وصف البرنامج الأكاديمي

يوفر وصف البرنامج الأكاديمي هذا ايجازاً مقتضياً لأهم خصائص البرنامج ومخرجات التعلم المتوقعة من الطالب تحقيقها مبرهناً عما إذا كان قد حقق الاستفادة القصوى من الفرص المتاحة . ويصاحبه وصف لكل مادة ضمن البرنامج

1. المؤسسة التعليمية	جامعة الموصل
2. القسم الجامعي / المركز	كلية الهندسة / قسم الهندسة الميكاترونكس
3. اسم البرنامج الأكاديمي	هندسة الميكاترونكس
4. اسم الشهادة النهائية	بكالوريوس علوم
5. النظام الدراسي	فصلي
6. برنامج الاعتماد المعتمد	لايوجد - عدا تعليمات الجامعة و الكلية , علما ان القسم لا يملك الصلاحية الإدارية أو التخصيص المالي لتبني مثل هذه البرامج.
7. المؤثرات الخارجية الأخرى	القرارات العليا
8. تاريخ إعداد الوصف	2023-2022

9. أهداف البرنامج الأكاديمي

- التكيف الناجح مع المواقف التي تطرأ خلال المسارات المهنية داخل سوق العمل العالمي، من خلال استخدام المعلومات الأساسية والخلفية الجوهرية لتخصص هندسة الميكاترونيات في مجالات علوم الكهرباء والإلكترونيات، وعلوم الكمبيوتر، وعلوم الحرارة والسوائل، وعلوم المواد، وتصميم الآلات وهندسة الإنتاج، والروبوتيات، والاتصالات، والذكاء الاصطناعي، والتحكم الآلي. أو من خلال الحصول على شهادات الدراسة العليا.
- تطبيق منهجية التصميم فيما يتعلق بالهندسة الميكاترونية، من خلال دمج استخدام معايير التصميم والقيود الواقعية ومراعاة التأثير الاقتصادي والبيئي والاجتماعي للتصميم.
- المشاركة في الخدمة المهنية مثل المشاركة في المجتمعات المهنية، والتطبيق والدعم المستمر للأخلاقيات المهنية.
- الاهتمام الدائم بالتطوير المهني من خلال أنشطة التعلم المستمر، واكتساب الثقة بالنفس، والإبداع، والقيادة.

10. مخرجات التعلم المطلوبة وطرائق التعليم والتعلم والتقييم

أ-المعرفة والفهم

أ1- مباديء العلوم الأساسية والتطبيقية والهندسية اللازمة للإلمام بإختصاص هندسة الميكاترونكس (كالرياضيات والهندسة الكهربائية والفيزياء والهندسة الميكانيكية وهندسة الحاسوب).

أ2- علوم هندسة الميكاترونكس كالاجهزة الكهروميكانيكية وأجهزة السيطرة والنظم الرقمية والاتمتة والانسان الالي.

أ3- أسس المهنية وما يتعلق بها من مهارات الإتصال مثل التقديم وكتابة التقارير مع الإلمام بالمحددات الإقتصادية والقانونية والصحية والإجتماعية والأمنية.

ب -المهارات الخاصة بالموضوع ب 1 – حل وصياغة المسائل الهندسية بشكل عام ولا سيما تلك المتعلقة بهندسة الميكاترونكس ب 2 – تحديد وصياغة المسائل الهندسية وتطبيق المعارف الرياضية والعلوم والطرق الهندسية ومهارات الإبداع لحل المسائل في مجال هندسة الميكاترونكس. ب 3 – تفسير البيانات العددية وتطبيق الطرائق الرياضية على تحليل المسائل. ب 4– تحضير المواصفات الفنية والتشغيلية لعناصر وأنظمة الطاقة والأجهزة الكهربائية والميكانيكية.
طرائق التعليم والتعلم
- المحاضرات النظرية - جلسات المناقشة - التجارب المختبرية - مختبرات الحاسوب
طرائق التقييم
- الإمتحانات النصف فصلية والنهائية -الإمتحانات القصيرة -التقارير -الإمتحانات العملية -الإلقاء
ج-مهارات التفكير ج1-إجراء وتصميم التجارب العملية للأنظمة الكهروميكانيكية إضافة الى تحليل وتفسير النتائج العملية المتعلقة بأنظمة الطاقة. ج2-كتابة برامج حاسوبية وإستخدام برامج جاهزة لحل المسئل المتعلقة بمجال الأختصاص ج3-تطبيق التقنيات والمهارات والأدوات الهندسية الحديثة والسيطرة الذكية على الأنظمة الميكانيكية والكهربائية.
طرائق التعليم والتعلم
- المحاضرات النظرية - جلسات المناقشة - التجارب المختبرية - مختبرات الحاسوب - المشاريع

- التدريب الصناعي
طرائق التقييم
-الإمتحانات الفصلية و النهائية -الإمتحانات القصيرة -التقارير -الإمتحانات العملية
د -المهارات العامة والمنقولة (المهارات الأخرى المتعلقة بقابلية التوظيف والتطور الشخصي). د1-العمل بإحترافية وبمسؤلية اخلاقية بشكل منفرد أو ضمن فريق متعدد الأختصاصات د2-كتابة التقارير الفنية والألقاء بشكل فعال. د3-استخدام تكنلوجيا المعلومات بشكل فعال المتعلقة بالتطبيقات الهندسية عموما ومجال الميكاترونكس والسيطرة بشكل خاص. د4-إمكانية البدء بمشاريع بحثية علمية مستقبلا.
طرائق التعليم والتعلم
- المحاضرات النظرية - جلسات المناقشة - التجارب المختبرية - مختبرات الحاسوب - المشاريع - التدريب الصناعي
طرائق التقييم
-الإمتحانات النصف فصلية و النهائية -الإمتحانات القصيرة -التقارير -الإمتحانات العملية -الإلقاء

11.التخطيط للتطور الشخصي
تطور الطالب, برنامج المدرس لتطوير الطالب مثل إستخدام الأنترنت , إستخدام (IT), أستخدام وسائل السلامة في المختبر و تنمية الشخصية الأكاديمية لدى الطالب القادرة على المنافسة و الحوار و حل المشكلات.
12.معيار القبول (وضع الأنظمة المتعلقة بالالتحاق بالكلية أو المعهد)
1- التوزيع المركزي من قبل وزارة التعليم العالي يحدد المقبولين في كلية الهندسة 2- تحدد إختيارات المقبولين الأقسام حيث تتم المنافسة بينهم على أساس المجموع- ثم مجموع دروس المفاضلة. 3- يقبل النقل من الأقسام و الجامعات الأخرى بموجب الضوابط و التعليمات العليا.
13.أهم مصادر المعلومات عن البرنامج
تطور البرنامج من خلال المصادر التوجبهات العليا مايستحدث من علوم في مجال الإختصاص
14.رؤية القسم والرسالة والأهداف
https://uomosul.edu.iq/engineering/%d8%a7%d9%84%d8%b1%d8%a4%d9%8a%d8%a9-%d9%88%d8%a7%d9%84%d8%b1%d8%b3%d8%a7%d9%84%d8%a9-%d9%88%d8%a7%d9%84%d8%a7%d9%87%d8%af%d8%a7%d9%81-5

15.بنية البرنامج

المرحلة الاولى
الفصل الاول

Course code	Subject	Weekly Hours			Unit No.
		Theoretical	Tutorial	Laboratory	
MTE 101	Mathematics I	4	0	0	4
MTE 102	Engineering Mechanics I (Static)	2	1	0	2
MTE 103	Electric Circuits & Network Analysis I	2	1	2	3
MTE 104	Computer Programming I	2	0	2	3
MTE 105	Engineering Drawing	0	0	3	1
MTE 106	Human Rights	2	0	0	2
MTE 107	Engineering Materials	2	0	0	2
MTE 108	Physics I	2	0	0	2
Total		16	2	7	19
		25			

المرحلة الاولى
الفصل الثاني

Course code	Subject	Weekly Hours			Unit No.
		Theoretical	Tutorial	Laboratory	
MTE 109	Mathematics II	3	1	0	3
MTE 110	Engineering Mechanics II (Static)	2	1	0	2
MTE 111	Electric Circuits & Network Analysis II	2	1	2	3
MTE 112	Computerprogramming II	2	0	2	3
MTE 113	Computer Aided Drawing	0	0	3	1
MTE 114	English Language	2	0	0	2
MTE 115	Manufacturing Processes	2	0	2	3
MTE 116	PhysicsII	2	0	0	2
Total		15	43	9	19
		27			

المرحلة الثانية
الفصل الاول

Course code	Subject	Weekly Hours			Unit No.
		Theoretical	Tutorial	Laboratory	
MTE 201	Engineering Mathematics I	3	1	0	3
MTE 202	Fluid Mechanics I	2	1	0	2
MTE 203	Thermodynamics	2	1	0	2
MTE 204	Mechanics of Materials	2	1	0	2
MTE 205	Statistics	2	0	0	2
MTE 206	Electronics Principles and Devices I	2	0	2	3
MTE 207	Electrical Machines	2	1	2	3
MTE 208	Engineering Mechanics(Dynamics)	2	1	0	2
Total		17	6	4	19
		27			

المرحلة الثانية
الفصل الثاني

Course code	Subject	Weekly Hours			Unit No.
		Theoretical	Tutorial	Laboratory	
MTE 210	Engineering Mathematics II	3	1	0	3
MTE 211	Fluid Mechanics II	2	0	2	3
MTE 212	Heat Transfer	2	0	0	2
MTE 213	Engineering Economics	2	0	0	2
MTE 214	Electronics Principles and Devices II	2	1	2	3
MTE 215	Electromechanical system	2	0	2	2
MTE 216	Digital Logic	2	1		3
MTE 217	Mechanical Engineering Laboratory	0	0	2	1
Total		15	3	8	19
		26			

المرحلة الثالثة
الفصل الاول

Course code	Subject	Weekly Hours			Unit No.
		Theoretical	Tutorial	Laboratory	
MTE 301	Engineering analysis	3	1	0	3
MTE 302	Control systems I	2	0	2	3
MTE 303	Microprocessors and Assembly Language	2	1	2	3
MTE 304	Design of Machine Elements I	3	1	0	3
MTE 305	Signal Processing	2	0	0	2
MTE 306	Mechanisms and Vibration	2	1	0	2
MTE 307	Experimental Methods for Engineering	1	0	2	2
MTE 308	Power Electronics and Drive	2	0	1	2
Total		17	4	7	20
		28			

المرحلة الثالثة
الفصل الثاني

Course code	Subject	Weekly Hours			Unit No.
		Theoretical	Tutorial	Laboratory	
MTE 309	Hydraulic and Pneumatic Systems	2	0	2	3
MTE 310	Control systems II	2	0	2	3
MTE 311	Microcontroller system Design	2	0	2	3
MTE 312	Design of Machine Elements II	3	1	0	3
MTE 313	Numerical analysis	2	1	0	2
MTE 314	Theory of Machines	2	1	0	2
MTE 315	Mechatronics Measurements	2	0	2	3
MTE 316	Solid Modeling	0	0	2	1
Total		15	3	10	20
		28			

المرحلة الرابعة
الفصل الاول

Course code	Subject	Weekly Hours			Unit No.
		Theoretical	Tutorial	Laboratory	
MTE 401	Communication and Networking Engineering	2	0	0	2
MTE 402	Digital Control Systems	2	1	2	3
MTE 403	Artificial intelligent	2	1	0	2
MTE 404	Image Processing	2	0	0	2
MTE 405	Industrial Automation I	2	0	2	3
MTE 406	Design of Mechatronics System	2	0	2	3
MTE 407	Robotics I	2	0		2
MTE 408	Project I	1	0	2	2
Total		15	2	8	19
		25			

