



كـتـيـب بـرـنـامـج الـهـنـدـسـة الـتـطـبـيـقـيـة

كـلـيـة الـهـنـدـسـة

2022

قـسـم الـهـنـدـسـة المـيـكـانـيـكـيـة والصـنـاعـيـة

Mechanical & Industrial Engineering Department



1st: List of General Courses :- قوائم مسميات المقررات الدراسية للمرحلة العامة :-
Humanities Courses العلوم الإنسانية

Course No.	Course name	Pre request	Credits	اسم المقرر	رقم المقرر
		المتطلبات	الوحدات		
GH141	English I	Nil	3	اللغة الإنجليزية 1	ع 141
GH142	English II	GH141	3	اللغة الإنجليزية 2	ع 142
GH150	Arabic I	Nil	2	اللغة العربية 1	ع 150
GH151	Arabic II	GH150	1	اللغة العربية 2	ع 151
GH152	Technical Writing in Arabic	GH151	1	كتابة التقارير الفنية	ع 152
Total Credits			10	إجمالي عدد الوحدات	

General Science Course

العلوم الأساسية العامة

Course No.	Course name	Pre request	Credits	اسم المقرر	رقم المقرر
		المتطلبات	الوحدات		
GS101	Mathematics I	Nil	3	الرياضيات 1	ع 101
GS102	Mathematics II	GS101	4	الرياضيات 2	ع 102
GS111	Physics I	Nil	3	الفيزياء 1	ع 111
GS112	Physics II	GS111	3	الفيزياء 2	ع 112
GS112L	Physics Lab	GS111	1	فيزياء معمل	ع 112 م
GS115	Chemistry	Nil	3	الكيمياء العامة	ع 115
GS115L	Chemistry Lab	Nil	1	الكيمياء معمل	ع 115 م
GS200	Computer Programming	Nil	3	برمجة حاسوب	ع 200
GS203	Mathematics III	GS102	3	الرياضيات 3	ع 203
GS204	Mathematics IV	GS102	3	الرياضيات 4	ع 204
GS206	Probability & Statistics	Nil	3	الإحصاء والاحتمالات	ع 206
Total Credits			30	إجمالي عدد الوحدات	



General Engineering Courses

ثانيا : قائمة العلوم الهندسية العامة

Course No.	Course name	Pre request	Credits	اسم المقرر	رقم المقرر
		المتطلبات	الوحدات		
GE121	Engineering Mechanics I	Nil	3	ميكانيكا هندسية 1	هـ ع 121
GE125	Engineering Graphics	Nil	2	الهندسة الوصفية	هـ ع 125
GE127	Engineering Drawing	Nil	2	الرسم الهندسي	هـ ع 127
GE129	Workshop Technology	Nil	2	تقنية الورش	هـ ع 129
GE129 L	Workshop Technology Lab	GE 129	1	معمل تقنية الورش	هـ ع 129 م
GE133	Properties of Materials	GS101 GS111 GS115	3	خواص المواد	هـ ع 133
GE222	Engineering Mechanics II	GE121	3	ميكانيكا هندسية 2	هـ ع 222
Total Credits			16	إجمالي عدد الوحدات	

مسميات المقررات الدراسية الملزمة لجميع طلبة القسم

2nd . List of Departmental Compulsory Courses.

Course No.	Course name	Pre request	Credits	اسم المقرر	رقم المقرر
		المتطلبات	الوحدات		
EE280	Electrical Eng. Fundamentals	GS101,S112L	3	أساسيات الهندسة الكهربائية	هـ كه 280
ME 201	Mechanical Drawing	GE127	2	الرسم الميكانيكي	هـ مك 201
ME202	Workshop Practice	GE129 GE129L	2	تدريبات الورش	هـ مك 202
ME204	Strength of materials	GE121 GE133	3	مقاومة المواد	هـ مك 204
ME205	Stress Analysis I	ME204 CE203	3	تحليل الإجهادات 1	هـ مك 205
ME206	Metallurgy	GE129 GE133	3	علم المعادن	هـ مك 206
ME210	Thermodynamics I	GS102 GS111	3	ديناميكا حرارية 1	هـ مك 210



ME215	Production Engineering I	ME206	3	هندسة الإنتاج 1	هـ مك 215
ME261	Industrial Management	Nil	3	الإدارة الصناعية	هـ مك 261
ME301	Design Of Mechanical ElementsI	ME201 ME205	3	تصميم العناصر الميكانيكية	هـ مك 301
ME302	Heat Transfer I	GS102 ME210	3	انتقال الحرارة 1	هـ مك 302
ME306	Mechanics Of Machines I	GE222	3	ميكانيكا الآلات 1	هـ مك 306
ME309	Numerical Analysis	GS200 GS203 GS204	3	التحليل العددي	هـ مك 309
ME 312	Fluid Mechanics I	GE222 GS203 ME210	3	ميكانيكا الموائع 1	هـ مك 312
ME315	Production Engineering II	ME206	3	هندسة الإنتاج 2	هـ مك 315
ME317	Energy Conversion sys.	ME302	3	منظومات تحويل الطاقة	هـ مك 317
ME318	Measur. & Instrumentations	ME306 ME312 GH152	3	معمل المقاييس وأجهزة القياس	هـ مك 318
ME 322	Principles of Air Con. & Ref.	ME302	3	اساسيات التبريد والتكييف	هـ مك 322
ME325	Mechanical Vibrations	GS204 ME306	3	الاهتزازات الميكانيكية	هـ مك 325
ME330	Automatic Control I	GS204 GE222 EE280	3	التحكم الآلي الصناعي	هـ مك 330
ME365	Eng. Economics & feasibility	ME261	3	الاقتصاد الهندسي ودراسة الجدوى	هـ مك 365
ME599	B.Sc. Project	Min 130 credit	3	المشروع	هـ مك 599
Total Credits			64	إجمالي عدد الوحدات	

- ثالثاً :- قوائم مسميات المقررات الدراسية الملزمة والاختيارية لشعبة الهندسة التطبيقية
- . Applied Mechanics Branch**
- قائمة مسميات المقررات الملزمة والخاصة بطلبة شعبة الهندسة التطبيقية فقط.
 - **List Of Courses**

Course No.	Course name	Pre request	Credits	اسم المقرر	رقم المقرر
		المتطلبات	الوحدات		
ME303	Stress Analysis II	ME205	3	تحليل الإجهادات 2	هـ مك 303
ME326	Theory of Machines II	GE222	3	نظرية الآلات 2	هـ مك 326
ME405	Design of M/C Elements II	ME301	3	تصميم اجزاء الآلات 2	هـ مك 405
ME425	Theory of Vibrations	ME325	3	نظرية الإهتزازات	هـ مك 425
ME451	Automatic Control II	ME330	3	التحكم الآلي 2	هـ مك 451
ME492	Applied Mechanics Lab.	Not less than 100 Credits	2	معمل الميكانيكا التطبيقية	هـ مك 492
Total Credits			17	إجمالي عدد الوحدات	

