs] Building PLC in automated systemsDescription (operating system and application software) of the plc [15 hrs]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The key strategy for presenting this module will be to stimulate students' engagement in the tasks while also refining and strengthening their critical thinking abilities. This will be accomplished through courses, interactive tutorials, and the consideration of various sorts of experiments incorporating certain sample activities that are attractive to the students.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SSWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	64	**Structured SSWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	4
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	61	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	4
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**	2	5% (10)	5 and 10	LO #1, #2 and #3, #4
	Assignments	2	5% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #4

Summative assessment	**Midterm Exam**	1 hr	10% (10)	7	LO #1 - #4
	Final Exam	3 hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction to control and automation technology
Week 2	Basic elements of automation and production control system
Week 3	Advanced automation function and industry levels
Week 4	Hardware components to control the automation process
Week 5	DC sensors, actuators and servo motors
Week 6	z transform for control systems
Week 7	Intelligent control systems (artificial neural network).
Week 8	Effective functions used in artificial networks
Week 9	Topology of neural networks, Types of neural networks ,Neural network controller models
Week 10	Implementation of fuzzy groups
Week 11	Fuzzy inference systems , The control infrastructure is fuzzy
Week 12	Genetic algorithm (introduction and biological background)
Week 13	Genetic algorithm steps, Genetic algorithm operator
Week 14	Microprocessor (brief description and definition)**,** Characteristics, uses, and programming of the microprocessor
Week 15	Microcontroller , Differences between microprocessor and microcontroller, Microcontroller chip , Introduction to PLC Definitions Functions and features of PLC Basics of plc block diagram

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Modern Control Engineering, Katsuhiko Ogata Automatic Control System, S. Hasan Saeed.	No
Recommended Texts	Modern Control Engineering Automatic Control System	No
Websites	http://docs.znu.ac.ir/members/pirmohamadi_ali/Control/Katsuhiko%20Ogata%20_%20Modern%20Control%20Engineering%205th%20Edition.pdf	

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.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	Computer aided design and manufacturing			**Module Delivery**	
Module Type	core			**Theory** **Lab**	
Module Code	STUTTC474				
ECTS Credits	6				
SWL (hr/sem)	150				
Module Level	4		**Semester of Delivery**	7	
Administering Department	ESTE		**College**	TTC	
Module Leader	To be assigned		**e-mail**		
Module Leader's Acad. Title			**Module Leader's Qualification**		
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name			**e-mail**		
Scientific Committee Approval Date	25/9/2024		**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- To provide a knowledge of computer aided design and manufacturing (CAM CAD). 2- Learn to draw in 2D and 3D. 3- Drawing some manufacturing drawings by auto CAD.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1- Solution of problems involving basic CAD CAM 2- Selection and application of appropriate analysis techniques 3- Observation and recording of experimental data 4- Preparation of technical report.

Indicative Contents المحتويات الإرشادية	Part A –application of AutoCAD overview of AutoCAD-Ways to enter the command, Ways to enter the command. [15 hrs] Full explanation of drawing, line, circle, square orrectangle.etc [15 hrs] Execute key board drawing on. [10 hrs] The right application for everything. [15 hrs] Part B –2D&3D drawing Learn to draw in2D& 3D. [25 hrs] Drawing some manufacturing drawings by AutoCAD. [7 hrs] Introduction to finite element method-Solve problems by finite element method[15 hrs].

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The key strategy for presenting this module will be to stimulate students' engagement in the tasks while also refining and strengthening their critical thinking abilities. This will be accomplished through courses, interactive tutorials, and the consideration of various sorts of experiments incorporating certain sample activities that are attractive to the students.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SSWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	94	**Structured SSWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	6
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	56	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	3
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	150		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	1	5% (5)	5 and 10	LO #1 and #3
	Assignments	1	5% (5)	6 and 8	LO #3, and #4
	Project	1	5% (5)	Continuous	All
	Report	1	10% (10)	13	LO #4
	Lab Reports and Lap Exam	امتحان 1 ,تقرير15 عملي	تقارير (10)% 0.666 امتحان عملي (5)% 5	1-15, 8	All, 1-6
Summative assessment	**Midterm Exam**	1 hr نظري	10% (10)	7	LO #1 - #3
	Final Exam	4 hr 3 hr نظري 1hr عملي	50% 35% نظري 15% عملي	15	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	An overview of AutoCAD-ways to enter the command
Week 2	Ways to enter the command.
Week 3-4	Full explanation of drawing, line, circle, square or rectangle.
Week 5-6	Execute keyboard drawing on.
Week 7-8	The right application for everything.
Week 9-10	Learn to draw in2D
Week 11-12	Learn to draw in3D.
Week 13-14	Drawing some manufacturing drawings by AutoCAD.
Week 15	Introduction to finite element method-Solve problems by finite element method