المرحلة الرابعة
الفصل الثاني

Course code	Subject	Weekly Hours			Unit No.
		Theoretical	Tutorial	Laboratory	
MTE 409	Intelligent Control	2	1	0	2
MTE 410	Engineering Management	2	0	0	2
MTE 411	Special Topics in Mechatronics	2	1	0	2
MTE 412	Industrial Automation II	2	0	2	3
MTE 413	Robotics II	2	0	2	3
MTE 414	Project II	1	0	2	2
MTE 415	Computer Interfacing	2	0	2	3
MTE 416	Professional Ethics	2	0	0	2
Total		15	2	8	19
		25			

16.م مخطط مهارات المنهج

الاشارة في المربعات هي مقابلة لمخرجات التعلم الفردية من البرنامج الخاضعة للتقييم																	
			مخرجات التعلم المطلوبة من البرنامج														
السنة / الفصل	رمز المادة	اسم المادة	أساسي أم اختياري	المعرفة والفهم			المهارات الخاصة بالموضوع				مهارات التفكير			المهارات العامة والمنقولة (أو) المهارات الأخرى المتعلقة بقابلية التوظيف والتطور الشخصي			
				أ1	أ2	أ3	ب1	ب2	ب3	ب4	ج1	ج2	ج3	د1	د2	د3	د4
الأولى	MTE 114	English Language	أساسي	√		√								√	√		
	MTE 104	Computer Programming I		√		√			√			√				√	
	MTE 101	Mathematics I		√				√	√								
	MTE 105	Engineering Drawing		√													
	MTE 103	Electric Circuits & Network Analysis I		√			√				√						
	MTE 102	Engineering Mechanics I (Static)		√			√										
	MTE 108	Physics I		√	√		√	√			√						
	MTE 115	Manufacturing Processes		√			√	√		√			√				

										√				Human Rights	MTE 106	
				√					√	√			√	Engineering Materials	MTE 107	
								√					√	Mathematics II	MTE 109	
						√				√			√	Electric Circuits & Network Analysis II	MTE 111	
										√			√	Engineering Mechanics II (Static)	MTE 110	
	√				√							√	√	Computer Aided Drawing	MTE 113	
						√			√	√		√	√	PhysicsII	MTE 116	
	√				√			√			√		√	Computer programming II	MTE 112	

مخرجات التعلم المطلوبة من البرنامج																
المهارات العامة والمنقولة (أو) المهارات الأخرى المتعلقة بقابلية التوظيف والتطور الشخصي				مهارات التفكير			المهارات الخاصة بالموضوع				المعرفة والفهم			أساسي أم اختياري	اسم المادة	رمز المادة	السنة / الفصل
د4	د3	د2	د1	ج3	ج2	ج1	ب4	ب3	ب2	ب1	أ3	أ2	أ1				
										√			√	أساسي	Fluid Mechanics II	MTE 211	الثانية
					√			√			√		√		Statistics	MTE 205	
					√			√					√		Engineering Mathematics I	MTE 201	
										√			√		Engineering Mechanics(Dynamics)	MTE 208	
						√			√				√		Electrical Machines	MTE 207	

	MTE 203	Thermodynamics		√			√										
	MTE 206	Electronics Principles and Devices I		√			√				√						
	MTE 204	Mechanics of Materials		√			√			√							
	MTE 213	Engineering Economics			√	√			√	√							
	MTE 210	Engineering Mathematics II		√					√			√					
	MTE 202	Fluid Mechanics I		√			√										
	MTE 216	Digital Logic		√			√										
	MTE 215	Electromechanical system			√			√			√						
	MTE 214	Electronics Principles and Devices II		√			√				√						
	MTE 217	Mechanical Engineering Laboratory		√			√	√			√		√				
	MTE 212	Heat Transfer		√			√										
				مخرجات التعلم المطلوبة من البرنامج													
السنة / الفصل	رمز المادة	اسم المادة	أساسي أم اختياري	المعرفة والفهم			المهارات الخاصة بالموضوع				مهارات التفكير			المهارات العامة والمنقولة (أو) المهارات الأخرى المتعلقة بقابلية التوظيف والتطور الشخصي			
				أ1	أ2	أ3	ب1	ب2	ب3	ب4	ج1	ج2	ج3	د1	د2	د3	د4
	MTE 301	Engineering analysis		√					√			√					

							√		√			√			Control systems I	MTE 302	الثالثة
					√			√					√		Numerical analysis	MTE 313	
									√			√			Theory of Machines	MTE 314	
									√			√		أساسي	Mechanisms and Vibration	MTE 306	
							√		√			√			Design of Machine Elements I	MTE 304	
						√			√			√			Mechatronics Measurements	MTE 315	
										√			√		Microprocessors and Assembly Language	MTE 303	
						√			√				√		Signal Processing	MTE 305	
				√		√			√	√			√		Experimental Methods for Engineering	MTE 307	
							√		√			√			Design of Machine Elements II	MTE 312	
						√			√			√			Power Electronics and Drive	MTE 308	
							√		√			√		أساسي	Control systems II	MTE 310	
										√		√			Microcontroller system Design	MTE 311	
				√		√			√			√			Hydraulic and Pneumatic Systems	MTE 309	
	√				√				√			√			Solid Modeling	MTE 316	
مخرجات التعلم المطلوبة من البرنامج																	

السنة / الفصل	رمز المادة	اسم المادة	أساسي أم اختياري	المعرفة والفهم			المهارات الخاصة بالموضوع				مهارات التفكير			المهارات العامة والمنقولة (أو) المهارات الأخرى المتعلقة بقابلية التوظيف والتطور الشخصي			
				أ1	أ2	أ3	ب1	ب2	ب3	ب4	ج1	ج2	ج3	د1	د2	د3	د4
	MTE 401	Communication and Networking Engineering			√		√				√		√				
الرابعة	MTE 404	Image Processing	أساسي		√			√		√							
	MTE 407	Robotics I			√			√			√		√				
	MTE 413	Robotics II			√			√			√		√				
	MTE 402	Digital Control Systems			√			√			√						
	MTE 408	Project I			√			√		√	√	√	√				√
	MTE 411	Special Topics in Mechatronics			√			√			√	√	√				√
	MTE 416	Professional Ethics				√								√			
	MTE 415	Computer Interfacing			√			√				√				√	
	MTE 409	Intelligent Control	أساسي		√			√			√						
	MTE 410	Engineering Management			√	√				√							√
	MTE 406	Design of Mechatronics System			√			√				√					√
	MTE 405	Industrial Automation I			√			√		√	√	√	√				√
	MTE 414	Project II			√			√			√	√	√			√	√
	MTE 403	Artificial intelligent			√			√				√				√	

√				√	√	√	√		√			√			Industrial Automation II	MTE 412	

ادناه تفاصيل مفردات المناهج لقسم هندسة الميكاترونكس:

Course Name: Mathematics I **Program Code: MTE 101, Credits: 3**	
Week 1	Prerequisites for Calculus :Coordinates and Graphs in the Plane; Directions and Quadrants; Distance between Points; Graphs of Equations; Intercepts and More about Graphing; Slope and Equations for Lines; Slope of Non-vertical Lines; Lines That are Paralle
Week 2	Functions and Their Graphs: Domains and Ranges are Often Intervals; Even Functions and Odd Functions; Functions Defined in Pieces; How to Shift a Graph; Equations for Circles in the Plane; Equations for Parabolas.
Week 3	A Review of Trigonometric Functions: Radian Measure; The Six Basic Trigonometric Functions; Calculating Sines and Cosines; Graphs of Trigonometric Functions.
Week 4	Limits and Continuity: The Limit of a Function; The functions that haven't limits; The theories (1, 2, 3 to 6) of limit; Eliminating Common Factors from Zero Denominators; The Sandwich Theorem; sin (theta)theta theorem; Limits Involving Infinity; Asymptot
Week 5	Continuous Functions; Continuity at a Point; Continuity Test; Properties of Continuous Functions; Inverse Functions and Continuity; composites of continuous functions; Limits of Continuous Functions.
Week 6	Derivatives: mathematical definition of the derivative; Tangents and the

	Derivative at a Point; ; Defining Slopes and Tangent Lines; The Derivative of a function; The Slope of Lines; Differentiation Rules; Integer Powers, Multiples, Sums, and Differences;
Week 7	Velocity, Speed, and Other Rate of Change such as acceleration and jerk; Derivatives of Trigonometric Functions such as Sine, Cosine and other Basic Functions; The Chain Rule; Integer Powers of Differentiable Functions; Derivative Formulas that Include th
Week 8	Implicit Differentiation and Fractional Powers; Lenses, Tangents, and Normal Lines; Using Implicit Differentiation to Find Derivatives of Higher Order; Fractional Powers of Differentiable Functions; Linear Approximations and Differentials.
Week 9	Applications of Derivatives: Related Rates of Change; Maxima, Minima, and the Mean Value Theorem; The First Derivative Theorem; The Mean Value Theorem; Curve Sketching with y’ and y“; Points of Inflection; Graphing with y’ and y“.
Week 10	Graphing Rational Functions Asymptotes and Dominant Terms: Horizontal and Vertical Asymptotes; Oblique Asymptotes; Optimization; Applied Examples from Mathematics; Applied Examples from Industry.
Week 11	Mid Exam : Matrices: Basic Definitions; Addition, Subtraction and Multiplication
Week 12	Transposition, Determinants and Inverse of a Matrix; System of Linear Algebraic Equation.
Week 13	Gramer’s rule and Matrix inverse.
Week 14	Gauss elimination and Gauss-Jordan method.
Week 15	Final Exam.
Course Name: Engineering Mechanics I (static) Program Code: MTE 102 , Credits: 2	
Week 1	Forces system
Week 2	Forces system

Week 3	Forces system
Week 4	Moment
Week 5	Moment
Week 6	Moment
Week 7	Couple moment
Week 8	Equilibrum
Week 9	Equilibrum
Week 10	Friction
Week 11	Friction
Week 12	Centroid of Area
Week 13	Centroid of Area
Week 14	Centroid of Length
Week 15	Centroid of Volume

Course Name: Electric circuits & Network analysis I Program Code: MTE 103 , Credits: 3	
Week 1	Introduction, Basic Concepts
Week 2	Units, Charge, Current, Voltage, Power, Conservation of Energy,
Week 3	Circuit Elements, Resistive circuits
Week 4	Ohms' law,
Week 5	Kirchhoff's Voltage Law (KVL)
Week 6	Kirchhoff's Current Law (KCL)
Week 7	The Single-Node-Pair Circuit, Series Circuits, Parallel Circuits, Voltage Division, Current Division
Week 8	Single Loop/Node Circuits
Week 9	Resistor Combinations/Transformations
Week 10	Mesh (Current) Analysis, Mesh Analysis with Supermeshes
Week 11	Equivalent Practical Sources, Star/Delta
Week 12	Circuits with Dependent Sources
Week 13	Nodal Analysis
Week 14	Loop Analysis
Week 15	Superposition Theorem

Course Name: computer programming I Program Code: MTE 104, Credits: 3	
Week 1	Introduction to Computers and Programming
Week 2	
Week 3	Steps for creating and executing a C++ application.
Week 4	
Week 5	Identifiers, Variables, Data types
Week 6	
Week 7	Arithmetic operators, mathematical expressions.
Week 8	Midterm Exam-1
Week 9	Type casting, Assignments, Rational operators
Week 10	If statement
Week 11	
Week 12	If/else statements, logical operators, nested ifs.
Week 13	
Week 14	Conditional operator, Loops (While), Loops (for)
Week 15	Final exam

