

يقسم الهندسة الميكانيكية رؤية لغد الاثنين 14/22

رئيس القسم
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قسم هندسة ميكانيكا الطيران والقوى والانتاج

تم افتتاح قسم الهندسة الميكانيكية بكلية الهندسة بجامعة سرت في العام الجامعي 2005/2006م. ومن منطلق الخبرة التراكمية طيلة الفترات الزمنية الماضية ومواكبة التطورات العلمية ذات العلاقة بالتخصصات العلمية الدقيقة ويحتوي القسم على الشعب التالية (شعبة هندسة ميكانيكا القوى، شعبة هندسة الطيران وشعبة علم مواد وانتاج). تعتبر المدة الدراسية لنيل درجة البكالوريوس هي خمس سنوات دراسية وبنظام الفصلين الدراسيين لكل سنة وتبدأ الدراسة بالسنة الاولى بالقسم العام (العلوم الاساسية) وهي عامة لجميع الطلاب المسجلين بكلية الهندسة تليها سنتين دراسيتين لمقررات في قسم العلوم ميكانيكا العامة ويتم توزيع الطلاب بعد تجاوزهم لمرحلة العلوم ميكانيكا العامة على التخصصات وفق الشعب المطروحة بالقسم ويتم اختيار الشعبة من قبل الطالب بداية من فصل الدراسة السابع خلال دراسته بالكلية وذلك حسب ما هو وارد في جداول المقررات الدراسية وفقاً للقواعد التي يحددها مجلس القسم في ضوء الإمكانيات التعليمية المتاحة بكل شعبة. وبناء على ما تقدم وانطلاقاً من الرغبة الجادة في تطوير ومواكبة التطور العلمي والتركيز على تخصصات دقيقة بالقسم اقترح القسم العلمي فتح الشعب الثلاثة:





ويضم القسم حالياً ثلاث شعب وهى:

1. شعبة هندسة ميكانيكا القدرة

تعتبر هذه الشعبة من الشعب المهمة في قسم هندسة ميكانيكا الطيران والانتاج والقدرة. وتمتاز هذه الشعبة بدروسها التخصصية التي تغطي كل ما يحتاج اليه مهندس ميكانيكا القدرة من تصاميم وتشغيل وصيانة والمحركات والآلات الدوارة في المحطات. وايضا يوفر شعبة هندسة ميكانيكا القدرة اساسيا للمهن الهندسية في الصناعات بالقطاع الخاص والقطاع العام في بلادنا وخاصة في مجال الطاقة والموائع وتوليد الكهرباء والتبريد وتكييف الهواء وتحلية المياه، فمهندس ميكانيكا القدرة يعمل في مجال واسع من الصناعات فهو يعطي مجالات واسعة جدا مثل النظم الميكانيكية الحرارية ونظم تحويل الطاقة وتوليد القدرة الميكانيكية والكهربائية وتشمل ايضا طرق نقل القدرة من خلال تصميم وانتاج واستخدام وسائل خاصة بذلك مثل المبادلات الحرارية والغلايات والتوربينات وابراج التبريد واسالة الغازات الطبيعية وخطوط نقل الغاز والبتروول والمياه ومنظومات التبريد والتكييف الهواء المركزي وتحلية المياه والطاقت الجديدة والمتجددة.

2. شعبة هندسة ميكانيكا الطيران

وتعتبر من التخصصات التي يتميز بها قسم هندسة ميكانيكا الطيران والانتاج والقدرة وتمتاز هذه الشعبة بدراساتها التخصصية التي تغطي كل ما يحتاج اليه مهندس الطيران. هذه الشعبة تعمل على تأهيل المهندس الكفوء للقيام بتصاميم نظرية لملائرة تستطيع الطيران ضمن نطاق الغلاف الجوي. ولهذا العلم أربعة موضوعات رئيسية لابد لمهندس الطيران الإلمام بها - علم قوى الهواء أو الديناميكا الهوائية هو علم يعنى بدراسة التصميم الخارجي للملائرة كلها، علم الاستقرار والتحكم، علم أنظمة الدفع هو يدرس تصميم المحرك وإنتاجه، وهو يعتمد على دراسة الديناميكا الحرارية وديناميكا الغازات وخواص الوقود - علم الإنشاءات والهياكل هو علم يعنى بتصميم وإنتاج هياكل الملائرة وإنشاءاتها، ويركز على المواد ذات المتانة الكافية والوزن الخفيف والإنشاءات رقيقة الجدران والشبكية الشكل.



3. شعبة هندسة ميكانيكا علم المواد والانتاج.

تعتبر المواد دائماً وفي مختلف العصور من أهم عناصر التقدم وبناء الحضارات. وقد سُميت الكثير من هذه الحضارات باسم المواد المبتكرة فيها، ابتداءً من العصر الحجري إلى العصر البرونزي وإلى العصر الحديدي. أما في عصرنا هذا فقد تم ابتكار العديد من المواد التي يمكن استخدامها في شتى المجالات، حيث يهتم علم وهندسة المواد بدراسة العلاقة بين بنية المواد وخواصها، كما يهتم بابتكار طرق معالجة المواد والمحافظة على استمراريتها وتطويرها، وإنتاج مواد جديدة أكثر تطوراً. وقد ساهم هذا العلم في تسارع وثيرة التطور الكبير الذي حدث في المجالات الصناعية المختلفة، والذي يتطلب تطوير وإنتاج مواد تواكب متطلبات الصناعة ذات الخواص الأكثر ملائمة لظروف التشغيل والاستخدام في مجالات متعددة، مما يتيح للألات والمعدات عمراً افتراضياً أطول، كما ساهم في استحداث وتطوير مواد جديدة ذات مواصفات خاصة، لسد احتياجات الصناعات التقنية الحديثة، مثل بناء المفاعلات النووية ومركبات الفضاء والطائرات الحديثة والسفن وتصنيع الدوائر المتكاملة التي تشكل القاعدة الحقيقية للصناعات الالكترونية المتقدمة، والإنشاءات المدنية والمعمارية ذات الطابع الإنشائي الخاص. ونود الإشارة أيضاً إلى علم هندسة الإنتاج الذي يهدف إلى إنتاج وتصميم النظم الميكانيكية، وتطويرها وتحسينها إنتاجياً وخدمياً. وتُعد هندسة الانتاج مطلباً دائماً لمواكبة النظم العلمية والصناعية والإدارية لمتابعة كافة المجالات، سواءً فيما يخص التصنيع والقياسات والجودة والتطبيقات الهندسية الخفيفة والمتوسطة والثقيلة. وتشمل هندسة الإنتاج دراسة العديد من النواحي ذات الصلة بالصناعات المختلفة مثل تصميم الماكينات والألات، علوم الديناميكا والاهتزاز والحركة، عمليات تشكيل المعادن واللحام والحرفلة والحداة، وطرق قطع المعادن والتشغيل والتحكم الآلي بالماكينات، والقياس الدقيق للأبعاد، ونظريات الجودة الشاملة، وتخطيط المصانع، إلى جانب العديد من المجالات الأخرى.