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1-3	Way to enter the command
Week 4-6	Full explanation of drawing, line, circle, square orrectangle.etc
Week 8-9	Execute keyboard drawing
Week 10	The right application for everything
Week 11-12	Learn to drawn 2D
Week 13-14	Learn to drawn 3D
Week 15	Drawing some manufacturing drawing by AutoCAD

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Computer Aided Design and Manufacturing, C.B. Besant, 1986 CAD/CAM, Mc Mahan and Browne, 1998. Computer Aided Manufacture, Chang and Richard, 2006. CAD/CAM Principles and Applications, Rao, 2010.	No
Recommended Texts	CAD/CAM Principles and Applications, Rao, 2010. Computer Aided manufacturing, S. Vishal, 2013	No
Websites	1- https://www.amazon.com/Cad-Cam-Principles-Applications-3Ed/dp/0070681937	

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.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	Renewable Energy			**Module Delivery**	
Module Type	core			**Theory** **Lab**	
Module Code	STUTTC475				
ECTS Credits	5				
SWL (hr/sem)	125				
Module Level	4		**Semester of Delivery**	7	
Administering Department	ESTE		**College**	TTC	
Module Leader	To be assigned		**e-mail**		
Module Leader's Acad. Title			**Module Leader's Qualification**		
Module Tutor			**e-mail**		
Peer Reviewer Name			**e-mail**		
Scientific Committee Approval Date	25/9/2024		**Version Number**	1	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module		**Semester**	
Co-requisites module		**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1- To present the fundamental principles and architecture of Renewable Energy systems. 2- To discuss, examine, and evaluate the key technological components of Renewable Energy. 3- To review key technological applications of Renewable Energy.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. To describe the challenges, problems, and potential solutions associated with the use of various Renewable Energy sources 2. To understand the fundamental principles and technologies of renewable energy components and systems, and other related topics such as energy storage systems, hybrid energy systems, and distribution (smart) grids. 3. To describe the use of renewable sources and the various components used in energy production with respect to applications (e.g. heating, cooling, desalination, power generation) 4. To gain specific knowledge in special fields such as solar, wind, fuel cell, and battery storage. 5. To use different software/laboratory equipment for modeling/designing/analyzing a Renewable Energy system

Indicative Contents المحتويات الإرشادية	Renewable Energy Resources (RESs) Photovoltaic Energy Systems Physics of sunlight and photovoltaics Photovoltaic system components Photovoltaic system calculation and aspects Solar thermal systems Wind Energy System Wind Energy Fundamentals Wind Turbines Operation and Control Energy storage OFF-grid/ Stand-alone systems

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The key strategy for presenting this module will be to stimulate students' engagement in the tasks while also refining and strengthening their critical thinking abilities. This will be accomplished through courses, interactive tutorials, and the consideration of various sorts of experiments incorporating certain sample activities that are attractive to the students.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SSWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	94	**Structured SSWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	6
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	31	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	2
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**	1	5% (5)	5 and 10	LO #3, #4 and #4, #5
	Assignments	1	5% (5)	2 and 13	LO #3, #4 and #5
	Project	1	5% (5)	Continuous	All
	Report	1	10% (10)	14	LO #1, #3 and #4
	Lab Reports and Lap Exam	امتحان 1 ,تقرير15 عملي	تقارير (10)% 0.666 امتحان عملي (5)%5	1-15, 8	All, 1-5
Summative assessment	**Midterm Exam**	1 hr نظري	10% (10)	7	LO #1 - #5
	Final Exam	4 hr 3 hr نظري 1hr عملي	50% 35% نظري 15% عملي	15	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction and Overview of Renewable Energy Resources (RESs)
Week 2	Physics of sunlight and photovoltaics
Week 3	Photovoltaic system components
Week 4	Photovoltaic system calculation and aspects
Week 5-7	Solar thermal systems
Week 8-11	Wind Energy Fundamentals
Week 12-13	Wind Turbines Operation and Control
Week 14	Energy storage
Week 15	OFF-grid/ Stand-alone systems