Course Name: Engineering drawing Program Code: MTE 105, Credits: 1	
Week 1	مقدمة وتعريف الطلبة بمادة الرسم الهندسي ويتضمن ما يلي: ---- (اسبوع) • التعرف على الادوات الهندسية وكيفية استخدامها • أنواع الاقلام المستخدمة في رسم الاشكال الهندسية • تخطيط اللوحة وأعداد حقل العناوين • كيفية التعامل مع البورد الهندسي واللوحة الهند
Week 2	أنواع الخطوط في الرسم الهندسي : ---------- (اسبوع) الخطوط المرئية , الخطوط المخفية , خطوط المراكز , خطوط الابعاد , خطوط القطع . • رسم لوحة تطبيقية على الموضوع---------- :.
Week 3	• #العمليات الهندسية المختلفة : ---------- (ثلاثة أسابيع) • التعريف بمقياس الرسم وانواعه: المدني والميكانيكي ومقياس التكبير والتصغير. تعليم الطلبة كيفية تطبيق ورسم العمليات الهندسية التالية: • رسم مستقيم يوازي مستقيم معلوم • رسم عمود منصف لمستقيم معلوم
Week 4	# العمليات الهندسية المختلفة : ---------- (ثلاثة أسابيع) تعليم الطلبة كيفية تطبيق ورسم العمليات الهندسية التالية: • رسم المماسات والتعرف على نقاط التماس وكيفية تعيينها • رسم قوس معلوم بحيث يمس مستقيمين معلومين بينهما زاوية : قائمة , حادة ومنفرجة. • أيجاد المركز لقوس معلوم يمس : مستقيم معلوم وقوس دائرة معلومة , قوسي دائرة من الداخل , قوسي دائرة من الخارج.
Week 5	• # العمليات الهندسية المختلفة : ---------- (ثلاثة أسابيع) تعليم الطلبة كيفية تطبيق ورسم العمليات الهندسية التالية: • أيجاد المركز لقوس معلوم يمس قوس دائرة معلومة ويمر بنقطة خارجة عنها • رسم الاشكال الهندسية المنتظمة : المثلث المتساوي والمختلف الاضلاع , الشكل الخماسي والسداسي • رسم الشكل المعكوس • رسم ثلاث لوحات تطبيقية على الموضوعلوحة رقم (2) C.W,لوحة رقم(3,4)H.W

Week 6	نظرية الأسقاط العمودي للأجسام ---------- --- (أربعةأسابيع) • أنواع الاسقاط في الرسم واهميته العملية • الأسقاط ذات الاشعة العمودية
Week 7	نظرية الأسقاط العمودي للأجسام ---------- • انواع المساقط الناتجة من الاسقاط العمودي والمعتمد في أسقاط الاجسام الهندسية المختلفة • المسقط االامامي والرأسي والجانبي الايمن والجانبي الايسر
Week 8	نظرية الأسقاط العمودي للأجسام ---------- • كيفية ترتيب ورسم المساقط المطلوبة لاي جسم على لوحة الرسم
Week 9	• رسم ثلاثة لوحات تطبيقية على الموضوع لوحة رقم (3) ---C.W, لوحة رقم (5,6) --- H.W
Week 10	رسم المجسمات الثلاثية الابعاد ---------- (أربعة أسابيع) • انواع المجسمات الثلاثية الابعاد وفوائدها العملية المتساوية القياس
Week 11	رسم المجسمات الثلاثية الابعاد ---------- • رسم محاور التقايس وكيفية وضع الابعاد عليها
Week 12	رسم المجسمات الثلاثية الابعاد ---------- • الربط بين المساقط المعطاة وعملية تخيل ورسم
Week 13	رسم المجسمات الثلاثية الابعاد ---------- • رسم ثلاث لوحات تطبيقية على الموضوع لوحة رقم, C.W--- (4) لوحة رقم --- (8,7) H.W • كويز رقم (3)
Week 14	رسم المسقط الثالث المحذوف للجسم ---------- (أسبوعان) • كيفية أستنتاج المسقط المحذوف من مسقطين معلومين للجسم • رسم المسقط المحذوف للاجسام ذات الاسطح المائلة
Week 15	رسم المسقط الثالث المحذوف للجسم ---------- • رسم لوحتين تطبيقية على الموضوع - لوحة رقم ,C.W- (5,6) لوحة رقم.H -- (9,10)

Course Name: Human Rights Program Code: MTE 106, Credits: 2	
Week 1	تعريف حقوق الانسان
Week 2	خصائص حقوق الانسان
Week 3	مصادر حقوق الانسان
Week 4	انواع حقوق الانسان
Week 5	القيود الواردة على حقوق الانسان.
Week 6	واجبات الافراد وحقوقهم.
Week 7	ضمانات حقوق الانسان على الصعيد الدولي.
Week 8	امتحان نصف مقرر
Week 9	ضمانات حقوق الانسان على الصعيد الوطني.
Week 10	الفساد الاداري انواعه واثار الفساد الاداري على حقوق الانسان.
Week 11	طرق و وسائل مكافحة الفساد الاداري.
Week 12	الديمقراطية وانواعها ومميزاتها وعيوبها
Week 13	مبدأ الفصل بين السلطات واثره على حقوق الانسان.
Week 14	حق الشعوب في تقرير المصير وحق الفرد في اكتساب الجنسية والحقوق الجماعية للانسان.
Week 15	امتحان نهائي

Course Name: Engineering Materials Program Code: MTE 107 , Credits: 2	
Week 1	Introduction and some basic definitions
Week 2	
Week 3	Physical and Mechanical properties of materials: Fundamental tests I (Tensile Test)
Week 4	
Week 5	Fundamental tests II (Compression Test)
Week 6	
Week 7	Fundamental tests III (Hardness Test)
Week 8	Fundamental tests III (Impact Test)
Week 9	Midterm Exam
Week 10	Metals and Alloys
Week 11	Steels
Week 12	Other Metals
Week 13	Material Selection
Week 14	Composite Materials
Week 15	Final Examination

Course Name: physics I Program Code: MTE 108, Credits: 2	
Week 1	introduction to magnetic theory , historical , types of magnetic material
Week 2	electromagnetic theory application ,
Week 3	electromagnetic circuit analysis , field density , field intensity
Week 4	solved problem
Week 5	active and passive material component of electric circuit (resistance) (indutance, capacitance) construction type characteristics
Week 6	diode , type , characteristic , construction
Week 7	diode application circuit clipping circuit
Week 8	diode application circuit clamping circuit
Week 9	mid term exam
Week 10	transistor , type , characteristic , construction ,
Week 11	NEW ENGINEERING MATERIALS Dielectric materials: Definition – Dielectric Breakdown – Dielectric loss – Internal field – Claussius Mossotti relation
Week 12	Superconducting materials: Introduction – Properties- Meissner effect – Type I & Type II superconductors – BCS theory-Application
Week 13	Nanomaterials: Introduction – Synthesis of nano materials – Top down and Bottom up approach- Ball milling- PVD method- Applications. Smart materials: Shape memory alloys-Biomaterials (properties and applications)
Week 14	WAVE OPTICS Huygens' principle, superposition of waves
Week 15	–Theory of interference of light -Young's double slit experiment. Thin films-Newton's rings, Michelson interferometer-Anti reflection coating. Fresnel and Fraunhofer diffraction– diffraction due to 'n' slits- plane transmission grating. Rayleigh criterion for limit of resolution - resolving power of grating

Course Name: Mathematics II Program Code: MTE 109, Credits: 3	
Week 1	Calculus and Area Formulas for Finite Sums Definite Integrals The Fundamental Theorems of Integral Calculus Indefinite Integrals Integration by Substitution-Running the Chain Rule Backward
Week 2	Areas between Curves Volumes of Solids of Revolution-Disks and Washers
Week 3	Cylindrical Shells-An Alternative to Washers
Week 4	Lengths of Curves in the Plane Area of Surfaces of Revolution
Week 5	Inverse Functions and Their Derivatives
Week 6	Ln x, ex ,and Logarithmic Differentiation Other Exponential and Logarithmic Functions
Week 7	Indeterminate Forms and I,Hopital
Week 8	The Inverse Trigonometric Functions
Week 9	Derivatives of Inverse Trigonometric Functions, Related Integrals
Week 10	Basic Integration Formulas Integration by Parts
Week 11	Trigonometric Integrals
Week 12	Trigonometric Substitution
Week 13	Rational Functions and Partial Fractions Polar Coordinates
Week 14	Graphing in Polar Coordinates
Week 15	Final exam

Course Name: Engineering Mechanics II Program Code: MTE 110, Credits: 2	
Week 1	Virtual Work
Week 2	Virtual Work
Week 3	Virtual Work
Week 4	Virtual Work
Week 5	Trusses (joint method)
Week 6	Trusses (joint method)
Week 7	Trusses (Section method)
Week 8	Trusses (Section method)
Week 9	Frame analysis
Week 10	Frame analysis
Week 11	Centroid
Week 12	Centroid
Week 13	Moment of Inertia
Week 14	Moment of Inertia
Week 15	Moment of Inertia

Course Name: Electric Circuits & Network Analysis II Program Code: MTE 111, Credits: 3	
Week 1	Thévenin Theorem
Week 2	Norton Theorem
Week 3	Maximum power transfer
Week 4	AC sources, AC circuits
Week 5	Capacitors, Resistance Capacitors Circuits
Week 6	Inductors, Resistance Inductors Circuits
Week 7	Capacitors and Inductors, Combinations
Week 8	Impedances Calculations
Week 9	Resisters, Capacitors, Inductors Circuits
Week 10	First-order Circuit
Week 11	Second-order Circuit
Week 12	Frequency Response
Week 13	Operational Amplifier Circuits
Week 14	Filters and Bod Plot
Week 15	Review

Course Name: Computer Programming II Program Code: MTE 112 , Credits: 3	
Week 1	Loops (Do-While), nested loops, break and continue statements
Week 2	
Week 3	Switch statement, Introduction to functions.
Week 4	
Week 5	function types, function parameters, function return type.
Week 6	
Week 7	Scopes, local and Global variables, Default arguments, Passing parameters to functions.
Week 8	**midterm exam**
Week 9	One Dimensional Arrays
Week 10	
Week 11	Two Dimensional Arrays
Week 12	
Week 13	Square Arrays.
Week 14	
Week 15	Final exam

Course Name: Computer Aided Drawing Program Code: MTE 113, Credits: 1	
Week 1	AutoCAD (first introduction lecture). • Starting AutoCAD. • Exploring AutoCAD user interface (title bar, menu bar, standard toolbar, drawing area, command window, status bar) and characteristics and benefits of each component to build a drawing in AutoCAD. • Using the keyboard and mouse in AutoCAD. • Use of absolute coordinates (linear and polar) strategy to specify points on the workspace. • Use of relative coordinates (linear and polar) strategy to specify points on the workspace. • Learning some draw and modify commands (action, access, options). • Classwork. • Homework.
Week 2	AutoCAD (second introduction lecture). • Specifying drawing units. • Workspace drawing size, specifying default initial drawing window limits, zooming strategies, Scaling, and annotative scaling. • Use of Grid-and-Snap strategy to specify points in the workspace. • Using the Dyn button tool. • Learning additional draw and modify commands (action, access, options). • Classwork. • Homework.