معامل قسم هندسة ميكانيكا الطيران والقوى والانتاج

يضم القسم مجموعة من معامل المتخصصة التي تهدف الى تدريب الطلبة، وتزويدهم بالخبرة العملية في مجال اختصاصهم، والجدول التالي يوضح اسماء معامل.

| | |
|---|--|
| Material Science Laboratory | معامل علم المواد |
| Strength of Material Laboratory | معامل مقاومة مواد |
| Fluid Mechanics Laboratory | معامل ميكانيكا الموائع |
| Thermodynamics Laboratory | معامل ديناميكا حرارية |
| Theory of Machines Laboratory | معامل نظرية آلات |
| Heat Transfer Laboratory | معامل انتقال حرارة |
| Manufacturing Engineering Laboratory | معامل هندسة التصنيع |
| Hydraulic Machines & Gas Dynamics Laboratory | معامل آلات هيدروليكية وديناميكا الغازات |
| Refrigeration & Air Conditioning Laboratory | معامل تبريد وتكييف الهواء |
| Power Plant Engineering & Internal Combustion Engines. Laboratory | معامل هندسة محطات القوى وآلات الاحتراق الداخلي |
| Renewable Energy Laboratory | معامل الطاقات المتجددة |

متطلبات الحصول على درجة البكالوريوس في قسم ميكانيكا الطيران والقوى والانتاج
Requirements for B.Sc. Degree in Mechanic of Aeronautic, Power and
Production Engineering Department

| Year | Fall semester(First) | Spring Semester(Second) | SUM |
|------------------------|----------------------|-------------------------|------------|
| First (Basic Sciences) | 16 | 15 | 31 |
| Second | 16 | 16 | 32 |
| Third | 17 | 16 | 33 |
| Fourth | 13 | 15 | 28 |
| Fifth | 14 | 16 | 30 |
| Total | | | 154 |

| Type of Courses | Year | | | | | SUM |
|--|-------|--------|-------|--------|-------|------------|
| | First | Second | Third | Fourth | Fifth | |
| Human sciences (العلوم الإنسانية) (GH) | 9 | 3 | - | - | - | 12 |
| Basic sciences (العلوم العامة) (GS) | 17 | 9 | 3 | - | - | 29 |
| Basic engineering sciences (العلوم الهندسية العامة) (GE) | 5 | 4 | - | - | - | 9 |
| Compulsory Specialization sciences | - | 16 | 30 | - | - | 46 |
| Compulsory Specialization sciences | - | - | - | 28 | 27 | 55 |
| Elective Specialization sciences (المقررات التخصصية الاختيارية) | - | - | - | - | 3 | 3 |
| SUM | 31 | 32 | 33 | 28 | 30 | |
| Total | | | | | | 154 |



نظام ترقيم المقررات الدراسية

INDEX OF COURSE NUMBERS

Course numbering consists of two letters followed by three digits as follow

| | | | |
|-----|---|---|---|
| MGE | X | Y | Z |
| MPE | | | |
| MAE | | | |
| MME | | | |

MGE: Mechanical General Engineering

MPE: Mechanical Power Engineering

MAE: Mechanical Aeronautic Engineering

MME: Mechanical Materials Engineering

X : Level with respect to the year

Y : indicates the main area within the department

Z : indicates the course secondary areas



| No. | Courses Main Area | Secondary Area No. | Secondary Area |
|-----------|----------------------------------|--------------------|----------------------------------|
| 1 | Technical Arts | X00 - X05 | Engineering Drawing |
| | | | Workshop Technology |
| | | | Avionics |
| | | | Quality Management |
| | | | Engineering Economics |
| | | | Industrial Organization |
| 2 | Mechanics of Solids | X10 - X11 | Strength of material |
| | | | Engineering Mechanics |
| | | | Material Science |
| | | X12 - X15 | Corrosion and Protection |
| | | | Construction Materials |
| 3 | Mechanics of Fluids | X20 - X21 | Fluid Mechanics |
| | | X23 - X24 | Computational Methods |
| | | | Hydraulic Machines |
| | | | Pipe line technology |
| | | | Incompressible Flow |
| | | X25 - X27 | Aircraft Structure |
| | | | X30 - X31 |
| X43 - X44 | Heat Transfer | | |
| | Gas Dynamics | | |
| | Renewable Energy | | |
| 5 | Thermal Engineering Applications | X40 - X41 | Fundamental of Aeronautics |
| | | X42 - X43 | Air Conditioning & Refrigeration |
| | | | Steam Power Engineering |
| | | | Engines |
| | | | Water Desalination |
| | | | Power plant Engineering |
| | | | Cryogenic Engineering |



| | | | |
|---|---------------------------------------|-----------|---|
| | | | Mechanical design using F.E.Packages |
| | | X44 - X45 | Turbo-machine |
| 6 | Theory of Machine | X50-X51 | Theory of Flight |
| | | X52 - X54 | Theory of Machine |
| | | | Mechanical Vibration |
| | | | Machine Design |
| | | | Flight Dynamics |
| | | | Aircraft Performance |
| | | | Aircraft Components Design and Assembly |
| 7 | Industrial and Production Engineering | X60 - X62 | Manufacturing Processes |
| | | | Welding Technology |
| | | | Corrosion Engineering and Protection |
| | | | Maintenance Engineering |
| | | | Production Engineering |
| 8 | Mechatronics | X70 - X72 | Basic of Electrical & Electronics Engineering |
| | | | Automatic Control |
| | | | Aircraft Electricity and Instruments |
| | | | Aircraft Stability and Control |
| | | | Engineering Measurements |
| | | | Elective Course |
| 9 | Graduation & Training and Others | | Seminar |
| | | | Graduation Project |



المقررات الدراسية لقسم ميكانيكا الطيران والقوى والانتاج

Academic Courses for Mechanic of Aeronautic, Power and
Production Engineering Department

Engineering Courses for all Sections

علوم هندسية أساسية لجميع الشعب

Second Year

Third Semester Courses

| No | Course Name | Code | Units | Weekly Hours | | | Prerequisite |
|----|--------------------------|--------|-------|--------------|----------|-----------|--------------|
| | | | | Lecture | Tutorial | Practical | |
| 1 | Mathematics III | GS222 | 3 | 3 | 1 | - | GS121 |
| 2 | Engineering Workshop | GE244 | 2 | 1 | - | 2 | - |
| 3 | Descriptive Geometry | GE243 | 2 | 2 | 1 | - | GE142 |
| 4 | Computer Science | GS228 | 3 | 2 | - | 2 | - |
| 5 | Strength of Materials I | MGE221 | 3 | 3 | 1 | - | GE140&GS131 |
| 6 | Engineering Mechanics II | MGE224 | 3 | 3 | 1 | - | GE140 |
| | | | 16 | | | | |



Fourth Semester Courses

| No | Course Name | Code | Units | Weekly Hours | | | Prerequisite |
|----|--------------------------|---------|-------|--------------|----------|-----------|--------------|
| | | | | Lecture | Tutorial | Practical | |
| 1 | Mathematics IV | GS223 | 3 | 3 | 1 | - | GS222 |
| 2 | Technical Report Writing | GH218 | 1 | 1 | 1 | | |
| 3 | National Culture | GH214 | 2 | 3 | - | - | |
| 4 | Mechanical Drawing | MGE211 | 2 | 1 | - | 2 | GE142 |
| 5 | Materials Science | MGE225 | 2 | 2 | 1 | - | GS131 |
| 6 | Materials Science Lab. | MGE225L | 1 | - | - | 2 | GS131 |
| 7 | Fluid Mechanics I | MGE231 | 3 | 3 | 1 | - | GS131&GS121 |
| 8 | Theory of Machines I | MGE261 | 2 | 2 | 1 | - | MGE224 |
| | | | 16 | | | | |