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1-5	Simulation of solar module using MATLAB/Simulink
Week 6-10	Simulation of wind turbine using MATLAB/Simulink
Week 11-15	Design and Simulate Battery and Energy Storage Systems using MATLAB/Simulink

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	1. Vaughn C. Nelson, Kenneth L. Starcher, Introduction to Renewable Energy (Energy and the Environment) 2nd Edition, https://www.amazon.com/Introduction-Renewable-EnergyEnvironment/dp/1498701930. 2. John A. Duffie, William A. Beckman, Solar Engineering of Thermal Processes, Fourth Edition (https://onlinelibrary.wiley.com/doi/book/10.1002/9781118671603). 3. James F. Manwell, Jon G. McGowan, Anthony L. Rogers, Wind Energy Explained: Theory, Design and Application, 2nd Edition (https://www.wiley.com/enus/Wind+Energy+Explained%3A+Theory%2C+Design+and+Application%2C+2nd+Edition-p9780470686287). 4. Huggins, Robert Energy Storage, Fundamentals, Materials and Applications, (https://www.springer.com/gp/book/9783319212388). 5. Louie, Henry Off-Grid Electrical Systems in Developing Countries, (https://www.springer.com/gp/book/9783319918891). 6. Handschin, Edmund, Petroianu, Alexander Energy Management Systems, Operation and Control of Electric Energy Transmission Systems, https://www.springer.com/gp/book/9783642840432. 7. Mertens, Konrad. Photovoltaics: fundamentals, technology, and practice. John Wiley & Sons, 2018	No
Websites		

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.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	Signals and systems			**Module Delivery**	
Module Type	core			**Theory** **Lab**	
Module Code	STUTTC481				
ECTS Credits	6				
SWL (hr/sem)	150				
Module Level	4		**Semester of Delivery**	8	
Administering Department	ESTE		**College**	TTC	
Module Leader	To be assigned		**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	25/9/2024		**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- To provide a knowledge of Signals and systems. 2- Illustration and discussion the principles of Signals and systems. 3- The ability to analyze and solve problems. 4- To be able to create a new signals and systems that will have some desirable properties. 5- To understand the limits of signals and systems properties.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1- An understanding of signals and systems and operation. 2- List the various terms associated with signals and systems. 3- Summarize what is meant by a basic of signals and systems selection. 4- Discuss the structure, properties and application on of different signals and systems. 5- Known the operation of signals and systems according to modern techniques methods that support all applications. 6- Identify the principle of different techniques of analysis's . 7- Identify the properties of different analyses techniques.

Indicative Contents المحتويات الإرشادية	Part A signals and system types , analyses, theory Representation of basic signals and sequences in MATLAB , plot continuous and discrete time, plot discrete-time signal in Matlab, plot special signals with discrete time , elementary transformations of the independent variable in Matlab. [15 hrs] Revision problem classes [6 hrs] Part B –Properties of materials Operations on continuous signals, fourier transform and its Properties, sampling Theorem, autocorrelation & cross correlation Between Signals. [15 hrs] Convolution between two signals, discrete fourier transform (DFT) & Inverse DFTC computation fast fourier transform (FFT). [15 hrs] Implementation of LP FIR Filters, Implementation of HP FIR Filters.[10 hrs]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The key strategy for presenting this module will be to stimulate students' engagement in the tasks while also refining and strengthening their critical thinking abilities. This will be accomplished through courses, interactive tutorials, and the consideration of various sorts of experiments incorporating certain sample activities that are attractive to the students.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SSWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	94	**Structured SSWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	6
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	56	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	3
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	150		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	1	5% (5)	5 and 8	LO #1 and #3
	Assignments	1	5% (5)	4 and 14	LO #3 and #6
	Project	1	5% (5)	Continuous	All
	Report	1	10% (10)	14	LO # 3
	Lab Reports and Lap Exam	امتحان 1 ,تقرير15 عملي	تقارير (10)% 0.666 امتحان عملي (5)%5	1-15, 8	All, 1-4
Summative assessment	**Midterm Exam**	1 hr نظري	10% (10)	7	LO #1 - #4
	Final Exam	4 hr 3 hr نظري 1hr عملي	50% 35% نظري 15% عملي	15	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Representation of basic Signals and Sequences in MATLAB
Week 2	Plot Continuous and Discrete Time
Week 3	Plot Discrete-Time Signal In Matlab
Week 4	Plot Special signals with discrete time
Week 5	Elementary transformations of the independent variable in Matlab
Week 6	Operations on Continuous signals
Week 7	Fourier Transform and its Properties
Week 8	Sampling Theorem
Week 9	Autocorrelation & Cross correlation Between signals
Week 10	Convolution between Two signals
Week 11	Discrete Fourier Transform (DFT)
Week 12	Inverse DFT Computation
Week 13	Fast Fourier Transform (FFT)
Week 14	Implementation of LP FIR Filters
Week 15	Implementation of HP FIR Filters