- المقررات الاختيارية الخاصة بطلبة شعبة هندسة الميكانيكا التطبيقية
 - **List Of Elrctive Courses**
- على الطالب إختيار عدد 4 مقررات إختيارية بإجمالي عدد وحدات 12 وحدة

Course No.	Course name	Pre request	Credits	اسم المقرر	رقم المقرر
		المتطلبات	الوحدات		
ME407	Fracture Mechanics	ME303	3	ميكانيكا الكسر	هـ مك 407
ME408	Theory of Machines III	ME326	3	نظرية الآلات 3	هـ مك 408
ME424	Expert Systems	GS200	3	النظم الخبيرة	هـ مك 424
ME426	Introduction to Noise Control	ME325	3	مقدمة للتحكم في الضوضاء	هـ مك 426
ME427	Machine Vibration	ME425	3	الإهتزازات الميكانيكية	هـ مك 427
ME432	Introduction to Finite Elements Method	ME309	3	مقدمة لطرق العناصر المتناهية	هـ مك 432
ME433	Introduction to Mechatronics	GS200 ME326	3	مقدمة للميكاترونك	هـ مك 433
ME435	Modeling & Simulation of Mechanical Structures	ME309 ME425	3	النمذجة والمحاكاة للمكونات الميكانيكية	هـ مك 435



ME436	Automotive Engineering	ME325 ME326	3	هندسة المركبات	هـ مك 436
ME501	Engineering Analysis	ME309	3	التحليل الهندسي	هـ مك 501
ME502	Experimental Stress Analysis	ME303	3	التحليل التجاربي للإجهادات	هـ مك 502
ME475	Product Mechanical Design	ME405 ME315	3	تصميم المنتج	هـ مك 475
ME503	Advanced Strength of Materials	ME303	3	مقاومة مواد متقدمة	هـ مك 503
ME505	Advanced Machine Design	ME405	3	تصميم الآلات متقدمة	هـ مك 505
ME507	Engineering Acoustics	ME325	3	هندسة الصوتيات	هـ مك 507
ME520	Industrial Automation	ME330	3	الاتمة الصناعية	هـ مك 520
ME522	Exp. Shock & Vibration Analysis	ME325	3	الصدمة التجريبية وتحليل الإهتزاز	هـ مك 522
ME524	Mechanics of Composite Materials	ME303	3	ميكانيكا المواد المركبة	هـ مك 524
ME528	Computer Aided Design	ME405	3	التصميم بواسطة الحاسوب	هـ مك 528
ME529	Robotics Analysis	ME326	3	تحليل الروبوتات	هـ مك 529
ME531	Tribology	ME405	3	الإحتكاك والبي والتزييت	هـ مك 531
ME532	Automatic Control III	ME451	3	التحكم الآلي 3	هـ مك 532
ME566	Introduction to system Identification	GS206 ME309 ME330	3	مقدمة للتعرف على النظم	هـ مك 566
ME591	Special Topics		3	مواضيع خاصة	هـ مك 591
ME592	Seminar		1	حلقة دراسية	هـ مك 592

الجدول التالي الذي يوضح تفاصيل متطلبات عدد الوحدات التخرج لكل شعبة بالقسم :

القسم	الشعبة أو البرنامج	العلوم الإنسانية		العلوم الأساسية العامة		العلوم الهندسية العامة		المقررات التخصصية		المقررات التخصصية		العلوم التخصصية الاختيارية		الإجمالي
		عدد	النسبة المئوية من إجمالي عدد الوحدات الكلية	عدد	النسبة المئوية من إجمالي عدد الوحدات الكلية	عدد	النسبة المئوية من إجمالي عدد الوحدات الكلية	عدد	النسبة المئوية من إجمالي عدد الوحدات الكلية	عدد	النسبة المئوية من إجمالي عدد الوحدات الكلية	عدد	النسبة المئوية من إجمالي عدد الوحدات الكلية	
الهندسة الميكانيكية والصناعية	قوى	10	6.7%	30	20.1%	16	10.7%	64	43.0%	14	9.4%	15	10.1%	149
	صناعية	10	6.7%	30	20.0%	16	10.7%	64	42.7%	15	10.0%	15	10.0%	150
	تطبيقية	10	6.7%	30	20.1%	16	10.7%	64	43.0%	17	11.4%	12	8.1%	149



المحتوى العلمي للمقررات الدراسية

Syllabus of General Courses

المحتوي العلمي للمقررات العامة

GH141 and GH142	English (I,II)	& 3 respectively 3Credits	NIL
-----------------	----------------	---------------------------	-----

GH141 and GH142 are complimentary courses designed to introduce the student to the basic patterns of scientific English at the introductory stage and thereafter deals with inure advanced materials. Each covers:

- (a)Intensive reading of passage containing material to student needs with comprehension question, contextual references, vocabulary exercises and affixation.
- (b)The study of scientific vocabulary which includes use of dictionary, spelling rules and affixation.
- (c)Revision and studs of Basic English verb tenses, active and passive.
- (d)Description of the laboratory experiment.
- (e) Study arid use of the passive voice in scientific technical English.
- (f) Ing form;
- (g)Compound nouns. The English noun phrases, relative clauses, deletion of relative, relation in active and passive voice.
- (h)Summary writing.

GH150 and GH151	ARABIC (I , II)	respectively 1 & 2Credits	NIL
-----------------	-----------------	---------------------------	-----

Review to Arabic courses taken in high school including construction of Arabic sentence, spelling and punctuation.

GH152	ARABIC TECHNICAL WRITING	Credits 1	NIL
-------	--------------------------	-----------	-----

Writing technical reports, Report preparation and presentation. preparation of minutes of meetings. Translation of technical document.

GS-101	MATH I	Credits 3	NILL
--------	--------	-----------	------

Limits, continuity, derivatives, chain rule, higher derivatives implied differentiation, trigonometric functions, maxima, minima, point of inflection. Curve sketching, role's theorem, mean value theorem. Definite, and indefinite integrals: Definition,



GS102	MATH. II	Credits 4	GS101
-------	----------	-----------	-------

Methods of integration: By partial fractions, by successive reduction formulaic, transcendental functions; differentiation & integration of transcendental function. Complex numbers, partial differentiation, applications on relative maxima and minima, the method of Lagrange multiplier. Multiple integration with application.