Third Year

Fifth Semester Courses

| No | Course Name | Code | Units | Weekly Hours | | | Prerequisite |
|----|---|--------|-------|--------------|----------|-----------|-----------------|
| | | | | Lecture | Tutorial | Practical | |
| 1 | Statistics & Probability | GS324 | 3 | 3 | 1 | - | - |
| 2 | Basics of Electrical & Electronics Eng. | MGE380 | 3 | 3 | 1 | | GS130 & GS120 |
| 3 | Thermodynamics I | MGE341 | 3 | 3 | 1 | - | GS131 & GS121 |
| 4 | Machine Design I | MGE364 | 3 | 3 | 1 | - | MGE211 & MGE221 |
| 5 | Production Engineering I | MGE376 | 3 | 3 | 1 | - | GE244 |
| 6 | Engineering Economics | MGE315 | 2 | 2 | 1 | | |
| | | | 17 | | | | |



| Sixth Semester Courses | | | | | | | |
|------------------------|------------------------------------|--------|-------|--------------|----------|-----------|---------------|
| No | Course Name | Code | Units | Weekly Hours | | | Prerequisite |
| | | | | Lecture | Tutorial | Practical | |
| 1 | Quality Management | MGE314 | 3 | 3 | 1 | | |
| 2 | Industrial Organization | MGE316 | 2 | 2 | 1 | | MGE315 |
| 3 | Heat Transfer I | MGE343 | 3 | 3 | 1 | - | GS222&MGE341 |
| 4 | Automatic Control | MGE382 | 3 | 3 | 1 | - | GS222&MGE224 |
| 5 | Corrosion Engineering & Protection | MGE474 | 3 | 2 | 1 | - | MGE225 |
| 6 | Engineering Measurements | MGE385 | 2 | 2 | 1 | - | MGE231&MGE341 |
| | | | 16 | | | | |



المحتوي العلمي للمقررات الدراسية لجميع الشعب بقسم ميكانيكا الطيران والقوى والانتاج ,Description of Courses Content for All Sections in Mechanic of Aeronautic Power and Production Engineering Department

MGE 221 Strength of Materials I (3 Units) Prerequisite: GE 140, GS131

Stress-strain concept - Stress-strain relationship - Shear stress-strain - Hooks law - Stresses in composite bars - Thermal stresses - Application to the simple problems of statically determinate and statically indeterminate problems - Theory of thin cylinders - Stress-strain analysis - Mohr circles - Simple theory of beams - Shear force - Bending moment diagram - Simple theory of torsion

MGE 224 Engineering Mechanics II (3 Units) Prerequisite: GE 140

Kinematics: Rectilinear translation - Curve linear translation - Curvilinear motion - Application to simple engineering problems - Kinetics: Newton's laws of motion - D'Alembert's principle and application to problems - Moment of inertia of area and masses of various regular bodies - Rotation of rigid bodies - Plane motions and application - Work – energy methods for particles and rigid bodies - Power and impulse momentum - Mechanical vibration

MGE 211 Mechanical Drawing (2 Units) Prerequisite: GE 142

The theoretical part: Understanding the most important topics like - Fasteners (Bolts & Screws) - Locking aids - Keys & Feathers - Splint shafts – Rivets - Weld representations - Gear representations - Marking of metals - Surface roughness - Grades of accuracy - Fits & Tolerances - PIN & ISO- Standards - The practical part: Assembly and detailed drawings of some mechanical parts that have to cover the mentioned topics - Computer applications of engineering drawing (AutoCAD)



MGE225 Materials Science (2 Units)

Prerequisite: GS 131

Introduction – Types – Structure properties – Strength to weight ratio - Atomic arrangement – Unit cells – Allotropic transformation - Atomic movement in materials – Diffusion – Fick's second law – Kirkendall effect – Solidification and grain size – Strengthening – Solid solution strengthening – Deformation strain hardening and annealing (cold and hot working) – Dispersion strengthening by phase transformation and heat treatment

MGE 231 Fluid Mechanics I (3 Units)

Prerequisite: GS131 & GS121

Introduction in fluid mechanics – Definitions and units – Fluid properties – Fluid hydrostatic – Fluid dynamics – Flow of ideal incompressible fluids – Boundary layer - Impact and momentum principles – Similarity and dimensional analysis – Fluid flow in pipes – Flow measurements – Computer applications in fluid mechanics

MGE 261 Theory of Machines I (2 Units)

Prerequisite: MGE224

Fundamental concepts - Properties of motion relative motion – Linkages - Instant Centres - Velocities by instant centres and by components - Method of relative velocities - Acceleration in mechanism - Kinematics of gear mechanism - Gear trains and non-standard gears - Cams: types of cams - Motion of cams: simple harmonic – Parabolic - Cycloidal motion - Construction of cam profile – tangent - Circular and polynomial cams - Belts drives - Static force and moment analysis; analytical and graphical methods - Superposition principle - Dynamic analysis - Dynamic of rigid bodies - Centre of percussion



MGE 380 Basics of Electrical and Electronics Eng. (3 Units) Prerequisite: GS120 & GS130

Analysis of DC circuits using Kirchhoff's laws, Thevenin's, Norton's and Superposition theorem, A.C fundamental, Generation of alternating emf, Analysis of R-L, R-C and R-L-C circuits, Series and Parallel resonance, 3-phase star and delta connected systems, Power and Power factor. The direct current – Electrical circuits theories – Delta and star junction and the conversion between them–Continuous sinusoidal AC circuits – Solving using time vectors – Electrical power and power coefficient in AC circuits – Three phase current – Electrical machines – DC machines – Electrical transformers – Synchronize machines – Induction machines – Small power motors. Conductors and semiconductors – Diodes and its applications – Bipolar transistor – Field effect transistor – Basic amplifier transistor circuits – Feed and biasing transistors – Small signals transistors models – One stage amplifier analysis

MGE 341 Thermodynamics I (3 Units) Prerequisite: GS131 & GS121

Basic concepts of thermodynamics - Ideal and actual gases – Mixtures of gases – The first law of thermodynamics – The basic processes of ideal gases – The second law of thermodynamics – Entropy – Availability – The thermodynamic probability – Differentials thermodynamic relationships – Thermodynamic property relations – Properties of pure substance - The thermodynamic properties of materials – Vapor processes – Heat flow processes

MGE 364 Machine Design I (3 Units) Prerequisite: MGE211 & MGE221

Process of Designing - Recording the design ideas - Forms of the design documentation - Design analysis -Optimum design - Stress and external loads - Stress concentration - Safety of factors - Stress as function of time - Fracture: Fatigue analysis - Bolted joint - Welding joint - Riveted joints - Screw joints - Power screws - Tolerances and fits in connections - Shaft design - Hub-shaft joints Combined load - Combined stresses



MGE 376 Production Engineering I (3 Units)

Prerequisite: GE 244

Mechanical working of metals, hot and cold working. Metal forming processes and equipment: Rolling, Forging, Extrusion, Drawing. Introduction and classification of machine tools, cutting tools and their materials, cutting fluids

MGE 314 Quality Management (3 Units)

Prerequisite

Quality and global competitiveness - Quality management and ethics - Quality culture - Customer satisfaction and retention - Employee empowerment - Leadership and change - Team building and teamwork - Education and training - Overcoming politics - Negativity and conflict in the workplace - ISO9000 and total quality

MGE 316 Industrial Organization and Works Management (2 Units) Prerequisite: MGE315

Introduction and definitions – Industrial Organization as control-architecture and functional-architecture – Industrial managements: types, principles, elements, functions. [The main five functions] – General overview about the following scientific managements: Process management (operation & maintenance planning and management) – Product management - Manpower (human resources) management – Materials and logistics management - Expenses in industry and costs management - Applications and used technologies

MGE 343 Heat Transfer I (3 Units)

Prerequisite: GS222 & MGE341

Introduction on modes of heat transfer – Conduction – Convection and radiation - Conduction heat transfer energy equation – Steady-state conduction - Heat transfer with varying conductivity – One-dimensional conduction heat transfer in cartesian and cylindrical coordinates – Conduction heat transfer with heat generation - Extended surfaces (fins) – Principles of convective heat transfer – Dimensionless analysis of forced convection heat transfer – Natural convection systems



MGE 382 Automatic Control (3 Units)

Prerequisite: GS222 & MGE224

Review of math – Tools - Complex number and Laplace transformation - Introduction to the control systems and classification - Mathematical modeling of dynamic systems - Block diagram and their algebra - Performance of the open and close loop control systems - Stabilities of linear close loop system - Root locus methods and application - Frequency response methods - Stability on frequency domain - Design and compensation of feedback control systems. Transient response analysis, 1st order system, .2nd order systems using MATLAB with Simulink