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Representation of Basic Signals and Sequences in MATLAB
Week 2	Plot continuous and discrete time basic signals
Week 3	Plot Discrete-Time Signal in MATLAB
Week 4	Plot Special signals with discrete time
Week 5	Elementary transformations of the independent variable in MATLAB
Week 6	Operations on Continuous signals
Week 7	Fourier Transform and its Properties
Week 8	Sampling Theorem
Week 9	Autocorrelation & Cross correlation between signals
Week 10	Convolution between Two signals
Week 11	Discrete Fourier Transform (DFT)
Week 12	Inverse DFT computation
Week 13	Fast Fourier Transform (FFT)
Week 14	Implementation of LP FIR Filters
Week 15	Implementation of HP FIR Filters

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Hwei P. Hsu, " Theory and Problems of signals and systems", McGraw-Hill, 1995	No
Recommended Texts	Fundamentals of Signals and Systems, Benoit Boulet & Boston Massachusetts, 2005	No
Websites	https://mlichouri.files.wordpress.com/2013/10/fundamentals-of-signals-and-systems.pdf	

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.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	Microprocessors and microcontrollers			**Module Delivery**	
Module Type	core			**Theory** **Lab**	
Module Code	STUTTC482				
ECTS Credits	6				
SWL (hr/sem)	150				
Module Level	4		**Semester of Delivery**	8	
Administering Department	ESTE		**College**	TTC	
Module Leader	To be assigned		**e-mail**		
Module Leader's Acad. Title			**Module Leader's Qualification**		
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name			**e-mail**		
Scientific Committee Approval Date	25/9/2024		**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- To provide a knowledge of microprocessors and microcontrollers. 2- Illustration and discussion the principles of microprocessors and microcontrollers in digital systems, description of the digital control concepts using microprocessors and micro controllers and it`s applications. 3- To understand the hardware and software of the 8086 microprocessor and 8051 microcontroller 4- To understand the 8086 microprocessor and 8051 microcontroller architecture and assembly language.

Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1- Able to recognize the Block diagram of Intel 8086. Understand the 8086 instruction set and its classification **2-** Able to recognize the 8086 emulators. Understand Numbering and coding systems with 8086 emulators. 3- Able to recognize the 8086 microprocessor data transfer instruction (MOV, XCHG, IN, OUT). Understand the 8086 microprocessor addition and subtraction (ADD, SUB). 4- Discuss the 8086 microprocessor multiplication and division (MUL, DIV).and Understandthe8086 microprocessor increment and decrement (INC, DEC). 5- Describe the 8086 microprocessor logical instructions (AND, OR, XOR, NOT). and understand the 8086 microprocessor logical instructions (SHIFT &ROTATE) 6- Identify the 8086 microprocessor control transfer instructions (JMP, LOOP, and CMP) and understand the flag control instructions. 7- Discuss the string manipulation instructions. Understand the a sci code manipulation instructions. 8- Able to recognize the software interrupts instructions, block diagram of Intel 8051 microcontroller. 9- Discuss the EDSim51 Emulator for the 8051 microcontrollers. Understand the 8051 Instruction Set and Assembly programming 10- Explain the 8051 microcontroller data transfer instruction. Understand the 8051 microcontroller arithmetic instructions 11- Identify the 8051 microcontroller loop and jump instructions. Understand the 8051 microcontroller call instructions. 12- Explain the 8051 microcontroller time delay instructions. Understand the led display using the 8051 microcontrollers. 13- Able to Recognize the Interfacing of the 8051 microcontrollers with the 7-Segment Display. Understand the stepper Motor Control Using the 8051 Microcontroller 14- Able to Recognize the Digital Analog Converter Interfacing with the 8051 Microcontroller. Understand the analog to Digital Converter Interfacing with the 8051 Microcontroller. 15- Able to Recognize the DC Motor Speed Control using the 8051 microcontrollers. Understand the 8051 Microcontroller-based system design