Week 3	AutoCAD (AutoCAD familiar drawing strategies) • Use of Ortho and Polar buttons drawing strategies. And the direct entry of distances. • Use of temporary and running Osnap button drawing strategy. • Using Otrack button tool. • Learning additional draw and modify commands (action, access, options). • Classwork. • Homework.
Week 4	• Exploring engineering drawing strategies inside AutoCAD and comparing them with AutoCAD tools facilities, through carefully selected class work exercises. • Introduction to use Grips, property palette, and right-click menu options to modify the drawing. • Learning additional draw and modify commands (action, access, options). • Homework.
Week 5	AutoCAD (Blocks of objects) • Using blocks (why blocks, making blocks, inserting and revising blocks in a drawing, find blocks in a drawing). • Sharing information between drawing (Design Center). • Classwork. • Homework.
Week 6	Lettering (English and Arabic lettering). • Writing using times new roman English font (Capital and small letters cases). • Writing using Al-Kofi Arabic font.

	• Classwork. • Homework.
Week 7	AutoCAD (Adding Text). • Controlling text in a drawing (setting up text style, using single-line text, using multi-line text, modifying an existing text, converting from single-line text to multi-line text and vice versa). • Using property and style toolbars to modify drawing parameters. • Classwork. • Homework.
Week 8	Engineering drawing (Dimensioning drawings) • Purpose of dimensioning, dimensions of size and position, use of scale, order of dimensioning. • Notes about using dimensions, dimension lines, extension lines, leader lines, dimension line weights, arrow heads, lettering, and reading directions. • Dimensioning techniques for common features. • Classwork. • Homework.
Week 9	AutoCAD (Dimensioning a drawing) • Dimensioning a drawing (setting up dimension style, using dimensioning tools, modifying an existing dimension). • Classwork. • Homework.
Week 10	AutoCAD (Adding hatches and gradients areas and Using layers). • Adding hatches and gradients. • Using layers (why layers, create, copy, and delete of layer(s), adding and

	removing the object of layers, separating drawing parts, dimensions information by layers). • Classwork. • Homework.
Week 11	AutoCAD (Layouts and Plotting). • Using Layouts and Plotting: (setting up a layout, adjusting a view port's contents, aligning viewports, using the plot dialog box, printing a drawing – with layouts). • Classwork. • Homework.
Week 12	Engineering drawing (orthographic projection) • Introduction, to describe shapes, and definition. • Orthographic views, selection of enough views to describe shapes, and spacing between the selected views. • Projecting the views (strategically), projecting of inclined surfaces, elliptical shapes, and curved boundaries. • What lines may indicate, hidden features, center line use, precedence of lines, reading of lines and areas. • Classwork. • Homework.
Week 13	AutoCAD • Exploring engineering drawing strategies inside AutoCAD and comparing them with AutoCAD tools facilities, through carefully selected class work exercises. • More about the use of Grips, property palette, and right-click menu options

	to modify the drawing. • Notes about some drawing strategies (command restarting/ending, undoing/redoing in AutoCAD, real-time panning and zooming, selection windows, cycling process at selecting objects). • Classwork. • Homework.
Week 14	Engineering drawing (Isometric drawing and sketching) • The reasons for pictorial drawing, Pictorial drawing methods. • Isometric projection, isometric drawing, non-isometric lines, angles in isometric, curves in isometric. • Classwork. • Homework.
Week 15	Engineering drawing (Isometric drawing and sketching) • Pictorial sketching and choosing of views in pictorial sketching, sketching the axes, sketching the principal lines, and use of diagonals. • Dimensioning of pictorial view. • Classwork. • Homework.

Course Name: English Language Program Code: MTE 114, Credits: 2	
Week 1	Unit 1 Hello - am/are/is/my/you. How are you. Good morning.
Week 2	Unit 2 Your world - Countries. He /she/they/his/ her. Fantastic/awful.
Week 3	Discussion
Week 4	Unit 3 All about you - Jobs Am/are/is. Negative and question personal information
Week 5	Unit 4 Family and friends - Have/has Our/their Possessive's. the family
Week 6	Unit 5 The way I live - Sports/food/drink. language and nationalities. a/an. number and prices
Week 7	Exam 1 - First Monthly Exam
Week 8	Unit 6 Every day - The time. Present simple-he/she. Always/sometimes /never. Days of the week
Week 9	Unit 7 My favorites - Question words Me/him/us/them. This/that.
Week 10	Unit 8 Where I live - Rooms and furniture. There is/are . preposition
Week 11	Discussion
Week 12	Unit 9 Times past - Saying. Was/were born. Past simple irregular verbs. Have/do/go
Week 13	Unit 10 We had a great time! - Past simple regular and irregular. Questions and negatives.
Week 14	Exam 2 - Second Monthly Exam
Week 15	General review of the course

Course Name: Manufacturing Processes Program Code: MTE 115, Credits: 3	
Week 1	Introduction and principal definitions
Week 2	Economic Orientation in Manufacturing
Week 3	Dimensions, measurements and measuring devices and Tolerances
Week 4	
Week 5	Metal Casting Process
Week 6	FUNDAMENTALS OF METAL FORMING
Week 7	Cutting theory
Week 8	Mid-Term Examination
Week 9	Material removal processes (Lathe and its related operations)
Week 10	Material removal processes (Boring and drilling)
Week 11	Material Removal Processes (Tapping)
Week 12	Material removal processes (Milling) I
Week 13	
Week 14	Introduction to non – traditional machining
Week 15	Final Examination

Course Name: Physics II Program Code: MTE 116, Credits: 2	
Week 1	Introduction to units
Week 2	**Force Systems**: force, rectangular components
Week 3	**Moment**: Moment, Resultant couple
Week 4	Kinematics of Particles: Introduction
Week 5	Rectilinear Motion
Week 6	Newton's 2nd law: force, mass, and acceleration approach
Week 7	Thermodynamics: Basic concepts, Dimensions and Units, Forms of Energy, Pressure, Temperature
Week 8	**Introduction to heat transfer:** Physical origins and rate equations, conduction,
Week 9	convection, and radiation
Week 10	Fluid Statics: variation of pressure with depth, Vapour pressure
Week 11	Capillarity, Forces on bodies immersed in fluids,
Week 12	Pascals Law Buoyancy and stability of floating/ submerged objects
Week 13	Introduction to units
Week 14	**Force Systems**: force, rectangular components
Week 15	**Moment**: Moment, Resultant couple

Course Name: Engineering Mathematics I Program Code: MTE 201, Credits: 3	
Week 1	Multivariable functions: Limits and continuity , Partial derivatives (definitions, functions of more than two variables), second and higher order partial derivatives.
Week 2	Multivariable functions: Chain rule for functions of two or three variables ,

	Maxima and minima and saddle points.
Week 3	Multivariable functions: review and special cases of partial derivatives.
Week 4	Complex analysis: Definitions and basic concepts, Cartesian form, polar form, exponential form, representations of a complex variable. Complex variables algebra, Roots of a complex number.
Week 5	Complex analysis: complex functions, limits, derivatives and continuity of complex functions. Analytic functions, Cauchy-Riemann equations, derivatives of analytic functions. Laplace equation, Harmonic and conjugate harmonic functions.
Week 6	Complex analysis: Rational functions, Logarithmic functions, Exponential functions.
Week 7	Complex analysis: Trigonometric and hyperbolic functions, General power of complex variables.
Week 8	Fourier Series: even and odd function , Half Wave Symmetry, periodic functions, definition of Fourier series, Trigonometric form
Week 9	Fourier Series: Line Spectrum (harmonic) the Fourier Series, Half wave symmetry, sum and shift of functions, Complex Exponential form of the Fourier Series
Week 10	Fourier Transforms: Fourier Integrals and introduction to Fourier Transforms
Week 11	Fourier Transforms
Week 12	Fourier Transforms
Week 13	Introduction to Vector Analysis: definition, notation, properties, Vector algebra: addition, subtraction, multiplications
Week 14	Introduction to Vector Analysis: vector algebra (continue) with applications
Week 15	Introduction to Vector Analysis: Vectors and Geometry, equation of line, plane, curve parameterization with geometric applications.

Course Name: Fluid Mechanics I Program Code: MTE 202, Credits: 2	
Week 1	Introduction; Fluid mechanics applications in science and mechatronics engineering; Matter; Solid and Fluid (liquid and Gas).
Week 2	Dimensions, Dimensional Homogeneity, and Units; Shear and normal stress, pressure; Definition of Fluid static and dynamic;
Week 3	Approaches to study fluid mechanics; Analytical method, Experiments, and Computation (Computation Fluid Dynamic, CFD); Definition of; Hydrodynamics, Hydraulics, Gas dynamics and Aerodynamics.
Week 4	Fluid Properties; Mass Density, Specific Volume, Specific Weight, Specific Gravity; Idea Gas Law, Dynamic and Kinematic Viscosity, shear stress and velocity gradient, Newtonian and Non-Newtonian Fluids; Compressibility, Process (Isothermal and Isentropic)
Week 5	Fluid Static (Hydrostatics); Pressure definition; Pressure at a Point; Pressure Force on a Fluid Element, Equilibrium force of a Fluid Element; Body and Viscous force; Pressure variation in a Fluid at Rest for Incompressible and compressible Fluid.
Week 6	Standard Atmosphere; Variation of Temperature; Pressure and Density of air with the Elevation; Absolute Pressure; Gage Pressure and Vacuum Pressure,
Week 7	Pressure Measurements; Barometer (Mercury and Aneroid Barometer), Piezometer Tube, U-Tube Manometer, Differential U-tube manometer, Inclined-tube manometer, Bourdon gage, Pressure transducers.
Week 8	Pressure distribution on flat surface surface; Hydrostatic Force on an Inclined Plane Surface of Arbitrary shape; resultant force and location of center of pressure, centroid and parallel axis theorem
Week 9	Hydrostatic Force on Submerged Curve Surface.
Week 10	Fluid Dynamics; Physical Quantities of Flow; Velocity, Pressure, Density, Temperature and Acceleration. Lagrangian and Eulerian Systems; Control

	volume method.
Week 11	Classification of Fluid Flow; Uniform and Non-uniform Flow, Steady and Unsteady Flow, One, two and three dimensional flows, Viscous and Inviscid Flow, Internal and External Flow, Laminar and Turbulent Flow (boundary layer), Compressible and Incompressible
Week 12	Elementary Equation of Motion; Differential and Control Volume Approach. Continuity Equation (Conservation of Mass) derivation, Volume and Mass Flow Rate, , Applications on Conservation of Mass.
Week 13	Bernoulli Equation; limitations and the assumptions, Pressure head, Velocity head, Elevation head, Piezometric head, Total head, Hydraulic and Energy Grade lines. Application of the Bernoulli equation; Pitot Tube, Pitot-Static Tube (stagnation point),
Week 14	Application of the Bernoulli equation; Pitot Tube, Pitot-Static Tube (stagnation point), Free Jet; Flowrate Measurement.
Week 15	Final course Exam.
Course Name: Thermodynamics Program Code: MTE 203, Credits: 2	
Week 1	Introduction to Thermodynamics
Week 2	Properties of Pure Substances
Week 3	The First Law of Thermodynamics for Closed Systems
Week 4	
Week 5	
Week 6	The First Law of Thermodynamics for Open Systems
Week 7	
Week 8	**Mid-Term Examination**
Week 9	
Week 10	The Second Law of Thermodynamics

Week 11	
Week 12	Introduction to heat transfer
Week 13	
Week 14	One dimensional conduction
Week 15	**Final Examination**

Course Name: Mechanics of Materials **Program Code: MTE 204, Credits: 2**	
Week 1	**Principles of statics (1 week)** External loads, support reactions, equations of equilibrium, internal resultant loadings
Week 2	**Stress (1 week)** Normal stress (tensile stress, compressive stress), shear stress, general state of stress, average normal stress in an axially loaded bar, average shear stress, allowable stress.
Week 3	**Strain (1 week)** Deformation, normal strain, shear strain, general state of strain.
Week 4	**Mechanical properties of materials (1 week)** The tension and compression test, Conventional stress-strain diagram, true stress-strain diagram, ductile materials, brittle materials, Hooke's law, Poisson's ratio, Shear stress-strain diagram, shear modulus of rigidity.
Week 5	**Axial load (1 week)** Elastic deformation of an axially loaded member, superposition, Thermal stress.
Week 6	**Torsion (1 week)** Torsional deformation of a circular shaft, torsion formula, power transmission, angle of twist.
Week 7 Week 8 Week 9	**Bending (3 weeks)** Shear and moment diagrams, graphical method.