MGE 474 Corrosion Engineering & Protection (3 Units)

Prerequisite: MGE 225

Definition, Electrochemical Nature of Corrosion, Thermodynamics Aspect of Corrosion, Forms of Corrosion, Corrosion Control: material selection, design, inhibitors, coating, cathodic and anodic protection

MGE 385 Engineering Measurements (2 Units)

Prerequisite: MGE 231 & MGE 341

Fundamentals of measurements – Characteristics of Measurement system – Classifications of measuring devices – statistical analysis of experimental data – Multipurpose measuring transducers – Electrical indicators – Pressure measurements – Flow measurements – Temperature measurements – Transport properties measurements – Time, velocity, and acceleration measurements – Force, torque, and power measurements – The linear measurements – Analogue devices (mechanical, electrical and fluids pressure) – Angles measurements – Fits and Tolerances - Design of instruments and measurements systems



شعبة هندسة ميكانيكا القوى

Mechanic Power Engineering Section

A. Compulsory Courses for Mechanic Power Engineering Section

المقررات الهندسية الملزمة لشعبة هندسة ميكانيكا القوى

Fourth Year

Seventh Semester Courses

| No | Course Name | Code | Units | Weekly Hours | | | Prerequisite |
|----|-------------------------------|---------|-------|--------------|----------|-----------|--------------|
| | | | | Lecture | Tutorial | Practical | |
| 1 | Fluid Mechanics II | MPE432 | 2 | 2 | 1 | - | MGE231 |
| 2 | Thermodynamics II | MPE442 | 2 | 2 | 1 | - | MGE341 |
| 3 | Thermodynamics Laboratory | MPE442L | 1 | - | - | 2 | MGE341 |
| 4 | Heat Transfer II | MPE444 | 2 | 2 | 1 | - | MGE343 |
| 5 | Heat Transfer Laboratory | MPE444L | 1 | - | - | 2 | MGE343 |
| 6 | Theory of Machines II | MPE462 | 2 | 2 | 1 | - | MGE261 |
| 7 | Theory of Machines Laboratory | MPE462L | 1 | - | - | 2 | MGE261 |
| 8 | Mechanical Vibration | MPE463 | 2 | 2 | 1 | - | MGE221 |
| | | | 13 | | | | |



Eighth Semester Courses

| No | Course Name | Code | Units | Weekly Hours | | | Prerequisite |
|----|--------------------------------|---------|-----------|--------------|----------|-----------|-----------------|
| | | | | Lecture | Tutorial | Practical | |
| 1 | Hydraulic Machines | MPE434 | 3 | 3 | 1 | - | MPE432 |
| 2 | Gas Dynamics | MPE445 | 2 | 2 | 1 | - | MPE432 & MPE442 |
| 3 | (Hyd. Mach.& Gas Dyn.) Lab. | MPE445L | 1 | - | - | 2 | ----- |
| 4 | Internal Combustion Engines | MPE453 | 3 | 3 | 1 | - | MGE343 |
| 5 | (P.P. Eng.& I.C. Engines) Lab. | MPE455L | 1 | - | - | 2 | ----- |
| 6 | Machine Design II | MPE465 | 2 | 2 | 1 | - | MGE364 |
| 7 | Maintenance Engineering | MPE475 | 3 | 3 | 1 | - | MGE315 |
| | | | 15 | | | | |

Fifth Year

Ninth Semester Courses

| No | Course Name | Code | Units | Weekly Hours | | | Prerequisite |
|----|----------------------------------|---------|-----------|--------------|----------|-----------|-----------------|
| | | | | Lecture | Tutorial | Practical | |
| 1 | Renewable Energy | MPE546 | 3 | 3 | 1 | - | MGE343 |
| 2 | Refrigeration & Air Conditioning | MPE551 | 3 | 3 | 1 | - | MPE442 |
| 3 | Refrigeration & Air Cond. Lab. | MPE551L | 1 | - | - | 2 | ----- |
| 4 | Power Plant Engineering | MPE555 | 2 | 2 | 1 | - | MGE315 & MPE442 |
| 5 | MPE Project I: Seminar | MPE591 | 2 | - | - | 2 | Min 126 units |
| 6 | Turbo Machines | MPE558 | 3 | 3 | 1 | - | MPE442 |
| | | | 14 | | | | |



Tenth Semester Courses

| No | Course Name | Code | Units | Weekly Hours | | | Prerequisite |
|----|-----------------------------|--------|-------|--------------|----------|-----------|-----------------|
| | | | | Lecture | Tutorial | Practical | |
| 1 | Computational Method in MPE | MPE533 | 3 | 3 | 1 | - | MGE231 & MPE44 |
| 2 | Elective I | MPE580 | 3 | 3 | 1 | - | ---- |
| 3 | Sea water Desalination | MPE554 | 3 | 3 | 1 | - | MPE444 & MPE442 |
| 4 | ME Project II | MPE592 | 4 | 3 | 1 | - | MPE591 |
| | | | 13 | | | | |

B. Elective Courses for Mechanic Power Engineering Section

المقررات الهندسية الاختيارية لشعبة هندسة ميكانيكا القوى
(يتم اختيار مقرر بـ 3 وحدات)

| No. | Course Name | Designation | Units | عنوان المقرر |
|-------|-------------------------------------|-------------|-------|--------------------|
| 1. | Introduction to Railway Engineering | MPE580 | 3 | |
| 2. | Aircraft Engine Design | MPE580 | 3 | |
| 3. | Solar Thermal Energy | MPE580 | 3 | |
| 4. | Fundamentals of Combustion | MPE580 | 3 | |
| Total | | | 3 | إجمالي عدد الوحدات |



المحتوي العلمي للمقررات الدراسية الخاصة بشعبة هندسة ميكانيكا القوى

Description of Courses Content for Mechanic Power Engineering Section

MPE 444 Heat Transfer II (2 Units)

Prerequisite: MGE 343

Multidimensional conduction heat transfer - One-dimensional unsteady conduction heat transfer – Forced convection - External and internal flows - Momentum and thermal boundary layers analysis (momentum integral method) – Natural convection - Boiling heat transfer - Nucleate boiling - Film boiling – Condensation heat transfer - Condensation, turbulent and laminar film condensation on surfaces – Heat exchanger and its types – Logarithmic mean temperature difference calculation – Fouling resistance - Heat exchanger design - Thermal insulation – Types - Properties and selection methods of insulating materials

MPE 432 Fluid Mechanics II (2 Units)

Prerequisite: MGE 231

Introduction in fluid dynamics – Physical laws in fluid mechanics field – Reynolds transport theorem – Analysis of some engineering applications by control volume method – Deducing the Navier-Stock's equations - The use of Navier-Stock's equations in solving some engineering applications – Boundary layer theory – Boundary layer solution using Von-Karmen equations - Potential flow theory and its applications, using conformal mapping - Computer applications in the field of fluid mechanics



MPE 442 Thermodynamics II (2 Units)

Prerequisite: MGE 341

Mixture: General consideration - Dalton's - Amagat model of a mixture of gas and a vapor - Psychometric chart - Combustion: Fuels - Combustion process - Enthalpy of formation - Adiabatic flame temperature - Heat of reaction - Bomb and Juncker's calorimeters - Thermodynamics cycles: Carnot - Rankine – Reheat – Otto – Diesel – Dual – Brayton – Vapour - Compression refrigeration - Ammonia-absorption refrigeration cycles - Thermodynamics relations: Maxwell relations - Relations involving, Enthalpy, Internal energy and Entropy - Thermodynamics tables

MPE 462 Theory of Machines II (2 Units)

Prerequisite: MGE 261

Static force and moment analysis; analytical and graphical methods – Superposition principle – Dynamic analysis - Dynamic of rigid bodies - Center of percussion – Shaking forces and moments – Vibration analysis – Critical speed and resonance – Longitudinal and transverse vibrations – Tensional vibrations balancing: static and dynamic balancing – Balancing machines – Balancing of rotating masses -Reciprocating engines – Flywheel - Dynamic of analysis of cams .– Governors