Indicative Contents المحتويات الإرشادية	Part A -Intel 8086 Block diagram of Intel 8086. 8086 instruction set and its classification8086 emulators. Numbering and coding systems with 8086 emulators. 8086 microprocessor data transfer instruction (MOV, XCHG, IN, OUT). 8086 microprocessor addition and subtraction (ADD, SUB).The 8086 microprocessor multiplication and division (MUL, DIV). 8086 microprocessor increment and decrement (INC, DEC).8086 microprocessor logical instructions (AND, OR, XOR, NOT). 8086 microprocessor logical instructions (SHIFT &ROTATE) , 8086 microprocessor control transfer instructions (JMP, LOOP, and CMP)[42 hrs] Flag control instructions. String manipulation instructions. Understand the asci code manipulation instructions. Software interrupts instructions[20 hrs] Part B - Intel 8051microcontroller The 8086 microprocessor logical instructions (SHIFT &ROTATE),and 8086 microprocessor control transfer instructions (JMP, LOOP, and CMP). Flag control instructions. Discuss the String manipulation instructions. Asci code manipulation instructions. Software interrupts instructions. Block Diagram of Intel 8051 microcontroller.EDSim51 Emulator for the 8051 microcontrollers. The 8051 Instruction Set and Assembly Programming, 8051 microcontroller data transfer instruction. 8051 microcontroller arithmetic instructions, 8051 microcontroller loop, and jump instructions. 8051 microcontroller call instructions. [24hrs] 8051 microcontroller time delay instructions. Led display using the 8051 microcontrollers .Interfacing of the 8051 microcontrollers with the 7- Segment Display. Stepper Motor Control Using the 8051 microcontroller digital Analog Converter Interfacing with the 8051 Microcontroller. Analog to Digital Converter Interfacing with the 8051 Microcontroller. DC Motor Speed Control using the 8051 microcontrollers.8051 Microcontroller-Based System Design[38hrs]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	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 SSWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	94	**Structured SSWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	6
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	56	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	3
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	150		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	1	5% (5)	5 and 12	LO #4 and #8
	Assignments	1	5% (5)	4 and 14	LO #3 and #13
	Project	1	5% (5)	Continuous	All
	Report	1	10% (10)	13	LO #8

	Lab Reports and Lap Exam	امتحان 1 ,تقرير15 عملي	تقارير (10)% 0.666 امتحان عملي (5)%	1-15,8	LO #1- #15, LO #1- #8
Summative assessment	**Midterm Exam**	1 hr نظري	10% (10)	8	LO #1 - #7
	Final Exam	4 hr 3 hr نظري 1hr عملي	50% 35% نظري 15% عملي	15	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Block diagram of Intel 8086. 8086 instruction set and its classification
Week 2	The 8086 emulators. Numbering and coding systems with 8086 emulators.
Week 3	The 8086 microprocessor data transfer instruction (MOV, XCHG, IN, OUT). 8086 microprocessor addition and subtraction (ADD, SUB).
Week 4	The 8086 microprocessor multiplication and division (MUL, DIV). the 8086 microprocessor increment and decrement (INC, DEC).
Week 5	The 8086 microprocessor logical instructions (AND, OR, XOR, NOT). The 8086 microprocessor logical instructions (SHIFT &ROTATE)
Week 6	8086 microprocessor control transfer instructions (JMP, LOOP, and CMP). Flag control instructions.
Week 7	String manipulation instructions. Asci code manipulation instructions.
Week 8	Software interrupts instructions. Block Diagram of Intel 8051 microcontroller.
Week 9	EDSim51 Emulator for the 8051 microcontrollers. The 8051 Instruction Set and Assembly Programming