Week 10	**Transverse shear (2 weeks)**
Week 11	The shear formula for transverse force.
Week 12	**Combined loads (2 weeks)**
Week 13	Thin-walled pressure vessels, cylindrical vessels, combined loads.
Week 14	**Deflection of beams and shafts (2 weeks)**
Week 15	The elastic curve, slope, and displacement by integration of beams and shafts.

Course Name: Statistics Program Code: MTE 205, Credits: 2	
Week 1	Role of statistics in science , types of statistics(descriptive and inferential , data presentation (arithmetic mean , median, mode)
Week 2	descriptive statistics , histogram frequency distribution , data limits, data tabulation , polygon, ogive.
Week 3	basic concepts of probabilistic theory (random events and sample space) , relationship between statistics and probability
Week 4	Sets and probabilistic models, axioms of probability , rule of probability
Week 5	The definition of conditional probability and their properties
Week 6	Multiplication rule, total probability theorem, Bayes' theorem.
Week 7	Three events, mutually and non-mutually events
Week 8	Counting, permutation, combination
Week 9	The definition and classification of random variable (Discrete and Continuous), type of discrete distribution
Week 10	Discrete probability distributions, Binomial and Poisson Distribution.
Week 11	Continuous distribution, normal distribution
Week 12	Test of hypothesis, types of errors in hypothesis testing, hypothesis tests of means.
Week 13	Test of the mean with unknown population variance, hypothesis test of two means with known population variance.
Week 14	the principles design of experiments, one way and two way ANOVA (ANOVA: the Analysis of Variance).
Week 15	Final Exam.

Course Name: Electronics Principles and Devices I Program Code: MTE 206, Credits: 3	
Week 1	Introduction to Semiconductor Diodes, pn junction diode .
Week 2	Diode types , Load-Line analysis ; series, parallel, and series-parallel diode networks.
Week 3	Diode Applications,clipper and clamper diodes.
Week 4	Half-Wave , Full-Wave and Bridge rectifiers.
Week 5	Zener diode and its application (voltage regulator)
Week 6	Introduction to Bipolar junction transistors (BJT) and it is configurations
Week 7	DC analysis of BJT equivalent circuits(Introduction, operating point, Fixed-bias Configuration, Emitter-bias Configuration)
Week 8	Voltage-divider Bias Configuration, Collector Feedback Configuration, Emitter-follower Configuration (common collector), common- base.
Week 9	Design operation of BJT configurations
Week 10	AC analysis of BJT equivalent circuits part 1,introduction, equivalent model, re-model Fixed bias configuration, re-model Voltage-divider bias configuration
Week 11	AC analysis of BJT equivalent circuits part 2 (re-model CE Emitter-Bias configuration, 1) Un-bypassed situation. 2) bypassed configuration.
Week 12	AC analysis of BJT equivalent circuits part 3 (re-model of Emitter-Follower Configuration, re model of common Base configuration , Re-model Collector Feedback C)
Week 13	Effect of RL And RS, Design example of the C.E amplifier circuit
Week 14	Multi stages transistor , Cascaded Systems , Direct coupling and Darlington configuration.
Week 15	Transistor as switch

Course Name: Electrical Machines Program Code: MTE 207, Credits: 3	
Week 1	types of electric dc machine (shunt, series , compound) , construction of dc machine
Week 2	principle operation of dc motor , torque and voltage equation of dc motor
Week 3	dc shunt motor equivalent circuit , analysis , dc series motor equivalent circuit , analysis
Week 4	dc compound motor equivalent circuit , analysis
Week 5	losses in dc motor and efficeincy
Week 6	solved problem
Week 7	mid term exam
Week 8	speed control method of dc shunt motor (flux control , armature control, voltage control)
Week 9	speed control method of dc series motor and dc compound motor (flux control , voltage control)
Week 10	characteristics of dc shunt motor , characteristics of dc series motor
Week 11	characteristics of dc compound motor
Week 12	dc paramagnet magnet motor , construction , operation , speed control
Week 13	Single phase transformer , types , construction , and operation principle
Week 14	no load , load transformer operation modes , voltage equation , equivalent circuit
Week 15	efficiency of transformer , open and short circuit test

Course Name: Engineering Mechanics(Dynamics) Program Code: MTE 208, Credits: 2	
Week 1	Kinematics of Particles: Introduction
Week 2	Rectilinear Motion
Week 3	Plane Curvilinear Motion, Rectangular Coordinates
Week 4	Plane Curvilinear Motion,Normal and Tangential Coordinates
Week 5	Plane Curvilinear Motion, Polar coordinates
Week 6	Relative Motion (Translating Axes)
Week 7	Kinetics of Particles; Force, Mass, and Acceleration
Week 8	Work and Energy, Kinetic energy
Week 9	Work and Energy, Potential energy
Week 10	Impulse and Momentum, Linear
Week 11	Impulse and Momentum, Angular.
Week 12	Kinematics of Rigid Bodies: Rotation
Week 13	Relative Velocity
Week 14	Kinetics of Rigid Bodies: Introduction
Week 15	Appendix A Mass Moment of Inertia.

Course Name: Engineering Mathematics II Program Code: MTE 210, Credits: 3	
Week 1	• Definition and Classification of differential equation (ordinary and partial, order, degree, Linear and non-linear, homogeneous and non-homogeneous). • Solutions of 1st order linear ordinary differential equations, homogeneous and non-homogeneous. General and particular solutions.
Week 2	Solutions of 1st order nonlinear ordinary differential equations, homogeneous and non-homogeneous, using the method of Separation of Variables and and Exact and modified exact equations method.
Week 3	• Solutions of 1st order nonlinear ordinary differential equations, homogeneous and non-homogeneous, using various methods of substitution. • Various fields of applications of 1st order ordinary differential equations.
Week 4	• Possible solutions of boundary value problems. also, introduce the stability criteria of solution (its physical meaning in engineering systems). The dependence of stability and system behavior on the characteristic roots. • Solution of 2nd order, homogeneous, linear ordinary differential equations with constant coefficients.
Week 5	• Solution of 2^{nd} order, nonhomogeneous, linear ordinary differential equations with constant coefficients by the methods of Undetermined coefficients and Variation of parameters. • Various fields of applications of second order ordinary differential equations with solutions.
Week 6	Laplace transform: definition, versatility and application, Laplace Inverse Transform, using tables and partial fractions. Application of Laplace transform definition on various Geometric functions.

Week 7	Laplace Transform of derivatives, solution of linear ordinary differential equations using Laplace Transforms, 1st-shifting theorem (Translation in S-domain).
Week 8	Unit step function and its Laplace Transform. 2nd shifting theorem (Translation in t- domain), Laplace Transforms of derivatives.
Week 9	Laplace transforms of integrals (t-function integral and S-function integral), Convolution Theorem.
Week 10	Practices of applying Laplace inverse transform on various special functions.
Week 11	Linear Algebra: System of linear algebraic equations, geometric approach, Gauss elimination.
Week 12	Linear Algebra (matrices and linear equations): introduction and algebra, review of matrix notation, algebra, transpose, determinant, and rank. Some special matrices. Linear dependence, existence, and uniqueness.
Week 13	Linear Algebra (matrices and linear equations): solution of homogeneous system of linear equations. Inverse matrix and Cramer's rule, LU-Factorization.
Week 14	Linear Algebra (Eigen value problem): Introduction, eigenvalue and eigenvector. Solution procedure and applications. Orthogonal and symmetric matrices, eigenvalue problem, nonhomogeneous problem.
Week 15	Linear Algebra (Eigen value problem): Diagonalization. Application to 1^{st} order system with constant coefficient (optional). Quadratic form (optional)

Course Name: Fluid Mechanics II Program Code: MTE 211, Credits: 3	
Week 1	Derivation of the linear momentum equation
Week 2	Application of the Linear Momentum Equation; Change in Flow Direction; Weight, Pressure, and Change in Speed. Pressure and Change in Flow Direction; Pressure, Change in Speed, and Friction;
Week 3	Linear Momentum—Weight, Pressure, Friction, and Nonuniform Velocity Profile; Thrust; Nonuniform Pressure. Moving Control Volume
Week 4	Derivation of the Moment-of-Momentum Equation; Application of the Moment-of-Momentum Equation; Torque and Power.
Week 5	Dimensional Analysis; Buckingham Pi Theorem; Determination of Pi Terms.
Week 6	Apply the Buckingham pi theorem.
Week 7	Dimensionless Groups in Fluid Mechanics; Dimensionless Correlation of Experimental Data;
Week 8	Modeling and Similitude; Theory of Models, Model Scales, Practical Aspects of Using Models
Week 9	Typical Model Studies
Week 10	Viscous Flow in Pipe; Characteristics of Pipe Flow, laminar and turbulent pipe flow, Energy Considerations.
Week 11	Dimensional Analysis of Pipe Flow; Major Losses, Moody chart, Comparison of Laminar or Turbulent
Week 12	Minor Losses; loss coefficient of valve, entrance and exit, pipe components
Week 13	Pipe flow topics; Single pipes, Pressure drop, Head loss, Flowrate, Determine diameter
Week 14	Multiple Pipe System; Series and parallel pipe systems
Week 15	Final course Exam.

Course Name: Heat Transfer Program Code: MTE 212, Credits: 2	
Week 1	**Introduction to heat transfer**
Week 2	
Week 3	**Introduction to conduction**
Week 4	
Week 5	**One–dimensional, steady state conduction**
Week 6	
Week 7	**Two-dimensional, steady state conduction**
Week 8	**Mid-Term Examination**
Week 9	
Week 10	**Introduction to convection**
Week 11	
Week 12	
Week 13	**Classification of heat exchangers**
Week 14	
Week 15	**Final Examination**

Course Name: Engineering Economics Program Code: MTE 213, Credits: 2	
Week 1	Engineering economy (definition and concept)
Week 2	Interest and economic relationship
Week 3	Capital time value, cash flow
Week 4	Comparison between alternatives
Week 5	Present value concept, equivalent annual cost
Week 6	
Week 7	Economic Appraisal , Discount Rate
Week 8	
Week 9	Payback period, internal rate of return
Week 10	Replacement , depreciation
Week 11	Straight line depreciation , sum of year’s digits, declining balance
Week 12	Inflation
Week 13	Breakeven point
Week 14	Sensitivity analysis
Week 15	Feasibility study

Course Name: Electronics Principles and Devices II Program Code: MTE 214, Credits: 3	
Week 1	Introduction to FET transistor, FET types , and it comparison with BJT. Structure and principle of operation of enhancement & depletion type MOSFETs & JFET
Week 2	Metal–Oxide–Semiconductor Field-Effect Transistor types of MOSFETs and Basic Construction and Basic Operation and Characteristics of:- 1. Depletion-type MOSFET (DMOSFET). 2. Enhancement-type MOSFET (EMOSFET).
Week 3	Field-Effect Transistor Biasing part 1 • Introduction. • Fixed-Bias Configuration. • Self-Bias Configuration.
Week 4	Field-Effect Transistor Biasing part 2 • Voltage-Divider Biasing. • Common-Gate Configuration
Week 5	Field-Effect Transistor Biasing part 3 • Depletion-Type MOSFETs. • Enhancement-Type MOSFETs. • Combination Networks. • Design.
Week 6	• Become acquainted with the small-signal ac model for a JFET and MOSFET. • Be able to perform a small-signal ac analysis of a variety of JFET and MOSFET configurations.
Week 7	• Begin to appreciate the design sequence applied to FET configurations.
Week 8	• Become acquainted with the frequency response of a BJT and FET amplifier.