GS-111	Physics I	Credits 3	NIL
--------	-----------	-----------	-----

Waves: Wave equations, traveling waves and stationary waves; principles of superposition, Doppler effect.

Sound; Definitions, velocity of sound in air and material media and its variation, velocity of transverse & longitudinal vibration in wires and rods. Echoes briefly.

Optics: properties of light, the electromagnetic character of light; sources of light and their spectra, absorption & scattering, dispersion, polarization of light.

GS-112	Physics II	Credits 3	GS111
--------	------------	-----------	-------

Electrostatics: charges and fields, the electric potential; electric current; the magnetic field, electric fields in matter. Photoelectric effect, Einstein's explanation and quantum theory of the hydrogen atom. Radioactive decay law derivation.

GS-112L	Physics Lab	Credits 1	NIL
---------	-------------	-----------	-----

Experiments about sound, light, electricity, magnetism, heat and electro-chemical conversion.

GS-115	Chemistry	Credits 3	NIL
--------	-----------	-----------	-----

Measurements and SI units; chemical equations and stoichiometry; structures of atoms and periodic relationships, chemical compounds:

The gaseous state; solutions-electrolytes and non-electrolytes; acids and bases; thermochemistry; chemical equilibrium; ionic equilibrium I and II; organic chemistry.

GS-115L	Chemistry Lab	Credits 1	NIL
---------	---------------	-----------	-----

Some experiments related to GS115 course.

GS-200	Computer Programming	Credits 3	NIL
--------	----------------------	-----------	-----

Introduction to computer science; basic principles of computer structure; basic components of programming languages; problem solving steps; Algorithms; introduction to Programming Language; Tokens; Values & variables; Input & Output



statements; Statements, Expressions and Operators; Flow of Controls (if, if..elseif, switch statements, ternary operator); Iteration and loops (while, do-while and for loop statements); Continue and Break statements; Built-in functions, User defined functions; Scope of variables (global, local and static variables); Arrays (one dimensional array, 2 dimensional array , multi-dimensional arrays); some arithmetic operations on arrays; Arrays and functions; File I/O, files and streams, opening and closing files, reading & writing text files; other data types (i.e. structures, pointers)

GS-203	Mathematics III	Credits 3	GS-102
--------	-----------------	-----------	--------

Vector analysis, div, grad, curl, Green's, Gauss's and Stokes theorems and their applications, Linear algebra, matrices and their applications. N-Euclidean space, vector spaces. Matrices, algebra of matrices, rank of a matrix, linear transformation, system of linear equation, equivalent and similar matrices, eigen values and eigenvectors.

GS-204	Mathematics IV	Credits 3	GS-203
--------	----------------	-----------	--------

Ordinary differential equations, differential equations of first order and first degree, different forms, non-linear differential equations of first order, linear differential equations constant coefficients; homogeneous case, method of variation of parameters, method of undetermined coefficient; method of laplace transforms, simultaneous differential equations in series; gamma, beta functions, Bessel function, modified bessel function, Legendre polynomials; spherical harmonics, hyper-geometric function.

GS-206	Probability and Statistics	Credits 3	NIL
--------	----------------------------	-----------	-----

Probability: concept of a random experiment and sample space; addition and multiplication laws of probability; conditional probability and independence, Bay's theorem and its application. Random variables and their probability distribution; Binomial, poisson, Normal, Gamma, Exponential, Uniform and cauchy distributions and their properties.

Basic statistical concepts: Statistical data, measures of central simple linear regression, regression coefficient and correlation coefficient, non-linear regression. Fitting of linear and non-linear regression to data. Multiple linear regression and multiple correlation coefficient.



GE-121	Engineering Mechanics I (Statics)	Credits 3	NIL
--------	-----------------------------------	-----------	-----

Statics of particles; forces in plane and space; statics of rigid bodies : Equivalent system of forces; equilibrium in two and three dimensions, work and energy, analysis of trusses, frames, and machines, free body diagram; kinematic; stability friction, centroids and center of gravity-lines, area and volumes. Moment of inertia of areas and masses.

GE-125	ENGINEERING GRAPHICS or “ DESCRIPTIVE GEOMETRY “	2Credits	Nil
--------	--	----------	-----

Introduction, the purpose of Descriptive Geometry, different types of projection. Representation of point, line and plane. Position problems. Metric problems. Projection on auxiliary views. Polyhedrons, development and intersections. Circle and sphere. Cone and cylinder. Curved surfaces, development and Intersection.

GE-127	ENGINEERING DRAWING	Credits 2	Nil
--------	---------------------	-----------	-----

Introduction; definitions, conventions. Instrument, dimensioning, some geometrical constructions; e.g., drawing of some polygons, parallel lines, line and arc tangents. Projection; theory, types of projection, one view projection, multi-view projection, first and third angle projection, applications, including missing line views. Sectional views; complete section, half section, part section, removed sections, revolved section, and applications.

GE-129 & GE129L	WORKSHOP TECHNOLOGY and Lab	Credits 2+1	Nil
-----------------	-----------------------------	-------------	-----

Industrial safety; engineering materials and their mechanical and physical properties; classifications, ferrous and nonferrous metals, natural and synthetic materials; introduction to manufacturing processes: casting, welding, forging, rolling, extrusion; sheet metal working methods, metal machining.

GE-133	PROPERTIES OF MATERIALS	Credits 3	Nil
--------	-------------------------	-----------	-----

Elastic and plastic behavior of metals, plastic deformation of metals; atomic structure of materials, crystal geometry of; electrical, magnetic and optical properties of materials; materials at high temperature; recovery, recrystallization, grain growth; fatigue of metals; corrosion of metals and alloys; oxidation of metals and alloys.

GE-222	ENGINEERING MECHANICS II	Credits 3	GE-121
--------	--------------------------	-----------	--------

Introduction to dynamics. Kinematics of particles; Kinematics of rigid bodies. Three-dimensional motion of a particle relative to a rotating frame (Coriolis acceleration). D'Alembert's principle. Kinetic energy of a rigid body in plane motion. Kinetics of rigid bodies in three dimensions; motion of a gyroscope. Introduction to mechanical vibrations.

محتويات المقررات الملزمة لجميع البرامج (الشعب)
Syllabus of Departmental Compulsory Courses for Mechanical & Industrial Engineering

EE280	Electrical Engineering Fundamentals	3 Credits
-------	-------------------------------------	-----------

Pre-requisite: GS101,S112L

Kirchoff laws and applications, network theorems, applied electromagnetism and magnetic circuits, self and mutual inductance, rise and fall of current in an inductive circuit, capacitance, charging and discharging of capacitors, stored energy, alternating voltages and currents, average and R.M.S. values pastors, complex notation, R-L-C circuits resonance, quality factor. Power calculations.