MPE 463 Mechanical Vibration (2 Units)

Prerequisite: MGE 221

Introduction to the concept - Simple harmonic motion - Combination and split up of simple harmonic motions - Un-damping free vibration of single degree freedom - Systems: Natural frequency of vibration - Energy method - Simple and compound pendulum – Energy - Force and torque methods - Equivalent systems - Damping free vibration of single degree freedom system: viscous damping - under critical and over damping system - Equivalent dampers - Coulomb damping - Equivalent damping - Coefficient - Logarithmic decrement - Forced vibration of single degree freedom system - Sources of excitation, impresses harmonic force - Impressed force due to unbalance or acceleration excitation - Motion excitation - Magnification factor - Frequency response - Two degree freedom system - Natural frequency: classical method – Models - Multi degree freedom systems: Holzers methods – Reyleghs method – St.odoas method

MPE 434 Hydraulic Machines (3 Units)

Prerequisite: MPE 432

Introduction – Velocity triangles – Principles of momentum - Energy equation – Turbo machine theory - Euler theory – Dimensional analysis – Efficiency laws – Specific speed – Specific diameter – Pressure and volume coefficients – Cascade mechanics – Analysis of Force and coefficient of lift and drag resistance – Cascade performance – Pressure and flow rate diagram for straight cascade – Pressure distributor – Centrifugal pumps (performance – maintenance – troubles) – Cavitations theorem – Axial pumps – Pump selection – Hydraulic turbines – Pelton wheel – Francis Turbine – Kaplan turbine – Axial compressors – Volumetric machines .– Performance of reciprocating and rotary pumps



MPE 445 Gas Dynamics (2 Units)

Prerequisite: MPE432 & MPE442

Principals – Continuity and Bernoulli equations for compressible flow – Sonic velocity and mach number – Waves spreading – Empirical relations between pressure, temperature, density, and mach number – Flow density – The difference between subsonic and supersonic flow – The effect of increase in entropy – Damping energy – Accelerating and decelerating velocity in flow in pipes – Shock wave – Vertical shock wave equations derivation – Curve of multi weak shock waves – Shock wave spreading velocity – Two dimensional gas dynamic problems .– Frictional equations derivation – Subsonic flow – Expansion relations for supersonic flow

MPE 453 Internal Combustion Engines (3 Units)

Prerequisite: MGE 343

Basic engine types and their operation - Testing and dynameters, performance factors - Pressure measurement - Combustion in SI-engine - Combustion in CI-engine – Fuels - Octane and Cetane ratings - Knock and detonation the engine variables - Fuel metering in SI-engine - Elementary carburator, ignition systems - Fuel metering in CI engines - Wankel engine

MPE 465 Machine Design II (2 Units)

Prerequisite: MGE 364

Design analysis of shaft coupling and clutches - Introduction to friction and wear theory – Bearings - Rolling bearings - Selection and bearing calculations - Examples of correct design of bearing systems - Journal bearings; bearings with fluid and mixed friction - Construction and calculations of journal bearings - Gears: Spur gears - Geometry of bearings determinations of teeth numbers and load - Design analysis of gear trains - Planetary gear trains – Constructional arrangements - bevel worm and helical gears – Belt – Rope and chain drive - Computer methods application for optimum design of machine elements



MPE 475 Maintenance Engineering (3 Units)

Prerequisite: MGE 315

Introduction: Definition and objectives – Statistical concepts – Mathematics of failure: Reliability concepts – Fitting distribution to failure data – Maintenance management: investment decisions – Maintenance profit impact – Maintenance structure: Preventive – time based – condition based – corrective – design out – Data analysis: Renewal – repairable systems – Laplace trend test – analysis methodology – Optimizing maintenance strategies: Replacement/overhaul age – Inspection frequencies – Capital replacement – Simulation – Reliability – Centered Maintenance (RCM) – Maintenance systems: Components – structure – computer methods – Maintenance Practice: Systems approach – Management approach – Modeling

MPE 533 Computational Methods in Mech, Eng (3 Units) Prerequisite: MPE 432 & MPE 442

Introduction to computational fluid dynamics – Methods of engineering calculating and evaluating – Numerical representation for fluid and heat flow equations using finite difference and finite volume methods – Principles of accuracy, converging and stability of numerical solutions – Application in fluid flow problems and thermal processes using numerical analysis .computer program packages and computational fluid dynamics

MPE 546 Renewable Energy (3 Units)

Prerequisite: MGE 343

Introduction - The Origin of Renewable Energy Flows - The Individual Energy Sources - The Energy Conversion Processes - Energy Transmission and Storage - Energy Supply Systems - .Socio-economic assessment of Energy supply systems - Technologies for Renewable Energy



MPE 551 Refrigeration and Air Conditioning (3 Units) Prerequisite: MPE 442

Introduction – Gas Refrigeration cycles – Vapour compression cycles – Working fluids - Refrigerants – Multi pressure cycles – Compressors – Condensers – Expansion devices – Evaporators – Complete vapour compression refrigeration system – Moist air properties – Psychometric and air conditioning processes – Vapour absorption cycle – Vapor suction cycles – Applications in air conditioning – Designing considerations – Load estimation – Air transport and distribution – Control devices – Non-conventional cooling systems

MPE 555 Power Plant Engineering (2 Units) Prerequisite: MGE315 & MPE442

Energy sources and utilization – The thermodynamic analysis of Rankine cycle – Steam generators – The condensate feed water systems – The circulating water systems - Cooling systems . – Gas turbines and combined cycles – The nuclear power stations – Power plant economics

MPE 558 Turbo Machines (3 Units) Prerequisite: MPE442 & ME445

Introduction in Turbo machines - Turbo machines types – Thermodynamic cycles of turbo machines – Steam flow in turbo machine nozzles – Steam flow through impulse and reaction turbine blades – Bleeding and reheat systems in steam turbines – Performance parameters at variable loads - Methods of steam turbine control – Velocity regulation in steam turbines – Thermodynamic cycles of steam turbines - Gas turbines types – Thermodynamic cycles of gas turbines - Elements of gas turbines used in power stations and jet engines – Gas turbine performance – Air compressors – Design and methods of cooling gas turbine blades – Inlet and outlet ports of gas turbines used in airplanes - Diffusers design – Combustion chambers in gas turbines – Combined cycles



MPE 591 MPE Project I: Seminar (2 Units)

Prerequisite

The first in a two-part course sequence applying an integrated system design approach on a team-based project, open-ended problem with realistic constraints. Team effort and both oral and written presentations are a part of the experience. Important topics are presented in the lectures including the design process, design tools, engineering communication, engineering .ethics, and intellectual property

MPE 554 Seawater Desalination (3 Units) Prerequisite: MPE 444 & MPE 442

Potable water resources and need for desalination, Fundamentals of desalination, Overview and classification of desalination techniques, Single and multiple effect evaporation, Vapor compression, Single and Multi-stage flash distillation, Reverse Osmosis, Hybrid processes, Dual Purpose Power and Desalination plants, Desalination powered by renewable energy .sources, Economic analysis, Brine discharge management

MPE 592 MPE Project II (4 Units)

Prerequisite: MPE 591

Continuation and completion of project started in ME. Oral presentation and submission of final written report of the design project are essential requirements for the completion of the .course



MPE 580 Introduction to Railway Engineering (3 Units) Prerequisite

Introduction and History of Railway Design; Comparisons to Other Transport Systems; Economy, Requirements, Resources and Strategy; Demand Tariffs and Capacity; Rolling Stock; Railway Operations; Modern Railways Designs; Gauge Selection; Railway Traction and Loading; Route Design; Platforms, Bridges, Crossings, Canopies and Depots; Sand Blankets, Drains, Masonry, Fasteners, Concrete, Bolts and Welds; Sleeper, Ballast and Sub-Beds; Wheel-Rail Interface; Curves and Gradients; Track Loads; Wheel Design; Mechanical Problems: Life-time, Failures, Thermal, Stresses, Strains, Elasticity, Wear and Creep Issues. Track .Defects