	Be able to normalize a frequency plot, establish the dB plot, and find the cutoff frequencies and bandwidth.
Week 9	Introduction to the operational amplifier, Differential Amplifier Circuit , Op-Amp Basics, Practical OP-AMP Circuits.
Week 10	Applications of operational amplifier part1 (Inverting Amplifier, Non-inverting Amplifier, Unity Follower, Integrator, Differentiator)
Week 11	Applications of operational amplifier part2 (Comparator, Voltage Subtraction, Voltage Summing, Multiple-Stage Gains, Constant-gain Multiplier...)
Week 12	Special-Purpose Op-Amp Circuits , Instrumentation Amplifiers, Isolation Amplifiers , and Operational Transconductance Amplifiers (OTAs)
Week 13	Power Amplifiers, Introduction, Definitions and Amplifier classes (class A, B , AB and C)
Week 14	General Filter Considerations, Capacitor Filter and RC Filter.
Week 15	The Oscillator , Feedback Oscillators and The 555 Timer as an Oscillator .

Course Name: Electromechanical system Program Code: MTE 215, Credits: 2	
Week 1	introduction to electromechanical energy conversion theory , principle, limmitation , application
Week 2	solenoid , types , construction
Week 3	solenoid , principle operation , application
Week 4	brushless dc motor , construction , operation , speed control
Week 5	servo motor construction , operation , speed control,
Week 6	servo motor control circuit
Week 7	mid term exam
Week 8	stepper motor construction , operation , speed control,
Week 9	stepper motor control circuit
Week 10	single phase induction motor , construction , type
Week 11	torque equation ,losses , efficiency , equivalent circuit of single phase induction motor
Week 12	single phase induction motor starting methode seperate type , shaded pole
Week 13	single phase induction motor , capacitor run capacitor start
Week 14	universal motor construction , operation
Week 15	universal motor speed control,

Course Name: Digital Logic Program Code: MTE 216, Credits: 3	
Week 1	Numerical System o Binary System o Octal System o Hexadecimal System
Week 2	Numerical System Converting between Systems (Binary, Octal, Hexadecimal, Decimal) o Mathematical Operations o Binary System Problems
Week 3	Logic Gates o Gates with their symbols and truth tables o Logical Operations o Timing Diagram for logic gates o Logic gates as switches
Week 4	Logic Circuit Design o Logic circuit designing steps o Implementation of Logic circuits using truth tables o Implementation of logic circuits using equations o Converting logic circuit to logic equations
Week 5	Boolean Algebra and Identities o Basic Identification of Boolean algebra o Duals of Expressions o Demorgan's Theories o Truth tables for Demorgan
Week 6	Boolean Algebra and Identities Algebraic Manipulation

	o Simplifying Functions o Fewer Gates o Duality Properties o Complement of Functions
Week 7	Strategies of Minimizations o Terminology and Definitions o Guidelines of Simplifying Functions
Week 8	K-Map Simplifying SOP Procedures □ Three Variable K-Map □ Four Variable K-Map □ Five Variable K-Map o Karnaugh Map POS Minimization □ Three Variable K-Map □ Four Variable K-Map □ Five Variable K-Map o Getting between SOP and POS o Don't Care Conditions
Week 9	Multiplexer o Definitions o Constructions o 2-1-multiplexer o 4-1-multiplexer 8-1-multiplexer o 16-1-multiplexer o 32-1-multiplexer o Realizing Logic Functions Efficiently o Larger Multiplexer o Cascading Multiplexer Circuits
Week 10	De-Multiplexer o Definitions

	o Applications o 1-4-demultiplexer o 1-8-demultiplexer o 1-16-demultiplexer o Timing Diagram o 1-m-demultiplexer o De-multiplexer as Decoder o Characteristics table of De-multiplexer
Week 11	Decoder o Characteristics of Decoder o Construction of Decoder o Types of Decoders o 2-4-decoder o 3-8-decoder o 4-16 –decoder o Applications of Decoder o Expansions of Decoder
Week 12	Encoder o Definitions o Types o Applications o Code Convertor o Binary to Gray Code Convertor
Week 13	Adders and Subtractors Circuits o Half Adder o Full Adder o Binary Adder o Binary Subtractor o Binary Adder Subtractor
Week 14	Sequential Logic Circuits

	○ Latches and Some Definitions ○ Synchronous and Asynchronous Sequential Circuits ○ SR-Latches ○ SR-Latches as Memories ○ D-Latches
Week 15	Sequential Logic Circuits o JK-latches o T-Laches Counters

Course Name: Mechanical Engineering Laboratory Program Code: MTE 217, Credits: 1	
Week 1	Friction on Inclined Plane
Week 2	Torsion of Bar
Week 3	Hook's Law
Week 4	Reaction of Beams
Week 5	Impact Test
Week 6	Fatigue Test
Week 7	One Dimensional Heat Conduction
Week 8	Transient Heat Transfer
Week 9	Force Convection from a Cylinder in a Cross Flow
Week 10	Centrifugal Pump Performance
Week 11	Verification of Bernoulli Equation
Week 12	Venturi Meter Apparatus
Week 13	Impact of a Jet
Week 14	Losses in Piping Systems
Week 15	Final Exam

Course Name: Engineering analysis Program Code: MTE 301, Credits: 3	
Week 1	Vector Calculus: Review to vectors and vector algebra, Vector functions and vector field, vector and geometry.
Week 2	Vector Calculus: Derivative and it applications, space curve and its field, curvature, gradient of a vector
Week 3	Vector Calculus: Laplacian, Divergence, and Curl
Week 4	Vector Calculus: Line integral and independence on path, double integrals, Green's theorem
Week 5	Vector Calculus: Surface integral, Stokes' theorem, triple integrals, divergence theorem
Week 6	Discrete Fourier Series: introduction, approximation of Fourier series by N-point DFT
Week 7	Discrete Fourier Series: Filtering, and Dirac Delta function.
Week 8	Discrete Fourier Series: Windowed Fourier Transform
Week 9	Discrete Fourier Transform: The Shannon sampling theorem
Week 10	Discrete Fourier Transform: Lowpass and Bandpass filters
Week 11	Discrete Fourier Transform: linearity and periodicity, inverse N-point Discrete Fourier transform.
Week 12	Discrete Fourier Transform: approximation of Fourier coefficients.
Week 13	Z-Transform: definition and notation, sampling. Properties of Z-transform, linearity, delaying, advancing, other properties. Table of Z-transform.
Week 14	Z-Transform: inverse of Z-transform, inverse techniques. Discrete time systems and difference equations solution.
Week 15	Z-Transform: discrete linear systems characterization, z-transfer function, impulse response, stability, convolution. Relationship between Laplace and Z-transforms. Solution of discrete-time and state-space equations (optional).

Course Name: control system I Program Code: MTE 302, Credits: 3	
Week 1	Introduction to control system.
Week 2	Mathematical model of physical system, mechanical system I.
Week 3	Mathematical model of physical system, electrical system II.
Week 4	Block diagram, Block diagram reduction.
Week 5	Closed loop system subjected to disturbance.
Week 6	Closed loop system subjected to multivariable system.
Week 7	Signal flow graph representation.
Week 8	Find transfer function using mason gain formula
Week 9	Transient response analysis, First order system I.
Week 10	Transient response analysis, First order system II.
Week 11	Transient response analysis, Second order system, Damping ratio and natural frequency I.
Week 12	Transient response analysis, Second order system, Damping ratio and natural frequency II.
Week 13	Definition of transient response, specifications, impulse response and dominant poles I.
Week 14	Definition of transient response, specifications, impulse response and dominant poles II.
Week 15	Steady- state error in unity feedback.

Course Name: Microprocessors and Assembly Language Program Code: MTE 303, Credits: 3	
Week 1	Introduction to the microprocessors and microcomputers, System numbers.
Week 2	
Week 3	Microarchitectures of 8086 microprocessors and software model.
Week 4	
Week 5	Register and addressing mode
Week 6	
Week 7	Data transfer instructions.
Week 8	
Week 9	Arithmetic logic instructions
Week 10	Control instructions
Week 11	
Week 12	Shift and rotate statements
Week 13	Subroutine
Week 14	Midterm Exam
Week 15	***Final Exam***

Course Name: Design of Machine Elements I Program Code: MTE 304, Credits: 3	
Week 1	The Nature of Mechanical Design
Week 2	Materials in Mechanical Design
Week 3	
Week 4	Stress and deformation Analysis
Week 5	
Week 6	Combined Stresses and Mohr's Circle
Week 7	Design of Different Types of Loadings
Week 8	
Week 9	
Week 10	Columns
Week 11	Shaft Design
Week 12	
Week 13	Belt Drives
Week 14	Chain Drives
Week 15	Keys and Couplings

Course Name: Signal Processing Program Code: MTE 305, Credits: 2	
Week 1	Introduction to Digital signal processing 1. ADC blocks 2. The Sampling Theorem 3. Example
Week 2	Signals Representation 1. Graphical representation 2. Functional representation 3. Tabular representation 4. Sequential (Vector) representation Common D. Signals 1. Unit step signal 2. Impulse signal 3. Ramp signal 4. Exponential signal
Week 3	Discrete time signals manipulation 1. Shifting 2. Reversal 3. Time Scaling 4. Addition 5. Amplitude scaling 6. Multiplication 7. Unit delay element & Unit advance
Week 4	DISCRETE-TIME SYSTEMS 1. discrete-time systems as blocks 2. discrete-time systems types
Week 5	Properties of DISCRETE-TIME SYSTEM

	1. System Causality 2. System stability 3. Linear Systems 4. Time invariant system 5. LTI Systems
Week 6	Convolution 1. Convolution utilization 2. Convolution conditions 3. Methods of Convolution 4. Graphical Method Convolution
Week 7	Convolution(cont.) 1. Methods of Convolution 2. Slide Rule Method Deconvolution 1. Methods of Deconvolution 2. Iterative Method 3. The Graphical Method
Week 8	Term Exam
Week 9	Linear Constant-Coefficient Difference Equations 1. Solution of First-order LCCDE 2. Solution of Nth -order LCCDE
Week 10	Z-Transform, properties, examples on classical discrete-time signals, ROC and inverse Z-Transform
Week 11	Discrete-time LTI system analysis using the Z- variable. System function and its relationship to other forms of time- and frequency-domain representations.
Week 12	Digital Filters: IIR and FIR filters, stability and linear- phase properties of FIR filters against fast roll-off and low order properties of IIR filters.

Week 13	Design of IIR filters: numerical methods, IIR digital filters via bilinear transformation of classical analogue filters (Butterworth, Chebyshev, and elliptic), and impulse invariant method.
Week 14	Design of FIR filters: windowing and frequency sampling method. Realizations of IIR and FIR filters.
Week 15	Final Exam

Course Name: Mechanisms and Vibration Program Code: MTE 306, Credits: 2	
Week 1	Mechanisms-1: Types, Characteristics, and applications
Week 2	Mechanisms-2: Types, Characteristics, and applications
Week 3	Velocity analysis: Instantaneous method center.
Week 4	Velocity analysis: Relative velocity method.
Week 5	Acceleration analysis: Calculation of linear and angular accelerations for points on mechanisms.
Week 6	Acceleration analysis: Introductory Examples
Week 7	Acceleration analysis: detailed Examples, calculation of efficiency and power transmission.
Week 8	Introduction to vibration
Week 9	SDF – Free undamped motion: Theory and derivation of system equation
Week 10	SDF – Free undamped motion: Solution of equation, examples.
Week 11	SDF – Free damped motion: Theory and derivation of system equation.
Week 12	SDF – Free damped motion: Solution of equation, examples.
Week 13	SDF – Forced motion: introductory lecture to the topic.
Week 14	MDF – systems: introductory lecture to the topic.
Week 15	MDF – systems: introductory lecture to the topic.