Week 10	8051 microcontroller data transfer instruction. The 8051 microcontroller arithmetic instructions
Week 11	The 8051 microcontroller loop and jump instructions. 8051 microcontroller call instructions.
Week 12	The 8051 microcontroller time delay instructions. Led display using the 8051 microcontrollers.
Week 13	Interfacing of the 8051 microcontrollers with the 7- Segment Display. Stepper Motor Control Using the 8051 Microcontroller
Week 14	Digital Analog Converter Interfacing with the 8051 Microcontroller. Analog Digital Converter Interfacing with the 8051 Microcontroller.
Week 15	The DC Motor Speed Control using the 8051 microcontrollers.8051 Microcontroller-Based System Design

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Block diagram of Intel 8086, 8086 instruction set and its classification
Week 2	8086 emulator, Numbering and coding systems with8086 emulator
Week 3	The 8086 microprocessor data transfer instruction (MOV, XCHG,IN, OUT)
Week 4	The 8086 microprocessor addition and subtraction (ADD, SUB), The 8086 microprocessor multiplication and division (MUL,DIV), The 8086 microprocessor increment and decrement (INC, DEC)
Week 5	Lab 5: The 8086 microprocessor logical instructions (AND, OR, XOR, NOT), The 8086 microprocessor logical
Week 6	Lab 6;The 8086 microprocessor control transfer instructions (JMP, LOOP,CMP), Flag control instructions
Week 7	Lab 7; String manipulation instructions, Asci code manipulation instructions,
Week 8	Lab 8: : Software interrupts instructions, Block Diagram of Intel 8051microcontroller
Week 9	Lab 9: EDSim51 Emulator for 8051 microcontrollers, The 8051 Instruction Set and assembly Programming
Week 10	Lab 10: The 8051 microcontroller data transfer instruction, The 8051 microcontroller arithmetic instructions
Week 11	Lab 11: The 8051 microcontroller loop and jump instructions, the 8051 microcontroller call instructions
Week 12	Lab 12: The 8051 microcontroller time delay instructions, Led display Using the 8051 microcontroller
Week 13	Lab 13: Interfacing the 8051 microcontrollers with the 7-Segment Display, Stepper Motor Control Using the8051 Microcontroller
Week 14	Lab 14: Stepper Motor Control Using the8051 Microcontroller, Analog to Digital Converter Interfacing with the 8051Microcontroller

Week 15	Lab 15: DC Motor Speed Control Using the 8051 Microcontroller, 8051 Microcontroller-Based System Design

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	THE INTEL MICROPROCESSORS 8086/8088 Architecture, Programming, and Interfacing, Eighth Edition, by Barry B. Brey, PEARSON 2009.	NO
Recommended Texts	THE 8051 MICROCONTROLLER AND EMBEDDED SYSTEMS Using assembly and C, second Edition, by Muhammad Ali Mazidi, PEARSON 2005.	No

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.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	Air conditioning and cooling systems			**Module Delivery**	
Module Type	Core			**Theory** **Lab**	
Module Code	STUTTC483				
ECTS Credits	6				
SWL (hr/sem)	150				
Module Level	4		**Semester of Delivery**	8	
Administering Department	ESTE		**College**	TTC	
Module Leader	To be assigned		**e-mail**		
Module Leader's Acad. Title			**Module Leader's Qualification**		
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name			**e-mail**		
Scientific Committee Approval Date	25/9/2024		**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- To understand fundamental of air conditioning and refrigeration principles, psychometric processes and psychometric chart, air mixing process. 2- To understand the estimation of cooling load and the use of the related properties of various buildings materials. 3- The use of relevance charts of duct system designs and fan power. 4- To evaluate the heating load of buildings. 5- To develop knowledge of understanding piping systems of cold and hot water supplies. 6- To understand the Carnot and ideal vapor compression cycles and refrigeration systems. The absorption refrigeration cycle.

Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1- Describe of basic concepts of air conditioning and comfort properties. Understanding of the psychometric chart principles and various air processes. 2- Understanding of principles of the by-pass factor and air mixing processes. 3- Understanding of cooling load estimations of buildings. Learning the use of various properties of materials. 4- Skills of solving cooling load problems, estimations of the required cooling load. 5- Developing knowledge of duct system designs of conditioned air. 6- Understanding of the use of the required fan power for proper air supplies. 7- Studding piping system design of cold and hot water and relevant applied examples. 8- Estimations of heating load and reviewing various material types. 9- Discussion and review of the previous topics. 10- Define the refrigeration concept, Carnot and ideal vapor compression cycles with relevant examples. 11- Reviewing relevant examples of Carnot and ideal vapor compression cycles. 12- The absorption refrigeration cycle, advantages and disadvantages, basic concepts. 13- The use of solar absorption refrigeration systems. 14- Discussion and review of the previous topics.

Indicative Contents المحتويات الإرشادية	<u>Part A – define of basic air conditioning concepts and psychometric chart</u> Describe of basic concepts of air conditioning and comfort properties. Understanding of the psychometric chart principles and various air processes. Understanding of principles of the by-pass factor and air mixing processes. [16hrs] <u>Part B – Cooling load, duct design, fan power</u> Understanding of cooling load estimations of buildings. Learning the use of various properties of materials. Skills of solving cooling load problems, estimations of the required cooling load. Developing knowledge of duct system designs of conditioned air. Understanding of the use of the required fan power for proper air supplies. [32hrs] <u>Part C – Piping systems, heating load</u> Studding piping system design of cold and hot water and relevant applied examples. Estimations of heating load and reviewing various material types. [16hrs] Revision problems [8hrs] <u>Part D – Refrigeration</u> Define the refrigeration concept, Carnot and ideal vapor compression cycles with relevant examples. Reviewing relevant examples of Carnot and ideal vapor compression cycles. The absorption refrigeration cycle, advantages and disadvantages, basic concepts.The use of solar absorption refrigeration systems. [32hrs] Discussion and review of the problems. [8hrs]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	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 SSWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	94	**Structured SSWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	6
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	56	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	3
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	150		

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	1	5% (5)	5 and 10	LO #3, #4 and #4, #8
	Assignments	1	5% (5)	2 and 12	LO #3, #4 and #6, #7
	Project	1	5% (5)	Continuous	All
	Report	1	10% (10)	14	LO #5, #8 and #13
	Lab Reports and Lap Exam	امتحان 1 ,تقرير15 عملي	تقارير (10)% 0.666 امتحان عملي (5)5%	1-15, 8	All, 1-6
Summative assessment	Midterm Exam	1 hr نظري	10% (10)	7	LO #1 - #6
	Final Exam	4 hr 3 hr نظري 1hr عملي	50% 35% نظري 15% عملي	15	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Describe of basic concepts of air conditioning and comfort properties. Understanding of the psychometric chart principles and various air processes.
Week 2	Understanding of principles of the by-pass factor and air mixing processes.
Week 3	Understanding of cooling load estimations of buildings. Learning the use of various properties of materials.
Week 4	Skills of solving cooling load problems
Week 5	estimations of the required cooling load
Week 6	Developing knowledge of duct system designs of conditioned air.
Week 7	Understanding of the use of the required fan power for proper air supplies.
Week 8	Studding piping system design of cold and hot water and relevant applied examples.
Week 9	Estimations of heating load and reviewing various material types.
Week 10	Discussion and review of the previous topics.
Week 11	Define the refrigeration concept, Carnot and ideal vapor compression cycles with relevant examples.
Week 12	Reviewing relevant examples of Carnot and ideal vapor compression cycles.
Week 13	The absorption refrigeration cycle
Week 14	advantages and disadvantages, basic concepts. The use of solar absorption refrigeration systems.
Week 15	Discussion and review of the previous topics.