ME201	Mechanical Drawing	2 Credits
-------	--------------------	-----------

Pre-requisite: GE127

Introduction: Revision to engineering drawing. Types of mechanical drawings: Symbols, abbreviation and conventions. Fasting elements: Screw, key, pin, welding. Surface texture and surface finish symbols: Dimensional fits, tolerances. General purpose constructional machine elements: Gears, coupling, bearing, pipe thread, pipe joints, cams, springs, rivets.

ME202	Workshop Practice	2 Credits
-------	-------------------	-----------

Pre-requisite: GE129 & GE129L

Bench .work operation-drilling, countersinking, drilling blind holes, tapping; operation of lathe, drill press, shaper and milling machine-turning operation, thread cutting; plane surface and V-surface on shaper; side and face milling, T-slot milling. Welding straight and vertical. Foundry pattern making, sand testing hardness, permeability and strength.

ME204	Strength of Materials	3 Credits
-------	-----------------------	-----------

Pre-requisite GE121

Structural loading analysis: Types of structural loading, Classification of frames and beams, Statically determinate and indeterminate structures, Calculation of structure reactions.

Loading diagrams (beams): The method of sections, Shear in beams, axial force in beams, bending moment in beams; Shear, axial-force and moment diagrams; Step by step procedure, Shear diagram by summation; Moment diagram by summation; Shear force and bending moment relations.

Deflection of beams: Differential equation of deflection curve; Deflection by integration of the bending equation; Moment-area method; Temperature effects; Continuous beams.

Torsion: Circular and non-circular solid shafts; Hollow circular shafts; Thin-walled tubes; Shear center and shear flow.



Introduction to stress and strain analyses: Normal and shear stresses and strains; volumetric strains; Poisson's ratio; Hook's law; Engineering strains; True strains; Uniform deformation; Tensile tests; True stress-true strain curves; Point of instability.

ME205	Stress Analysis I	3 Credits
-------	-------------------	-----------

Pre-requisite: ME204

Introduction to stress and strain analysis: Engineering and true stresses and strains, Stress-strain relationship, Stress equilibrium equation, Simple torsion theory, Normal and shear stresses, Stresses of combined loading.

Stresses in bodies of revolution: Thin-walled pressure vessels (cylinders and spherical).

Stresses on oblique surfaces: Graphical representation of stress and strain, Principle stresses and strains, Mohr's circle for stress and strain, Plain stress and strain conditions.

Introduction to Failure theories: Static failure theories for ductile and brittle materials; Maximum shear stress theory, Maximum distortion energy theory, Maximum principle stress theory, Mohr-coulomb theory.

ME206	Metallurgy	3 Credits
-------	------------	-----------

Pre-requisite: GS111-GS102

Elementary theory of structure of metals, atoms, space lattice, crystal systems, arrangement of atoms; plastic deformation of metals, hot and cold working, recovery, recrystallization; grain growth; phase diagram, solidification of pure metals and alloys, equilibrium diagram; heat treatment of steel, TTT curves, heat treating processes, corrosion of metals; cast irons, carbon steels, alloy steels, nickel and its alloys, bearing metals, fusible alloys; introduction to powder metallurgy.

ME210	Thermodynamics I	3 Credits
-------	------------------	-----------

Pre-requisite: GS111-GS102

Introduction; historical background, units, definitions, concepts of heat, temperature, force and work. Closed system and control volume; equation of state for ideal gas; properties of pure substances. The first law of thermodynamics, reversible and irreversible processes. The second law of thermodynamics and its corollaries, temperature scale, entropy, closed system processes, steady and unsteady flow processes, thermodynamic cycles.

ME215	Production Engineering I	3 Credits
-------	--------------------------	-----------

Pre-requisite: ME202 - ME206

Mechanical working of metals, hot and cold working. Analysis of forging, rolling, drawing extrusion. Press working processes, equipment's and tools. Rubber and plastic forming methods. Introduction and classification of machine tools, cutting tools and their materials. Cutting fluids.



ME261	Industrial Management	3 Credits
-------	-----------------------	-----------

Pre-requisite: NIL

Concept of management, scientific management, functions and types of management, span of control; forecasting, factory planning, production planning and control, material management, work study, decision making, capital budgeting, personal management, industrial safety, maintenance planning.

ME301	Design Of Mechanical Elements I	3 Credits
-------	---------------------------------	-----------

Pre-requisite: ME201, ME204 & ME205

Introduction to design and design processes; Calculations of bolted and riveted joints, Power screws and welded joints. Keys and splines: types and stress calculations. Design of spur gears and springs, Selection of rolling elements bearings.

ME302	Heat Transfer I	3 Credits
-------	-----------------	-----------

Pre-requisite: GS203 & ME210

Introduction: conduction, convection, radiation, electrical analogy. Overall heat transfer coefficient. Conduction: steady state one dimensional heat flow in slabs, cylinders and spheres; critical insulation, internal heat generation, variable conductivity, extended surfaces; Steady state two dimensional conduction (Cartesian coordinates). Transient Heat Conduction. Radiation, absorption, reflection and transmission. Kirchoff's law, Stefan Boltzmann lap. Radiation intensity, emissive power, radiation between black and grey bodies. Heat exchangers.

ME306	Mechanics Of Machines I	3 Credits
-------	-------------------------	-----------

Pre-requisite: GE222

Kinematics: Mechanisms, Classification, Velocity and acceleration by analytical and graphical methods, Force analysis. Introduction to the theory of cams. Gears: Terminology, Classification, Gear trains.

Crank-effort diagrams: Flywheel effect on speed and energy fluctuations in engines.

ME309	Numerical Analysis	3 Credits
-------	--------------------	-----------

Pre-requisite: GS200 GS203 & GS204

Basic concepts and analysis of errors, the Taylor series and numerical differentiation, roots of equations, optimization, simultaneous linear algebraic and nonlinear set of equations, curve fitting and interpolation, numerical integration, ordinary differential equations (initial value problems, boundary value problems and Eigen value problems), and using computer for solving these numerical methods.



ME312	Fluid Mechanics I	3 Credits
-------	-------------------	-----------

Pre-requisite: GE222, GS203 & ME210

Introduction: continuum concepts and fluid properties; static pressure and its variation with height; pressure and force on submerged surfaces, buoyancy, fluid motion under linear acceleration and rotation of the container; stream line, vortices and circulation; concept of control volume, integral form of continuity and momentum equations; Euler's equation, Bernoulli's equation; Navier—Stoke's equation and stress field, viscous effects and energy dissipation; application of Bernoulli's equation, momentum equations; energy equation in integral form; static, dynamic and stagnation pressures; Pitot and static tube.