Course Name: Experimental Methods for Engineering Program Code: MTE 307, Credits: 3	
Week 1	Units and Dimensions, type of instruments
Week 2	Characteristics of instrument or transducers
Week 3	Errors in measurement systems
Week 4	Sources of measurement noise, Techniques for reducing measurement noise
Week 5	Signal processing tools
Week 6	Digital signal processing
Week 7	Electrical analogue meters
Week 8	Electrical Digital meters, Digital storage oscilloscope
Week 9	Midcourse Exam.
Week 10	DC Bridge circuits
Week 11	AC Bridge circuits
Week 12	Resistance, inductance and capacitance measurement
Week 13	Current measurement
Week 14	Frequency and phase measurement
Week 15	Final Course Exam.

Course Name: Power Electronics and Drive Program Code: MTE 308, Credits: 2	
Week 1	introduction to equations needed in power electronics circuit and wave analysis
Week 2	solved problem for ac and dc ciruit analysis
Week 3	power electronics switches diodes type operation principles and characteristics
Week 4	power electronics switches transistors type operation principles and characteristics
Week 5	power electronics switches thyristors type operation principles and characteristics
Week 6	solved problem
Week 7	thyristors triggering and commutations
Week 8	single phase uncontrolled rectifiers half wave
Week 9	single phase controlled rectifiers half wave
Week 10	single phase controlled and un controlled rectifiers full wave
Week 11	mid term exam
Week 12	single phase ac to ac half wave controlled circuit
Week 13	single phase ac to ac full wave controlled circuit
Week 14	Class A chopper
Week 15	Class B chopper

Course Name: Hydraulic and Pneumatic Systems Program Code: MTE 309, Credits: 3	
Week 1	Introduction to fluid power systems, DCV designation
Week 2	Working media fluid flow, Working media power generation unit and components.
Week 3	DCV Classification
Week 4	DCV usage, selection, and performance
Week 5	Non-return Valves
Week 6	flow control valves-1
Week 7	flow control valves-2
Week 8	pressure control valves-1
Week 9	pressure control valves-2
Week 10	electric and PLC – control
Week 11	Actuators – 1
Week 12	Actuators – 2
Week 13	Actuators – 3
Week 14	preliminary design considerations
Week 15	Identification code of fluid power circuit components

Course Name: Control systems II Program Code: MTE 310, Credits: 3	
Week 1	Modeling in state space I.
Week 2	Modeling in state space II.
Week 3	Introduction to stability.
Week 4	Routh stability criterion
Week 5	Controllability and Observability
Week 6	Introduction To Frequency Response I.
Week 7	Introduction To Frequency Response II.
Week 8	Root Locus Analysis I.
Week 9	Root Locus Analysis II.
Week 10	Construction Method Of Bode Plot And Asymptotic I.
Week 11	Construction Method Of Bode Plot And Asymptotic II.
Week 12	Conditionally stable system.
Week 13	Design of a Lead , Lag Compensator.
Week 14	Construction Method Of Bode Plot And Asymptotic.
Week 15	Relative Stability, Gain Margin, Phase Margin.

Course Name: Microcontroller system Design Program Code: MTE 311, Credits: 3	
Week 1	Introduction to the microcontrollers. RISC and CISC architectures.
Week 2	
Week 3	Architectures of PIC microcontrollers and memory orgnizations
Week 4	
Week 5	Data EEPROM memory and flash program
Week 6	Memory, I/O ports
Week 7	Byte oriented instructions instructions
Week 8	Project (1)
Week 9	Bit oriented instructions
Week 10	Control instructions
Week 11	
Week 12	If statements
Week 13	
Week 14	Midterm Exam
Week 15	Final Exam

Course Name: Design of Machine Elements II Program Code: MTE 312, Credits: 3	
Week 1	Kinematics of Gears
Week 2	
Week 3	Spur Gear Design
Week 4	
Week 5	Rolling Contact Bearings
Week 6	Plain Surface Bearings
Week 7	
Week 8	Springs
Week 9	
Week 10	Clutches and Brakes
Week 11	
Week 12	Fasteners
Week 13	Machine Frames, Bolted Connections, and Welded Joints
Week 14	Linear Motion Elements
Week 15	Electric Motors and Controls

Course Name: Numerical analysis Program Code: MTE 313, Credits: 2	
Week 1	Concepts and role for the numerical method in engineering, approximations and errors, the definition of Round-off error and truncation error, absolute and relative true/approximation error..
Week 2	Numerical solution of Nonlinear algebraic equations (Root of equations): Bracketing methods (Bisection, and False-position method).
Week 3	Open methods (Newton-Raphson and secant method).
Week 4	Numerical solution of linear algebraic equations (system): The difference between the direct and indirect methods, singular and ill/well-conditioned system, partial and complete pivoting, convergence criteria, Jacobi iteration method.
Week 5	The gauss-Seidel iterative method, Gauss-Seidel iterative with the relaxation factor method, Tri-diagonal system and its solution.
Week 6	Curve Fitting: Classification of Curve Fitting (Regression and Interpolation), the concepts of regression, and Least Square Criterion, Linear Regression.
Week 7	Nonlinear Regression, popular nonlinear regression models (Exponential, Power, Growth, and Polynomial model), the linearization of the first three nonlinear models, Polynomial regression.
Week 8	Introduction to Interpolation: Cubic Spline Interpolation (Cheney and Kincaid Formula)
Week 9	Numerical Integration: Trapezoidal Rule (equal and non-equal segment width), Simpson's1/3 rule (equal and non-equal segment width).
Week 10	Numerical Differentiation: Tayler series and truncation error, the approximation of the first derivative (FDA, BDA and CDA), the approximation of the second derivative (FDA, BDA and CDA).
Week 11	Numerical Solution of Ordinary Differential Equation (ODE): Classification of Differential Equation (Initial Value Problem "IVP" and Boundary Value

	Problem "BVP"), the numerical methods for solving the IVP (Euler's)
Week 12	Fourth-Order Runge-Kutta method for solving the IVP, Numerical solution for the system of ODEs with the two methods above.
Week 13	The numerical methods for solving the BVP: The shooting method adaptation together with the two above methods used to solve the IVP.
Week 14	Introduction to another methods (finite difference, finite volume, finite element method)
Week 15	Final Exam.

Course Name: Theory of Machines Program Code: MTE 314, Credits: 2	
Week 1	Turning Moment Diagram and Flywheel – 1
Week 2	Turning Moment Diagram and Flywheel – 2
Week 3	Rotational Balancing
Week 4	Frictional clutches: single and multiple plat
Week 5	Frictional clutches: Cone type
Week 6	Belt drives: Flat belt
Week 7	Belt drives: V-type
Week 8	Toothed gears: Definitions, classifications, and terminologies
Week 9	Toothed gears: pressure angle, gear law, sliding velocity between two teeth, path of contact, arc of contact, contact ration for involute gears.
Week 10	Toothed gears: Standard systems, interference between two involute gears.
Week 11	Gear train: Definition, law of speed ratio, reverted gear train, compound gear train.
Week 12	Gear train: Epicyclic gear train system.
Week 13	Gyroscope
Week 14	Cams
Week 15	Introduction to Mechanisms Synthesis

Course Name: Mechatronics Measurements Program Code: MTE 315, Credits: 3	
Week 1	Sensors and Transducers, Sensor Categories
Week 2	Position and displacement Transducer
Week 3	Force Sensors. Strain gauges
Week 4	Temperature measurement, principles, Thermoelectric effect, Optical sensors (air path and fiber optic)
Week 5	Rotational motion transducers, Rotational displacement and velocity
Week 6	Absolute angular displacement and Velocity, Gyroscopes
Week 7	Piezoelectric transducers, Ultrasonic transducers range Sensor Humidity measurements
Week 8	Level measurement Dipsticks, Float systems and hydrostatic systems, Pressure measurement, Diaphragms, Capacitive
Week 9	Midcourse Exam.
Week 10	pressure sensor fiber optic sensors, Bourdon tube, Bellows and Manometers, Flow measurement, Mass flow rate and volume flow ate , Capacitive devices and Ultrasonic level gauge
Week 11	Mass, force and torque measurement
Week 12	Vibration Shock Measurement, Piezoresistive transducers and Micro-sensors
Week 13	Nuclear sensors and Intelligent devices
Week 14	Actuators
Week 15	Final Course Exam.

Course Name: Solid Modeling Program Code: MTE 316, Credits: 1	
Week 1	**Introduction:** Solid Modeling, some available Software / Installation
Week 2	**Creating Sketch Entities:** Centerlines, Sketch Command, Line Command, Exit Sketch.
Week 3	**Creating Sketch Entities:** Circle Command, Center Point Circle.
Week 4	**Sketch Relations:** Using Geometric Relations, Horizontal Relation, Geometric Relation Symbols.
Week 5	**Sketch Relations:** Preventing Relations with [Ctrl] Key, View Sketch Relations, constraints, Examples.
Week 6	**Boss and Cut Features – Extrudes, Revolves, Sweeps, Lofts:** Creating Basic Swept Features, Extruded Boss/Base (Blind), Merge Result Option, Examples.
Week 7	**Boss and Cut Features – Extrudes, Revolves, Sweeps, Lofts:** Extruded Cut, Extruded Cut (Through All), Examples.
Week 8	**Dimensions:** Applying and Editing Smart Dimensions, Dimension, Smart Dimension.
Week 9	**Dimensions:** Dimension Standard, Dimension (Modify), Examples.
Week 10	**Feature Conditions – Start and End:** Controlling Feature Start and End Conditions, Extruded Boss/Base (Blind), Examples.
Week 11	**Feature Conditions – Start and End:** Examples.

Week 12	**Components-Parts:** Physical properties, Mechanical analysis.
Week 13	**Components-Assemblies:** mates (constraints).
Week 14	**CAD/CAM:** Manufacturing, Rapid prototyping, 3D Printing, CNC & G-Code
Week 15	**Case Study:** Examples of mechanical parts design and manufacturing

Course Name: Communication and Networking Engineering Program Code: MTE 401, Credits: 2	
Week 1	Communication Systems
Week 2	Signals and Its Categories
Week 3	Analog Communications
Week 4	Analog modulation: Amplitude modulation frequency modulation, phase modulation
Week 5	Digital Signaling and Circuits
Week 6	Analog to digital conversion, quantizing, encoding.
Week 7	Digital Modulation
Week 8	Fiber Optics
Week 9	Principles of Networking, Networks Categories
Week 10	Protocols, Standards, Standards Organisations, Internet Standards
Week 11	Network Models
Week 12	Network Layers
Week 13	Ethernet

Week 14	Wireless Networks
Week 15	Applications of Networking and Communication in Mechatronics

Course Name: Digital Control Systems Program Code: MTE 402, Credits: 3	
Week 1	Introduction to digital control.
Week 2	Discrete time system representation.
Week 3	Mathematical modeling of sampling process.
Week 4	Data reconstruction.
Week 5	Modeling discrete-time systems by pulse transfer function.
Week 6	Revisiting Z-transform.
Week 7	Mapping of s-plane to z-plane.
Week 8	Pulse transfer function I.
Week 9	Pulse transfer function II.
Week 10	Sampled signal flow graph.
Week 11	Stability analysis of discrete time systems.
Week 12	Jury stability test. Stability analysis using bi-linear transformation
Week 13	Time response of discrete systems.
Week 14	Transient and steady state responses
Week 15	Root locus method for discrete system.