MPE 580 AIRCRAFT ENGINE DESIGN (3 Units) Prerequisite

Turbine aviation engines: scope of using, design schemas, overview of units, aerothermodynamics calculations techniques. Short overview of basic design problems, overview basic responsibilities of control, diagnostic and monitoring unit. Guided, individual or group project of aircraft engines or its elements, the maintenance and repair procedures of both Piston and .Gas Turbine Engines and their procedures followed for overhaul of aero engines



شعبة هندسة ميكانيكا الطيران

Mechanic Aeronautic Engineering Section

A. Compulsory Courses for Mechanic Aeronautic Engineering Section

المقررات الهندسية الملزمة لشعبة هندسة ميكانيكا الطيران

Fourth Year

Seventh Semester Courses

| No | Course Name | Code | Units | Weekly Hours | | | Prerequisite |
|----|----------------------------|---------|-------|--------------|----------|-----------|----------------|
| | | | | Lecture | Tutorial | Practical | |
| 1 | Fundamental of Aeronautics | MAE450 | 3 | 3 | 1 | - | GS222& MGE231 |
| 2 | Theory of Flight | MAE460 | 2 | 2 | 1 | - | MGE224 &MGE261 |
| 3 | Heat Transfer II | MAE444 | 2 | 2 | 1 | - | MGE343 |
| 4 | Aircraft Vibration | MAE463 | 2 | 2 | 1 | - | MGE224 |
| 5 | Hydraulic Turbomachine | MAE458 | 3 | 2 | 1 | - | MGE341&MGE231 |
| 6 | Thermodynamics II | MAE442 | 2 | 2 | 1 | - | MGE341 |
| 7 | Thermal-Fluid Lab | MAE4421 | 1 | - | - | 2 | MGE341&MEG231 |
| | | | 15 | | | | |



Eighth Semester Courses

| No | Course Name | Code | Units | Weekly Hours | | | Prerequisite |
|----|--|---------|-----------|--------------|----------|-----------|-----------------|
| | | | | Lecture | Tutorial | Practical | |
| 1 | Aircraft Engines and Jet Propulsion | MAE453 | 3 | 3 | 1 | | MAE450 & MAE442 |
| 2 | Fundamentals of Aircraft Electricity and Instruments | MAE483 | 3 | 3 | 1 | | MGE380 & MGE385 |
| 3 | Flight Dynamics | MAE466 | 2 | 2 | 1 | | MAE450 |
| 4 | Incompressible Flow | MAE436 | 2 | 2 | 1 | | MGE231 & MAE442 |
| 5 | Aero-Fluid Mechanics and Machinery Lab | MAE432L | 1 | | | 2 | MAE450 |
| 6 | Computational Method in MAE | MAE433 | 2 | 2 | 1 | - | MAE450 & MAE442 |
| 7 | Aircraft construction materials | MAE427 | 2 | 2 | 1 | - | MGE225 |
| | | | 14 | | | | |

Fifth Year

Ninth Semester Courses

| No | Course Name | Code | Units | Weekly Hours | | | Prerequisite |
|----|--|--------|-----------|--------------|----------|-----------|-----------------|
| | | | | Lecture | Tutorial | Practical | |
| 1 | Aircraft Structures I | MAE537 | 3 | 3 | 1 | | MAE427 |
| 2 | Aircraft Performance | MAE567 | 2 | 2 | 1 | | MAE460 |
| 3 | Aircraft Component Design and Assembly | MAE568 | 2 | 2 | 1 | | MAE460 & MAE463 |
| 4 | MAE Project: Seminar | MAE591 | 2 | | 1 | 1 | Min. 126 Units |
| 5 | Aircraft Stability and control | MAE584 | 2 | 2 | 1 | | MAE483 |
| 6 | Avionics | MAE513 | 2 | 2 | 1 | | MGE211 |
| | | | 13 | | | | |



| Tenth Semester Courses | | | | | | | |
|------------------------|------------------------------|----------|-------|--------------|----------|-----------|-----------------|
| No | Course Name | Code | Units | Weekly Hours | | | Prerequisite |
| | | | | Lecture | Tutorial | Practical | |
| 1 | Aircraft Maintenance Systems | MAE575 | 3 | 3 | 1 | | MGE315 & MAE567 |
| 2 | Aircraft Structures II | MAE538 | 2 | 2 | 1 | - | MAE537 |
| 3 | Aerospace Structures Lab | MAE538 L | 1 | | | 2 | MAE537 |
| 4 | Elective I | MAE580 | 3 | 3 | 1 | | ---- |
| 4 | MAE Project II | MAE592 | 4 | 4 | | 2 | MAE591 |
| | | | 13 | | | | |

B. Elective Courses for Mechanic Aeronautic Engineering Section

المقررات الهندسية الاختيارية لشعبة هندسة ميكانيكا الطيران (يتم اختيار مقرر بـ 3 وحدات)

| No. | Course Name | Designation | Units | عنوان المقرر |
|-------|--------------------------|-------------|-------|--------------------|
| 1. | Helicopter Theory | MAE580 | 3 | |
| 2. | Environmental Pollution | MAE580 | 3 | |
| 3. | Air-Breathing Propulsion | MAE580 | 3 | |
| 4. | Finite Element Method | MAE580 | 3 | |
| Total | | | 3 | إجمالي عدد الوحدات |



المحتوي العلمي للمقررات الدراسية الخاصة بشعبة هندسة ميكانيكا الطيران Description of Courses Content for Mechanic Aeronautic Engineering Section

MAE 450 Fundamental of Aeronautics (3 Units) Prerequisite: GS222& MGE231

Dynamics of atmosphere, structural and geometric configuration of aircraft components, airfoil and wing geometry, general aerodynamic characteristics of airfoils and wings, aerodynamic forces and moments, high speed flight, viscous effects. Performance: General meaning of aircraft performance, elements of aircraft performance, power effects, operating limitations, Flight mechanics: General meaning of equilibrium, general meaning of stability, requirements to achieve equilibrium effect of C.G. position, types of controls of aircraft, lateral and directional control of aircraft. Propulsion: Aircraft engine types, aircraft engine components, Structures: Familiarization with the main components of the airplane, and terminology, control surfaces, basic flight instruments, structural configuration, basic materials and manufacturing processes

MAE 460 Theory of Flight (2 Units) Prerequisite: MGE224 &MGE261

Flight of lighter than and heavier than air, lift, drag, and moment of flight vehicles, general equations of motions of airplanes in free space, different coordinate systems, atmospheric flight, thrust and power required for propeller driven and turbojet driven aircraft systems, level performance, climb, cruise performance, take-off and landing, manoeuvre performance, turning flight, thrust and lift boundaries of aircraft. Longitudinal, lateral and directional static stability, handling qualities and characteristics of light aircraft, fixed wing aircraft in subsonic .flight, manoeuvring characteristics of perturbed motion



MPE 444 Heat Transfer II (2 Units)

Prerequisite: MGE343

Multidimensional conduction heat transfer - One-dimensional unsteady conduction heat transfer – Forced convection - External and internal flows - Momentum and thermal boundary layers analysis (momentum integral method) – Natural convection - Boiling heat transfer - Nucleate boiling - Film boiling – Condensation heat transfer - Condensation, turbulent and laminar film condensation on surfaces – Heat exchanger and its types – Logarithmic mean temperature difference calculation – Fouling resistance - Heat exchanger design - Thermal insulation – Types - Properties and selection methods of insulating materials

MAE 463 Aircraft Vibration (2 Units)