ME315	Production Engineering II	3 Credits
-------	---------------------------	-----------

Pre-requisite: GE129

Metal casting; molding materials, pattern, core making. Various casting processes; melting practices, felling, finishing, and casting defects. Welding processes and equipment. Types of welds, welding rods and electrodes, defects, inspection of welding joints.

ME317	Energy Conversion sys	3 Credits
-------	-----------------------	-----------

Pre-requisite: ME302

Fuels and Combustion: Types of fuels, Combustion equation, Stoichiometry, theoretical air required for complete combustion, Excess air, Calculation of combustion products.

Heat engines: definition, classification, basic components, Standard cycles, Terminology and Working principle and power conversion mechanism. Environmental impacts.

Renewable energies: definition of renewable energy, Classification, Applications. Working principle and energy conversion mechanism and environmental impacts.

ME318	Measur. & Instrumentations	3 Credits
-------	----------------------------	-----------

Pre-requisite: ME306, ME312 & GH152

Introduction to measurement systems, experiment planning, report writing, analysis of experimental data, error analysis, uncertainty analysis, statistical and probability analysis, normal distribution; correlation and regression analysis method of least square; mechanical and electrical devices for measuring displacement, velocity, pressure, temperature, flow rate, thermal and transport properties, force, torque and strain. Mechanical sensors, input-output devices, amplifications and instrumentation.



ME322	Principles of Air Con. & Ref	3 Credits
-------	------------------------------	-----------

Pre-requisite: ME302

Principle, concept and methods of air conditioning; Properties of moist air; Air conditioning processes; Summer and winter air conditioning cycles; human comfort and air conditioning; Ventilation and infiltration of air for buildings and the equipment of ventilation; Air conditioning systems types and selections; Principle of refrigeration systems and applications; Refrigerants properties and how to selections; Refrigeration cycles and performance.

ME325	Mechanical Vibrations	3 Credits
-------	-----------------------	-----------

Pre-requisite: GS204 & ME306

Free vibration: equation of motion, natural frequency, viscous damping; forced vibration: Harmonically excited vibration, rotating unbalance. Multi-degrees of freedom system: Normal mode vibration, co-ordinate coupling, vibration absorber, vibration isolation.

ME330	Automatic Control I	3 Credits
-------	---------------------	-----------

Pre-requisite: GS204, EE280 & GE222

Introduction to automatic control, review of Laplace transformation, mathematical models of dynamic system: system modeling, electrical and electronic circuits, block diagrams and signal flow graphs, mechanical system, electromechanical systems, sensors, temperature control system, robotic control system, analogous systems and linearization; State variable models, Characteristics of closed loop control system, performance of feedback control system in time domain; Basic modes of control, pneumatic controllers; Poles, zeros and stability; Root locus analysis; introduction to frequency response analysis; Introduction to discrete processes control.

ME365	Eng. Economics & feasibility	3 Credits
-------	------------------------------	-----------

Pre-requisite: ME261

Elements of engineering economics: measures of financial effectiveness, economical studies and accounting, costing, break even analysis. Value analysis. Interest and money time relationship, depreciation, capital financing and budgeting. Selection between alternatives. Replacement theory. Economic studies of public projects. Case studies.

ME599	B.Sc. Project	3 Credits
-------	---------------	-----------

Pre-requisite: Min.130 credits and completion of 100, 200 & 300 level courses

Projects is an in-depth theoretical and/or an experimental investigation of specific problem in different fields of mechanical and industrial engineering.



محتويات المقررات الملزمة لبرنامج الهندسة التطبيقية
Syllabus of Applied Mechanics Branch only (Compulsory courses)

ME303	Stress Analysis II	3 Credits
-------	--------------------	-----------

Pre-requisite ME205

Theory of Columns; Centric and eccentric loads, Euler's formula.

Three-Dimensional Analysis: Analysis of stress and strain in three dimensions, Mohr's circles for 3D states in stress and strain.

Airy's Stress Function: Airy's function and its application.

Solids of revolution: Ax symmetric stress and deformation in a solid of revolution.

Techniques of Analysis: Energy techniques in stress analysis, Numerical techniques for load and stress analysis.

Experimental Stress Analysis: Techniques, Strain gauges, Brittle lacquers, Photo-elastic methods, Dimensional analysis.

Introduction to the Theory of Shells.

ME326	Theory of Machines II	3 Credits
-------	-----------------------	-----------

Pre-requisite GE222

Kinematics: Mechanisms, Classification, Velocity and acceleration by analytical and graphical methods, Force analysis;

Introduction to the theory of cams:

Gears: Terminology, Classification, Gear trains;

Crank-effort diagrams: Flywheel effect on speed and energy fluctuations in engines.

ME405	Design of M/C Elements II	3 Credits
-------	---------------------------	-----------

Pre-requisite ME301

Lubrication: types, friction, viscosity, Petroff's law, theory of hydrodynamic. lubrication, Reynold's equations-journal bearings, types, manufacturing materials, pressure fed bearings, bearing design, thrust bearings, boundary lubricated beatings. Gears; force analysis, tooth stresses, dynamic. effects , fatigue resistance, spur gears, helical, bevel and worm gears. Antifriction bearings, roller and ball bearings, applied forces, thrust capacity.



ME425	Theory of Vibrations	3 Credits
-------	----------------------	-----------

Pre-requisite ME325

Transient vibration: Impulse excitation, Arbitrary excitation, Response spectrum.

normal mode.

Vibration of continuous systems: Vibrating string, Longitudinal vibration of rods, Torsional vibration of rods.

Euler's equation of the beam: Effect of rotary inertia and shear.

Rayleigh method: Dunkerley's equation, Rayleigh-Ritz method of matrix, iteration, calculation of higher modes.

Condition monitoring machines.

ME451	Automatic Control II	3 Credits
-------	----------------------	-----------

Pre-requisite ME330

Design of control system by root locus method.

Design of control system using frequency response.

PID controllers and brief description of robust control:, State space for design of control systems.

Design of discrete date control system.

ME492	Applied Mechanics Lab.	2 Credits
-------	------------------------	-----------

Pre-requisite Not less than 100 Credits

Applied Mechanics Lab.: Hydrodynamic lubrication unit, Whirling of shafts.

Vibration Lab.

Automatic Control Lab.

محتويات المقررات الاختيارية لبرنامج الهندسة التطبيقية
Syllabus of Elective courses for Applied Mechanics Branch

ME407	Fracture Mechanics	3 Credits
-------	--------------------	-----------

Pre-requisite ME303

Introduction: Modes of loading, stress field at the crack tip, Griffith theory.