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Effect of wind speed on relative humidity
Week 2	Psychometric processes
Week 3	Learn about the main air conditioning and refrigeration system
Week 4	Air Conditioner Unit performance
Week 5	Heat pump unit performance
Week 6	Electric Refrigerator Training Panel

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	1- Dr. Abbas A.S. Al-Jeebori, "Fundamentals of Air conditioning and Refrigeration"' Al-Qadisiya University, 2006. 2- مبادىء هندسة التكييف الهواء والتثليج, الدكتورخالد احمد الجودي, كلية الهندسة-جامعة البصرة, 1998 3- Wilbert F., Stoecker and Lekold W. Jones, “Refrigeration and Air conditioning", McGraw-Hill, 1982. 4- "ASHRAE fundamentals Handbook for air conditioning and Refrigeration", SI, 1997.	No
Recommended Texts	Books and Literatures in different kinds of air conditioning and Refrigeration.	No
Websites	https://www.youtube.com/watch?v=1TPKbia4NC0	

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.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	Programmable Logic controllers			**Module Delivery**	
Module Type	core			**Theory** **Lab**	
Module Code	STUTTC485				
ECTS Credits	6				
SWL (hr/sem)	150				
Module Level	4		**Semester of Delivery**	8	
Administering Department	ESTE		**College**	TTC	
Module Leader	To be assigned		**e-mail**		
Module Leader's Acad. Title			**Module Leader's Qualification**		
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name			**e-mail**		
Scientific Committee Approval Date	25/9/2024		**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. Characteristics of a PLC 2. Know general PLC issues 3. Understanding of PLC programming, ladder logic 4. Understand and design basic input and output wiring 5. Analysis and classification of the process control 6. Interlocking process control 7. Sequential process control 8. Random process control 9. Understand the operation of a PLC 10. Understanding of Siemens or Mitsubishi PLC hardware units and utilizing them.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Demonstrate knowledge of programmable logic controllers. 2. Demonstrate knowledge of process control systems. 3. Program using ladder logic programming of software. 4. Design PLC based system for process control. 5. Use digital and analog I/O. 6. Understand various timers, counters, fault and interrupt systems. 7. Define and design a PLC based process control system, its software/hardware design.
Indicative Contents المحتويات الإرشادية	An introduction to programmable logic controllers (PLCs) process control algorithms interfacing of sensors and other I/O devices simulation and networking.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	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 SSWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	94	**Structured SSWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	6
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	56	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	3
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	150		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	1	5% (5)	8 and 13	LO #3 and #4
	Assignments	1	5% (5)	12 and 14	LO#5 and #6
	Project	1	5% (5)	Continuous	All
	Report	1	10% (10)	13	LO #3, #4 and #5

	Lab Reports and Lap Exam	امتحان 1 ,تقرير15 عملي	تقارير (10)% 0.666 امتحان عملي (5)% 5	1-15, 8	All, 1-7
Summative assessment	**Midterm Exam**	1 hr نظري	10% (10)	7	LO #1 - #7
	Final Exam	4 hr 3 hr نظري 1hr عملي	50% نظري 35% عملي 15%	15	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction to Programmable Logic Controllers (PLCs) and its architecture
Week 2	Input/output modules, power supplies, opto isolation and memory map
Week 3	Allen-Bradley Compact Logix Instruction Set
Week 4	Siemens Instruction Set
Week 5	Addressing considerations for both PLC processors
Week 6	IEC 61131-3 programming language standard
Week 7	Ladder logic programming including combinational logic, branching and other rung conditions
Week 8	Start/stop circuits, special contacts, transitional contacts, latching instructions, memory circuit constructs and S/R to Seal Circuit transfer
Week 9	Timers, timing diagrams and examples for timer applications
Week 10	Counter basic programming, Arithmetic, program control instructions
Week 11	Control Panel Construction Standards
Week 12	Control standards external to the Control Pane

Week 13	Analog module-programming examples, Fault and interrupt service routines
Week 14	Sequential Programming Concepts Process control PLC programming including Faceplate
Week 15	. HMI Programming Organization Siemens Function/Function Blocks Motion Control of single axis motion systems

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1-3	Introduction to PLC and its applications
Week 4-6	PLC Programming and Safety Issues
Week 7-9	PLC Connections
Week 10-13	Ladder Logic Inputs and Outputs
Week 14	Hardware Debugging
Week 15	Applications to industrial control problems

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	1. Kamel, Khaled, and Eman Kamel. Programmable logic controllers: Industrial control. McGraw Hill Professional, 2013. 2. Handbook, P. L. C. "Practical Guide to Programmable Logic Controllers." Automation Direct. com. 3. Jack, Hugh. Automating manufacturing systems with PLCs. Lulu. com, 2010. 4. CHUNGPA, “User’s Manual :Universal PLC Training System CPS-3580U”, English ver1, 2020..	No

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.