Course Name: Artificial intelligent Program Code: MTE 403, Credits: 2	
Week 1	Introduction to Intelligence.
Week 2	Introduction to Artificial Neural Networks, Neuron Model.
Week 3	Feed-forward Neural Networks, Derivation of Error Backpropagation (EBP) Training Algorithm, Improving the Convergence Properties of EBP, Second Order Training Schemes.
Week 4	
Week 5	Radial Basis Function Neural Networks, Unsupervised Learning.
Week 6	Fuzzy Logic, Membership Functions.
Week 7	
Week 8	Standard Fuzzy Systems (SFS), Adaptive Neuro-Fuzzy Inference Systems (ANFIS)
Week 9	
Week 10	Introduction to Genetic Computing, Encoding and Decoding, Operators: Mutation, Crossover, Offspring generation.
Week 11	Particle Swarm Optimization
Week 12	Applications of Particle Swarm Optimization
Week 13	
Week 14	AI applications in Mechatronics.
Week 15	Project work.

Course Name: Image Processing Program Code: MTE 404, Credits:2	
Week 1	Introduction to Intelligence.
Week 2	Introduction to Artificial Neural Networks, Neuron Model.
Week 3	Feedforward Neural Networks, Derivation of Error Backpropagation (EBP) Training Algorithm, Improving the Convergence Properties of EBP, Second Order Training Schemes.
Week 4	Monthly Exam
Week 5	Radial Basis Function Neural Networks, Unsupervised Learning.
Week 6	Fuzzy Logic, Membership Functions.
Week 7	Midterm Exam
Week 8	Standard Fuzzy Systems (SFS), Adaptive Neuro-Fuzzy Inference Systems (ANFIS)
Week 9	Monthly Exam
Week 10	Introduction to Genetic Computing, Encoding and Decoding, Operators: Mutation, Crossover, Offspring generation.
Week 11	Second Term Exam
Week 12	Particle Swarm Optimization
Week 13	Applications of Particle Swarm Optimization
Week 14	AI applications in Mechatronics.
Week 15	Project work. and final exam

Course Name: Industrial Automation I Program Code: MTE 405, Credits: 3	
Week 1	Introduction, The major advantages of using automation, Automation Lab. Example, Industrial Automation vs. Industrial Information Technology,
Week 2	Role of automation in industry, Automation Advantages, Industrial Product Life Cycle, Economy of Scale and Economy of Scope, Production Systems Types, Types of Automation Systems
Week 3	Architecture of Industrial Automation Systems, The Functional Elements of Industrial Automation, Sensing and Actuation Elements.
Week 4	Industrial Sensors and Instrument Systems. Industrial Actuator Systems, Industrial Control Systems, The Architecture of Elements: The Automation Pyramid
Week 5	Measurement Systems, Static Characteristics, Sensitivity, sensitivity drift, Linearity, Hysteresis, Resolution, Accuracy, Precision,
Week 6	Dynamic Characteristics, Step response performance, Frequency Response Performance, Random Characteristics,
Week 7	Mid-Term Exam
Week 8	Introduction to Sequence/Logic Control and Programmable Logic Controllers, Industrial Example of Discrete Sensors and Actuators, Programmable Logic Controllers (PLC),
Week 9	Comparing Logic and Sequence Control with Analog Control, PLC Evolution , PLC >> Application Areas, PLCs Architecture, Communications processors, Expansion units, Input/output Units, Programmers
Week 10	The Software Environment and Programming of PLCs, Structure of a PLC Program, The cyclic execution of PLC Programs,
Week 11	The Relay Ladder Logic (RLL) Diagram, Example: Forward Reverse Control

Week 12	The Function Chart (IEC), The Statement List (STL), Typical Operands of PLC Programs, Internal Variable Operands or Flags,
Week 13	Timers(On delay, Off delay, Fixed pulse width timer, Retentive Timer, Non-Retentive Timer), Counter, User defined Data, Addressing, Operation Set.
Week 14	Formal Modelling of Sequence Control Specifications and Structured RLL Programming, motivation example Industrial stamping process,
Week 15	Steps in Sequence Control Design, Design of RLL Program, state transition logic, state logic, output logic,

Course Name: Design of Mechatronics System Program Code: MTE 406, Credits: 3	
Week 1	Mechatronics Design Process
Week 2	Transfer Functions, Block Diagrams and Manipulations
Week 3	Modeling and Simulation
Week 4	Block Diagram Modeling—Direct Method
Week 5	Block Diagram Modeling—Analogy Approach
Week 6	Block Diagram Modeling—Modified Analogy Approach
Week 7	Block Diagram Modeling of Electrical Systems
Week 8	Block Diagram Modeling Mechanical systems
Week 9	Block Diagram Modeling Electromechanical system
Week 10	Sensors and transducers Modeling
Week 11	Modeling of Actuating systems
Week 12	System control Modeling
Week 13	Study Case I
Week 14	Study Case II
Week 15	Evaluation

Course Name: Robotics I Program Code: MTE 407, Credits: 2	
Week 1	**Introduction to robotics,** Types of robots.
Week 2	**Joints ,** Types of joints used in robots Mechanisms.
Week 3	**Frames,** Descriptions: position, orientations, and frames.
Week 4	
Week 5	**Operators,** Operators: translations, rotations, and transformations.
Week 6	
Week 7	**Joint's Frame,** Link-connection description.
Week 8	**Midterm Exam**
Week 9	
Week 10	**Link properties,** Derivation of link transformations.
Week 11	**Position ,** Forward manipulator's kinematics.
Week 12	**Joint's angle,** Inverse kinematics of serial robots
Week 13	
Week 14	**Solving inverse kinematics,** Examples of industrial robots.
Week 15	

Course Name: Intelligent Control Program Code: MTE 409, Credits: 2	
Week 1	An introduction to classical and intelligent control systems.
Week 2	Intelligent systems and applied artificial intelligence.
Week 3	Intelligent control concepts.
Week 4	Artificial neural networks: fundamentals and architectures
Week 5	Artificial neural networks: applications.
Week 6	Introduction to fuzzy logic.
Week 7	Fuzzy control and stability.
Week 8	Control applications of fuzzy logic.
Week 9	Neuro-fuzzy controllers: theory and design.
Week 10	Neuro-fuzzy controllers: applications.
Week 11	Probabilistic and evolutionary algorithms.
Week 12	Optimization of intelligent systems using GA.
Week 13	Intelligent control systems: research paper analysis
Week 14	Intelligent control systems: design methods.
Week 15	Final exam and Projects discussion.

Course Name: Engineering Management Program Code: MTE 410, Credits: 2	
Week 1	Engineering Management , Organization and organizational structures
Week 2	Organization and organizational structures, Functional description
Week 3	Administrative correspondences and technical reports, Administrative correspondences and technical reports
Week 4	Decision making
Week 5	Production and operations management
Week 6	Plant Location
Week 7	Economic and Technical feasibility
Week 8	Project Management and Project Control
Week 9	Gantt Chart
Week 10	Pert Chart and critical path analysis
Week 11	Project Management and Project Control
Week 12	Specifications and quantities
Week 13	Total quality management
Week 14	Maintenance and repair
Week 15	Industrial safety and occupational health

Course Name: Special Topics in Mechatronics Program Code: MTE 411, Credits: 2	
Week 1	Nanotechnology systems and applications
Week 2	Embedded systems design and applications.
Week 3	Electric Cars
Week 4	Renewable energy systems design and applications
Week 5	***Heat exchangers***
Week 6	Intelligent systems design and applications
Week 7	SCADA Systems
Week 8	Midterm Exam
Week 9	Cooling Electronics equipment
Week 10	Industrial networks design and applications
Week 11	Segway electric vehicle design
Week 12	3D printers design and applications
Week 13	
Week 14	***Autotronics Engineering***
Week 15	***Final Exam***

Course Name: Industrial Automation II Program Code: MTE 412, Credits: 3	
Week 1	Fundamental Geometric Principles
Week 2	Fundamental principles of NC programming
Week 3	Positional Data
Week 4	
Week 5	Programming Motion Commands
Week 6	Milling Cycles Part I
Week 7	Midterm Exam
Week 8	Cutting Conditions
Week 9	Tool Offsets
Week 10	Milling Cycles Part II
Week 11	Turning Cycles Part I
Week 12	Computer Aided Design
Week 13	
Week 14	Computer Aided Manufacturing
Week 15	Final Examination

Course Name: Robotics II Program Code: MTE 413, Credits: 3	
Week 1	**Jacobean matrix ,** Velocity propagation from link to link.
Week 2	
Week 3	**Forces ,** Static force in manipulators.
Week 4	**Dynamics,** Iterative Newton-Euler dynamic formulation.
Week 5	
Week 6	
Week 7	**Trajectory generation ,** Cubic polynomials, LSPB.
Week 8	
Week 9	**Midterm Exam**
Week 10	**Control ,** Linear and Nonlinear Control of manipulator.
Week 11	
Week 12	
Week 13	**Mobile robots ,** Kinematics, sensors, path generation.
Week 14	
Week 15	**Final exam**

Course Name: Computer Interfacing **Program Code: MTE 415, Credits: 3**	
Week 1	Introduction to Data Acquisition on the PC
Week 2	Analog Signal Transmission, Wire and cable options, Noise and Ground, Zero and Span cct(Inverting Summer, Instrument Amplifier),
Week 3	Signal Condationing, Isolation Amplifier, Transformer-coupled Amplifiers, Optically Coupled Amplifiers
Week 4	Analog to Digital and Digital to Analog Conversion: Sample and Hold circuits, Analog, multiplexers/demultiplexers
Week 5	Analog to digital Converters, Digital to analog Converters, Examples of sensors with signal conditioned output
Week 6	Microprocessor Addressing System: Memory Mapped Addressing, I/O Addressing.
Week 7	Address decoder Design, Assembly Language for I/O
Week 8	Mid-Term Exam
Week 9	Programmable Peripheral Interface(PPI), Advantage, Addressing
Week 10	PPI Examples
Week 11	Computer Parallel Port: Architecture
Week 12	Computer Parallel Port: programming and examples
Week 13	Computer Serial Port: Architecture
Week 14	Computer serial Port: programming and examples
Week 15	Computer Game Port: Architecture, programming, and examples

Course Name: Professional Ethics Program Code: MTE 416, Credits: 2	
Week 1	تعريف حقوق الانسان.
Week 2	خصائص حقوق الانسان
Week 3	مصادر حقوق الانسان.
Week 4	انواع حقوق الانسان.
Week 5	القيود الواردة على حقوق الانسان.
Week 6	
Week 7	واجبات الافراد وحقوقهم.
Week 8	ضمانات حقوق الانسان على الصعيد الدولي.
Week 9	ضمانات حقوق الانسان على الصعيد الوطني.
Week 10	الفساد الاداري وانواعه واثار الفساد الاداري على حقوق الانسان.
Week 11	
Week 12	طرق و وسائل مكافحة الفساد الاداري.
Week 13	الديموقراطية وانواعها وميزاتها وعيوبها.
Week 14	مبدأ الفصل بين السلطات واثره على حقوق الانسان.
Week 15	حق الشعوب في تقرير المصير وحق الفرد في اكتساب الجنسية والحقوق الجماعية للانسان.