Linear fracture mechanics: Stress intensity factors, stress I.F and fracture toughness, and introduction to fracture mechanics design.

Plastic zone correction: The shape of plastic zone, plane stress, strain, and thickness effect, Irwin plastic zone corrections (and others).

Fracture and toughness criteria: KIC criteria through thickness yielding criteria, the transition temperature approach; Fracture analysis diagram (FAD); The ratio analysis diagram (RAD). ANSI/ASTM E.399 fracture toughness test.

ME408	Theory of Machines III	3 Credits
-------	------------------------	-----------

Pre-requisite ME326

Rigid body dynamics. gyroscope; gyroscope couple, Hooke' s joint. synthesis of mechanisms: slider-crank and 4-bar mechanisms.

Introduction to modal analysis.

ME424	Expert Systems	3 Credits
-------	----------------	-----------

Pre-requisite: GS200

For the syllabus contents details of this course see the same code in elective courses for Industrial & Production Branch

ME426	Introduction to Noise Control	3 Credits
-------	-------------------------------	-----------

Pre-requisite ME325

Nature and sound measurement; physical acoustics, levels and spectra, character of noise, sound propagation, sound measurement and analysis.

Noise control methods, acoustical materials, acoustical enclosures, Silencers, mufflers, active noise control, vibration control, reverberation control.

Sources of noise: fans and blowers, gear noise, gas jet noise, power press, vibratory bowls foundry noise...etc.

Environmental acoustics; sound control in building, community and environmental control and regulations, personal hearing protection.



ME427	Machine Vibration	3 Credits
-------	-------------------	-----------

Pre-requisite ME425

THE MAIN SOURCES OF VIBRATION IN MACHINERY:

The main sources of vibration in machinery. The single degree of freedom (SDOF) model. Using simple models for analysis and diagnostics. Six techniques for solving vibration problems with forced excitation. Some examples with forced excitation.

TORSIONAL VIBRATION

Torsional vibration indicators. Torsional and Lateral Vibration—The Key Differences. Objectives of torsional vibration analysis. Simplified models. Computer models. Energy expressions. Torsional vibration measurement

ROTOR DYNAMICS

Föppl/Jeffcott Single Mass Rotor. Rotor Gyroscopic Effects. Instability due to Aerodynamic Cross Coupling. Rotor-Dynamic Specifications for Compressors

VIBRATION MEASUREMENTS

Technical equipment (Analyzer, Transducers, etc.) Vibration Measured on Non-Rotating Parts of a Machine (Absolute Vibration). Shaft Vibration. Vibration analysis (frequency analysis)

DIAGNOSTICS OF COMMON ROTATING MACHINERY FAULTS

Unbalance. Misalignment .

FINITE ELEMENT ANALYSIS OF SIMPLE ROTOR SYSTEMS

Euler-Bernoulli Beam Theory. Finite Element Formulation. Applications.

ME432	Introduction to Finite Elements Method	3 Credits
-------	--	-----------

Pre-requisite ME309

Introduction; Introduction to engineering analysis; Direct Method; Integral formulations and variational Method; Trial solution methods; One dimensional problems; Finite element modeling, Coordinate and shape functions, The Galerkin approach, Assembly of Global stiffness matrix and load vector, Linear and higher order elements, Parametric elements, Boundary conditions and their treatment, Application of FEM to BVP, IBVP and propagation problems.

ME433	Introduction to Mechatronics	3 Credits
-------	------------------------------	-----------

Pre-requisite GS200 - ME326

Introduction to mechatronics systems; examples of mechatronic systems. Electric circuits and components; semiconductor electronics; digital circuits. Sensors and transducers; displacement, position and proximity sensors; velocity and motion sensors ; force sensors; fluid pressure sensors; liquid flow sensors; temperature sensors; light sensors; select of sensors.



Signal conditioning; the operational amplifier; Wheatstone bridge. Analogue and digital signals; digital-to-analogue and analogue-to-digital converters; multiplexers; digital signal processing. Switches: relays; power transistors ;silicon-controlled rectifiers; triacs. Actuators: direct current motors; DC motor control circuits; brushless DC motors; stepper motors; stepper motor control circuits; stepper motor application; servo motors; hydraulics; pneumatics; solenoid. Introduction to microprocessor system hardware, microprocessor operation, interfacing to a microprocessor controller, controller programming; Programmable logic controllers ,relay logic control, PLC operation, PLC programming. Mechatronics project.

ME435	Modeling & Simulation of Mechanical Structures	3 Credits
-------	--	-----------

Pre-requisite ME309 - ME425

Modeling and Simulation: Introduction to modeling and simulation, Modeling concepts, Simulation concepts, Introduction to available software, Hands on practice.

ME436	Automotive Engineering	3 Credits
-------	------------------------	-----------

Pre-requisite ME325 – ME326

Basic characteristics and operating conditions of automotive vehicles:
Introduction to general transmission layout of an automotive vehicle and various components:
Wind, rolling and gradient resistances: power requirements of vehicles, power units, and performance characteristics;
Stability of vehicles in turnings and slopes:
Power transmission systems: gear trains, clutches and differential axles;
Different drives; Brakes and steering mechanisms; Vehicle suspension system.

ME501	Engineering Analysis	3 Credits
-------	----------------------	-----------

Pre-requisite ME309

For the syllabus contents details of this course see the same code in elective courses for Mechanics Power Branch

ME502	Experimental Stress Analysis	3 Credits
-------	------------------------------	-----------

Pre-requisite ME303

Basic Electrical Measurements and Sensing Devices.

Stress Analysis By Strain Measurment; Mechanical Strain gages, Optical strain gages, Electrical strain gages, Moire fringe method, Brittle coatings for strain indication.

Variable-Resistance Strain gages; gages characteristics and types, Circuitry for resistance strain gages.

Recording and Indication equipment for Resistance Strain Gages; Recording and Indicator Equipment for static strains. Equipment for recording dynamic strain.

Force, Torque and Strain Measurements; Mass balance measurement, FORCE Measurement, stress and Strain, Strain Measurement temperature Compensation, some special Experimental Problems.

Photoelasticity : stress analysis by photoelasticity, stress analysis by photoelastic coatings.

Collecting Results and data representation; Data acquisition and Processing, Report Writing and Presentation.

ME503	Advanced Strength of Materials	3 Credits
-------	--------------------------------	-----------

Pre-requisite ME303

Three-Dimensional problems in rectangular, polar, and curvilinear coordinates. Elastic and plastic instability. Beams on elastic foundation. Non-Symmetrical bending of straight beams. Flat plates. thermal stresses. Effective stress concentration factors (Applications). Propagation of waves in elastic solid media.