Prerequisite: MGE224

Basic concepts of vibration and applications-Free vibration of single degree of freedom systems; damped, vibrations; types of damping; forced vibrations of single-degree of freedom system. Two degrees of freedom systems; normal modes of vibration; coupled co-ordinate; Multi-degree of freedom system; flexibility matrix and stiffness matrix; Eigen values and Eigenvectors; Lagrange's equation with application Torsional and bending vibration of continuous systems; Vibration measuring instruments; aircraft ground resonance test



MAE 458 Hydraulic Turbomachine (3 Units) Prerequisite: MGE231&MGE341

Introduction in Turbo machines - Turbo machines types – Thermodynamic cycles of turbo machines – Steam flow in turbo machine nozzles – Steam flow through impulse and reaction turbine blades – Bleeding and reheat systems in steam turbines – Performance parameters at variable loads - Methods of steam turbine control – Velocity regulation in steam turbines – Thermodynamic cycles of steam turbines - Gas turbines types – Thermodynamic cycles of gas turbines - Elements of gas turbines used in power stations and jet engines – Gas turbine performance – Air compressors – Design and methods of cooling gas turbine blades – Inlet and outlet ports of gas turbines used in airplanes - Diffusers design – Combustion chambers in gas turbines – Combined cycles

MAE 442 Thermodynamics II (2 Units) Prerequisite: MGE341

Mixture: General consideration - Dalton's - Amagat model of a mixture of gas and a vapor - Psychometric chart - Combustion: Fuels - Combustion process - Enthalpy of formation - Adiabatic flame temperature - Heat of reaction - Bomb and Juncker's calorimeters - Thermodynamics cycles: Carnot - Rankine – Reheat – Otto – Diesel – Dual – Brayton – Vapour - Compression refrigeration - Ammonia-absorption refrigeration cycles - Thermodynamics relations: Maxwell relations - Relations involving, Enthalpy, Internal energy and Entropy - Thermodynamics tables



MPE 442L Thermal-Fluid Lab (1 Units)

Prerequisite: MGE341

Performance test on a 4-stroke engine 2. Valve timing of a 4 – stroke engine and port timing of a 2-stroke engine 3. Determination of effectiveness of a parallel flow heat exchanger 4. Determination of effectiveness of a counter flow heat exchanger 5. Determination of the viscosity coefficient of a given liquid 6. COP test on a vapour compression refrigeration test rig 7. COP test on a vapour compression air-conditioning test rig 8. Study of a Gas Turbine Engine. 9. Determination of Conductive Heat Transfer Coefficient. 10. Determination of Thermal Resistance of a Composite wall

MAE 453 Aircraft Engines & Jet Propulsion (3 Units) Prerequisite: MAE450 & MAE442

Study of basic principles of propulsion systems with emphasis on jets and fan systems. Introduction to air breathing propulsion systems, thermodynamic cycles of gas turbine engines and their performances, the turbojet engine components and functions, engine non-rotating component aerodynamics and performance, Compressor: Axial and centrifugal compressor's velocity diagrams, Compressor losses, Compressor stall and surge. Comparison between axial and centrifugal compressor. Turbine: Axial and radial turbines, Axial turbine velocity diagrams and losses. Turbine blade cooling systems. Jet Engine Construction: Construction aspects of jet engine including turbine and compressor blade design and construction. Matching: Conservation of energy and mass through the engine components. Compressor map, matching procedure. Engine transient operation engine: starting problems, engine acceleration and deceleration



MAE 483 Fundamentals of Aircraft Electricity & Instruments (3 Units) Prerequisite: MGE380 & MGE385

Study The Nature of Electricity, Theory and Principle, Units of Electrical Measurement, Sources of Electricity , Chemical Action And Magnetism , Current Electricity and OHM'S Law, Circuit Elements , Electric Power , DC and AC. Current In Series and Parallel Circuits , Primary & Secondary Cells Batteries , Lead Acid and Nickel Cadmium Batteries , AC Voltage and Current , Resistance , Inductance and Capacitor in AC Circuits , Electron Control Devices and the Use of Electrical Measuring Instruments

MAE 466 Aircraft Flight Dynamics (2 Units) Prerequisite: MAE 450

Aircraft static longitudinal stability. Neutral point. Longitudinal control. Center of gravity limits. Hinge moments. Stick free stability. Stick force. Speed stability. Directional static stability. Directional control. Roll static stability. Roll control. Three-dimensional rigid body dynamics, aircraft equations of motion, unsteady equations of motion. Small disturbance theory. Stability derivatives. Linear zed equations of motion. Dynamic stability. Reduced-order models. Longitudinal and lateral stability modes. Flying qualities. Introduction to state feedback and pole placement

MAE 436 Incompressible Flow (2 Units) Prerequisite: MGE231&MAE442

Two-Dimensional Inviscid Fluid Flow, Stream Function and Velocity Potential, Superposition of Elementary Flows, Source Panel Methods, Thin airfoil theory, Vortex Panel Methods, .Finite Wings. Vortex Lattice Method, Incompressible Boundary Layer, Aerodynamic Design



MAE 433 Computational Methods (2 Units) Prerequisite: MAE450 & MAE442

Introduction to computational fluid dynamics – Methods of engineering calculating and evaluating – Numerical representation for fluid and heat flow equations using finite difference and finite volume methods – Principles of accuracy, converging and stability of numerical solutions – Application in fluid flow problems and thermal processes using numerical analysis .computer program packages and computational fluid dynamics

MAE 427 Aircraft Construction Materials (2 Units) Prerequisite: MGE225

Properties and applications of aircraft materials, forming methods, and manufacturing processes. Ethics and social responsibility for engineers. This course covers the nomenclature, properties and processing of engineering materials used in airframes, landing gear, and gas turbine engines. Materials examined will include structural aluminium alloys, titanium alloys, stainless steels, nickel based super alloys, high strength heat treated steels, fibre composites, honeycomb sandwich panels and layered composites, such as GLARE (Glass Laminate Aluminium Reinforced Epoxy). Manufacturing processes including chemical milling, forging, extrusion and composite lay-up are also discussed. The role of non-destructive inspection and airworthiness are presented along with the effects of long service exposure on mechanical properties of structural alloys



MAE 537 Aircraft Structure I (3 Units)

Prerequisite: MAE427

Gives Generic Study about Aircraft Structural Materials and Covers the Properties of Metals and Non-Metallic Structural Materials. Also Deals with. Principles of Stressed Skin Construction: Materials used, Loads, Fabrication & Structural idealization. Open and Closed thin Walled tubes: Bending, Shear and Torsion, Strain and Displacement, Booms, Applications. Multi-cell tubes: Bending, Torsion & Shear, Shear Variation, Effect of taper, Deflection, Applications. Energy methods: Strain and Complementary energy, Total Potential and its Stationary Values, Applications. Bending of thin plates which involves both exact and energy method solutions, combined bending and in-plane loading, effect of pre-loading curvature, structural instability: Euler buckling of perfect columns; inelastic buckling; loading of single and multi-cell thin walled tubes and torsion boxes, deflection phenomena Flight of lighter than and heavier than air, lift, drag, and moment of flight vehicles, general equations of motions of airplanes in free space, different coordinate systems, atmospheric flight, thrust and power required for propeller driven and turbojet driven aircraft systems, level performance, climb, cruise performance, take-off and landing, manoeuvre performance, turning flight, thrust and lift boundaries of aircraft. Longitudinal, lateral and directional static stability, handling qualities and characteristics of light aircraft, fixed wing aircraft in subsonic flight, manoeuvring .characteristics of perturbed motion



MAE 567 Aircraft Performance (2 Units)

Prerequisite: MAE460

The fundamentals of conventional aircraft flight. Elements and functions of aircraft basic configuration: forces and moments acting on an aircraft, aerodynamic coefficients, standard atmosphere. Performance: equations of motion, horizontal flight, climb performance, take-off performance, gliding descent and landing performance, range and endurance, flight envelope, V-n diagram. Longitudinal static stability: aerodynamic center, criterion for longitudinal static stability, static margin, unstable aircraft