ME505	Advanced Machine Design	3 Credits
-------	-------------------------	-----------

Pre-requisite ME405

The course deals with one or more of the following machine groups:

motor cars; suspension, hydraulic system, brake system and clutches, railway vehicles, pumps, compressors, blowers and turbines, Machine Tool, Robotics Manipulators, Injection Molding Machines. These subjects can be taught in the scope of: design of main components, dynamics and stability, loads, theory of operation, maintenance problems and safety requirements.

ME507	Engineering Acoustics	3 Credits
-------	-----------------------	-----------

Pre-requisite ME325

Acoustics waves: Linear wave equation, sound in fluids, Harmonic plane waves, Energy density, Acoustics intensity, Specific acoustic impedance, spherical waves.

Reflection and transmission: Transmission from one fluid to another, normal and oblique incidence, method of images.

Radiation and reception of acoustic waves: Radiation from a pulsating sphere, Acoustic reciprocity, continuous line source, radiation impedance, Fundamental properties of transducers, Absorption and attenuation of sound, classical absorption coefficient.

Pipes resonators and filters: Resonance in pipes, standing wave pattern absorption of sound in pipes, long wavelength limit, Helmholtz resonator, acoustic impedance, reflection and transmission of waves in pipe, acoustic filters, low pass, high pass and band pass. Noise, Signal detection, Hearing and speech, Noise, spectrum level and band level, detecting signals in noise, detection threshold, the ear, fundamental properties of hearing, loudness level and loudness.



Room acoustics: Sound in enclosure, a simple model for the growth of sound in a room, reverberation time, Sabine, sound absorption materials, measurement of the acoustic output of sound sources in live rooms, acoustics factor in architectural design, Environmental Acoustics.

Transduction: Transducer as an electives network, canonical equation for the two simple transducers transmitters, moving coil loud speaker, loudspeaker cabinets, horn loud speaker, receivers, condenser, microphone, moving coil electrodynamics microphone, piezoelectric microphone, calibration of receivers.

ME520	Industrial Automation	3 Credits
-------	-----------------------	-----------

Pre-requisite: ME330

Concept, scope and economic considerations ; fluid control elements; air cylinders, their design and mountings; pneumatic and hydraulic valves for flow control, meter and directional control, hydraulic servo system, JIC symbols; pneumatic safety and remote control circuits, clamping, traversing and releasing operations; switching circuits, Boolean algebra, elementary circuits; classification and application of transfer- devices and feeders, work orienting and picking devices; numerical control principals and applications, concept of adaptive control.

ME522	Exp. Shock & Vibration Analysis	3 Credits
-------	---------------------------------	-----------

Pre-requisite ME325

Introduction: Why study vibration and shock?

Definition of Terms: Transducers; Transducing elements; Measuring instrument or system.

Instruments: Classification of instruments; Important characteristics of instruments.

Transducers: Types of transducers, Construction of transducers.

Frequency Analysis: How to get from time domain to frequency domain; Fourier series; Fast Fourier Transform (FFT); Windowing; Convolution; Digital Fourier analysis.

Vibration Monitoring: Data acquisition; Data analysis.

ME524	Mechanics of Composite Materials	3 Credits
-------	----------------------------------	-----------

Pre-requisite ME303

Introduction to composite materials: classification and characteristics of composite materials, Basic terminology of laminated fiber reinforced composite materials, Fiber and matrices, Methods of manufacture of composite laminate,

Geometrical aspects: Unidirectional laminate continuous, woven roving and in-plane random fibers, volume fraction and weight fraction,

Micromechanical Behavior of Lamina: Determination of elastic properties of unidirectional, in-plane and random fibers lamina, tensile and compressive strengths in fiber direction. Macro-mechanical Behavior of Laminate: Classical lamination theory; lamina stress-strain relationship, resultant laminate forces and moments, special cases of laminate stiffnesses: symmetrical, anti-symmetrical and nonsymmetrical laminates, cross-ply laminate stiffness's. Failure criteria of composite materials. Equilibrium, buckling and vibration equations for laminated plates, Deflection of laminated plates, hydrothermal behavior of composite materials.

ME528	Computer Aided Design	3 Credits
-------	-----------------------	-----------

Pre-requisite ME405

Engineering Design: Cost Engineering, Optimization, Tolerancing Systems(Geometrical tolerances).

Computer Graphics: Computer Design Graphics, Autocad and related software Practice. CAD/CAM Interaction: Introduction to Computer aided manufacturing(CAM), Data Exchange Standards.

ME529	Robotics Analysis	3 Credits
-------	-------------------	-----------

Pre-requisite ME325

Overview: Chronological Perspective; Classifications; Technical Disciplines.

Forward kinematics: Coordinate Transformations; Denavit-Hartenberg representation (DH). D-H Matrix decomposition. Applications to existing robots

Inverse kinematics: General methods, Applications to existing robots, Complete inverse kinematics solution. Arm manipulator.

Motion kinematics: Derivation of the Jacobean; singularities; Inverse velocity and acceleration. Three-dimensional analysis; spherical wrist consequences, wrist and the gripper motions.

Force-Torque Relations; Force-Moment Translations; General Force-Torque relations.

Trajectory Planning: Polynomial paths and cubic segments (CS), Linear segments with parabolic blends(LSPB), Coordinated motion.

Dynamics(kinetics): LaGrange's Equation, Robotic Dynamical Equations, Inverse dynamics.

Positional and Force Control: Unity feedback system; PID Control, Non-linear Control.

ME531	Tribology	3 Credits
-------	-----------	-----------

Pre-requisite ME405

Introduction: Definition of tribology, historical, tribology in industry



Surface topography and surface in contact: The nature of metal surfaces, measurement of surface topography, quantify of surface roughness, contact surfaces: stress distribution due to loading, displacement due to loading, Hertzian contacts .

Friction : Friction measurements, possible cause of friction, the adhesion theory, modified adhesion theory, plastic interaction of surface asperities, , friction of polymer.

Wear: Types of wear, testing methods, simple theory of sliding wear, mechanism of sliding wear of metal and polymer, wear by hard particles, mechanism abrasive wear , Erosion by solid particle impact, application of wear relationship to design

Lubricants and lubrication: Lubricant properties and testing, lubrication regime, hydrodynamic, , elastohydrodynamic and boundary lubrications. Failure analysis due to tribological effects, case studies form industry.

ME532	Automatic Control III	3 Credits
-------	-----------------------	-----------

Pre-requisite ME451

State space methods (Single-input Single-output); State space models and transfer functions, state feedback ;Coordinate basis, similarity transformations ; Solutions of state equations, matrix exponentials, Caley-Hamilton Theorem ; Controllability and pole placement ; State estimation, observability, Kalman decomposition ;Observer-based state feedback control, reference tracking ; Transmission zeros ; Optimal pole placement, symmetric root locus.

Multi-input multi-output systems; Transfer function matrices, state space models of multivariable systems, Gilbert realization; Poles and zeros of multivariable systems, minimal realization.

Closed-loop stability; Pole placement for multivariable systems,LQR design, Kalman filter.

Digital control; Discrete-time systems: difference equations and z-transform; Discrete-time state space models, sampled data systems, poles and zeros ; Frequency response of sampled data systems, choice of sampling rate ;system identification and model order reduction ; Least squares estimation, ARX models, persistent excitation ; Identification of state space models, subspace identification ; Balanced realization and model order reduction.

Case study; Modeling and multivariable control of a process evaporator using Matlab and Simulink Software tools.

ME566	Introduction to system Identification	3 Credits
-------	---------------------------------------	-----------

Pre-requisite GS206 - ME309 - ME330

Syllabus Content Under Preparation

ME591	Special Topics	3 Credits
-------	----------------	-----------

ME592	Seminar	1 Credit
-------	---------	----------



نموذج قائمة المقررات الدراسية للبرنامج الدراسي للهندسة التطبيقية لدرجة البكالوريوس

Department of Mechanical & industrial Engineering

Faculty of Engineering

Study Plan of Applied Mechanics Program

Program : Applied Mechanics

Department Establishment Date : 1961

Study Period : 10 semesters

Number of Total Passed Credits : 149 Unit

Total Credits	Pre-request	Type of course	Distribution by hours			By hours	Credits	Course name	Course No.	The Semester
			Lab-Practes	Tutorial	Lectures					
16	-	د		1	3	4	3	Mathematics I	GS101	First Semester
	-	د		1	3	4	3	Physics I	GS111	
	-	د		1	3	4	3	Engineering Mechanics I	GE121	
	-	د			2	2	2	Workshop Technology	GE129	
	-	د			3	3	3	English I	GH141	
	-	د			2	2	2	Arabic I	GH150	
15	GS101	د		1	4	5	4	Mathematics II	GS102	Second Semester
	GS111	د		1	3	4	3	Physics II	GS112	
	GS111	د	3			3	1	Physics Lab	GS112L	
	GH141	د			3	3	3	English II	GH142	
	GH150	د			1	1	1	Arabic II	GH151	
	-	د	3		1	2	2	Engineering Drawing	GE127	
15	-	د				3	1	Workshop Technology Lab	GE129L	Third Semester
	-	د		1	3	4	3	Chemistry	GS115	
	GS102	د		1	3	4	3	Mathematics III	GS203	
	-	د	3		1	2	2	Engineering Graphics	GE125	
	GS101 GS111	د		1	3	4	3	Properties of Materials	GE133	
	GE121	د		1	3	4	3	Engineering Mechanics II	GE22	
17	-	د	3			3	1	Chemistry Lab	GS115L	Fourth Semester
	GS102	د		1	3	4	3	Mathematics IV	GS204	
	-	د	2		2	4	3	Computer Programming	GS200	
	GS101 GH112L	د		1	3	4	3	Electrical Eng. Fundamentals	EE280	
	-	د		1	3	4	3	Probability & Statistics	GS206	
	GE127	د	2	3	1	5	2	Mechanical Drawing	ME201	
	GS111 -	د		1	3	4	3	Thermodynamics I	ME210	



Total Credits	Pre-request	Type of course	Distribut ion by hours			By hours	Credits	Course name	Course No.	The Semester
			Lab-	Tutorial	Lectures					
15	GE129 GE129L	تخصصي	3			3	2	Workshop Practice	ME202	Fifth Semester
	GE129 GE133	تخصصي		1	3	4	3	Metallurgy	ME206	
	GH151	جامعي			1	1	1	Technical Writing	GH152	
	GE121 GE133	داعم		1	3	4	3	Strength of materials	ME204	
	GE222	تخصصي		1	3	4	3	Mechanics Of Machines I	ME306	
	GS203 GS204 GS200	تخصصي		1	3	4	3	Numerical Analysis	ME309	
15	ME206	تخصصي		1	3	4	3	Production Engineering I	ME215	Sixth Semester
	ME210	تخصصي		1	3	4	3	Heat Transfer I	ME302	
	ME204	تخصصي		1	2	3	3	Stress Analysis I	ME205	
	ME206	تخصصي		1	3	4	3	Production Engineering II	ME315	
	GS204 GE222	تخصصي		1	3	4	3	Mechanical Vibrations	ME325	
15	GS203 GE222 ME210	تخصصي		1	3	4	3	Fluid Mechanics I	ME312	Seventh Semester
	ME302	تخصصي		1	3	4	3	Principles of Air Con. & Ref.	ME322	
	ME302	تخصصي		1	3	4	3	Energy Conversion sys.	ME317	
	ME201 ME207	تخصصي		1	3	4	3	Design Of Mechanical Elements I	ME301	
	ME206	تخصصي		1	3	4	3	Industrial Management	ME261	
15	ME306 ME312 GH152	تخصصي		1	3	4	3	Measur. & Instrumentations	ME318	Eighth Semester
	GS204 EE280 GE222	تخصصي		1	3	4	3	Automatic Control I	ME330	
	GS200	تخصصي		1	3	4	3	Eng. Economics & feasibility	ME365	
	ME205	تخصصي		1	3	4	3	Stress Analysis II	ME303	
	GE222	تخصصي		1	3	4	3	Theory of Machines II	ME326	
14	ME301	تخصصي		1	3	4	3	Design of M/C Elements II	ME405	Ninth Semester
	ME325	تخصصي		1	3	4	3	Theory of Vibrations	ME425	
	ME330	تخصصي	3				2	Automatic Control II	ME451	
	Not less than 100 Credits	تخصصي						Applied Mechanics Lab.	ME492	
	Choose From Table of Elective Applied Mech Courses	تخصصي		1	3	4	3	Elective Applied Mech. Course # 1	ME***	
12	Choose From Table of Elective Applied Mech Courses	تخصصي		1	3	4	3	Elective Applied Mech. Course # 2	ME***	tenth Semester
		تخصصي		1	3	4	3	Elective Applied Mech. Course # 3	ME***	
		تخصصي		1	3	4	3	Elective Applied Mech. Course # 4	ME***	
		تخصصي		1	3	4	3	Elective Applied Mech. Course # 5	ME***	
	Min 130 credit	تخصصي		1	3	4	3	مشروع التخرج B.Sc project	ME599	