MAE 568 Aircraft Component Design & Assembly (2 Units) Prerequisite: MAE483

Stresses of loading aircraft, fatigue, rivet and joint stress variation, design operations, design of basic machine elements; shafts, hays, belts, etc., V-n diagram, structural layout drawing, wing design, fuselage, tail, take-off-landing system design

MAE 584 Aircraft Stability and Control (2 Units) Prerequisite: MAE483

Systematic account of Aircraft Stability and Control system elements and configuration. This includes the Static Longitudinal, Directional and Lateral stability with respect to the aircraft axis systems. Effect of various wings design and secondary control surfaces. The Aircraft system includes; A/C System in general, Hydraulic system, Pneumatic system, Flight control system, Landing gears system, fuel system, Cockpit pressurization & air conditioning system, Speed brake and thrust reversal, anti-icing system, electrical system, flight instruments, lifesaving equipment



MAE 513 Avionics (2 Units)

Prerequisite: MGE211

An introduction to modern avionic systems. Topics include: Terrestrial and Satellite Navigation Aids, Landing Systems, Surveillance Systems, Air-Ground and On board Communications, and Autopilots. Electronic devices which facilitate flying such as radars ILS (Instrument Landing System) ADF (Automatic Direction Finder) etc were specifically invented by the Avionic/Aircraft Instrument Engineer. The Avionic/Aircraft Instrument Engineer will have to ensure that the instrument fitted on an aircraft will function satisfactorily together with a .high degree of reliability

MAE 575 Aircraft Maintenance Systems (3 Units)

Prerequisite: MGE315

Preliminary design project of a complete propulsion system, including the airframe. Technical written reports and oral presentations. LEC turbines used in airplanes - Diffusers design – .Combustion chambers in gas turbines – Combined cycles

MAE 538 Aircraft Structures II (2 Units)

Prerequisite: MAE537

An introduction to the Theory of Elasticity. Structural instability of columns and thin plates. Analysis methods (Virtual work and energy and matrix methods including FEM) for stress and deflection calculations in determinant and indeterminate structures. Thin plate theory. .Composite materials analysis and design. Light aircraft design and build project



MAE 513 Avionics (2 Units)

Prerequisite: MGE211

An introduction to modern avionic systems. Topics include: Terrestrial and Satellite Navigation Aids, Landing Systems, Surveillance Systems, Air-Ground and On board Communications, and Autopilots. Electronic devices which facilitate flying such as radars ILS (Instrument Landing System) ADF (Automatic Direction Finder) etc were specifically invented by the Avionic/Aircraft Instrument Engineer. The Avionic/Aircraft Instrument Engineer will have to ensure that the instrument fitted on an aircraft will function satisfactorily together with a .high degree of reliability

MAE 575 Aircraft Maintenance Systems (3 Units)

Prerequisite: MGE315

Preliminary design project of a complete propulsion system, including the airframe. Technical written reports and oral presentations. LEC turbines used in airplanes - Diffusers design – .Combustion chambers in gas turbines – Combined cycles

MAE 538 Aircraft Structures II (2 Units)

Prerequisite: MAE537

An introduction to the Theory of Elasticity. Structural instability of columns and thin plates. Analysis methods (Virtual work and energy and matrix methods including FEM) for stress and deflection calculations in determinant and indeterminate structures. Thin plate theory. Composite materials analysis and design. Light aircraft design and build project

MAE 538L Aerospace Structures Lab (1 Units)

Prerequisite: MAE537

Hardness tests: Brinell hardness, Vickers hardness, Rockwell hardness – Buckling of struts –Experiments on thin-walled pressure vessel – Unsymmetrical bending and shear center measurements, measurement of strain using strain gauges, Shear force in a beam, Deflection of .beams and cantilevers, Continuous and indeterminate beams



:MAE 580 Helicopter Theory (3 Units)

Prerequisite

Introduction: Helicopters in general, critical parts of helicopters, types of helicopters. Rotor in vertical flight (momentum theory). Rotor in vertical flight (blade element theory). Mechanisms of rotor. Forward Flight: Momentum theory, blade element theory. Performance and Trim-Stability: Helicopter design, blade section design, blade tip shapes, rear fuselage up-sweep, second harmonic control

MAE 580 Environmental Pollution (3 Units)

Prerequisite

Pollution - Types of pollution – a brief study of the various types of pollution - Air pollution - Sources and effects of major air pollutants – Gases - Oxides of carbon, nitrogen and sulphur – Hydrocarbons – Particulates -Control of air pollution - Different methods - Water pollution - Sources and effects of major pollutants - Inorganic pollutants- heavy metals cadmium , lead, mercury - Ammonia, Fertilizers and Sediments (silt) - Organic pollutants – Detergents, pesticides, food waste, - Radioactive materials - Thermal pollutants - Control of water pollution - General methods

-
-



--- :MAE 580 Air-Breathing Propulsion (3 Units)

Prerequisite

Pollution - Introduction to combustion and flames – introduction to air breathing propulsion systems – engine thrust and performance parameters – aircraft engine types – ideal and real gas turbine cycle analysis – performance measures – engine-aircraft matching – aerothermodynamics of inlets, nozzles, combustion chambers and after burners – basics of turbomachinery – compressor and turbine blade flow path analysis (axial and centrifugal types) – engine component matching and off-design analysis – ram jets – hypersonic air-breathing engines

--- :MAE 580 Finite Element Method (3 Units)

Prerequisite

Introduction – finite element formulation from differential equation – finite element formulation based on stationarity of a functional – one-dimensional finite element analysis; shape functions, types of elements, applications – two-dimensional finite element analysis – numerical integration– applications to structural mechanics and fluid flow

شعبة هندسة ميكانيكا علم المواد والإنتاج

Mechanic Materials Science & Production Engineering Section

A. Compulsory Courses for Mechanic Materials
Science & Production Engineering Section

المقررات الهندسية الملزمة لشعبة هندسة ميكانيكا علم
المواد والإنتاج

Fourth Year

| Seventh Semester Courses | | | | | | | |
|--------------------------|--------------------------------------|--------|-------|--------------|----------|-----------|--------------------|
| No | Course Name | Code | Units | Weekly Hours | | | Prerequisite |
| | | | | Lecture | Tutorial | Practical | |
| 1 | Strength of Materials II | MME422 | 2 | 2 | 1 | - | MGE221 |
| 2 | Strength of Materials Lab. | MME423 | 1 | - | - | 2 | MGE221 |
| 3 | Physical Metallurgy I | MME486 | 3 | 3 | 1 | | MGE225 |
| 4 | Metallurgical Thermodynamics | MME440 | 2 | 2 | 1 | | MGE341 |
| 5 | Production Engineering II | MME477 | 2 | 2 | 1 | | MGE376 |
| 6 | Finite Element Methods | MME420 | 3 | 3 | 1 | | MGE231 & MGE341 |
| 7 | Mechanical Behaviour of Materials | MME428 | 2 | 2 | 1 | | MGE225 |
| | | | 15 | | | | |



Eighth Semester Courses

| No | Course Name | Code | Units | Weekly Hours | | | Prerequisite |
|----|--|--------|-----------|--------------|----------|-----------|-----------------|
| | | | | Lecture | Tutorial | Practical | |
| 1 | Physical Metallurgy II | MME487 | 3 | 3 | 1 | | MME486 |
| 2 | Extractive Metallurgy | MME488 | 2 | 2 | 1 | | MGE225 & MME440 |
| 3 | Ceramic Materials | MME429 | 3 | 3 | 1 | | MME428 |
| 4 | Engineering Alloys | MME421 | 3 | 3 | 1 | | MME486 |
| 5 | Metallography Laboratory | MME489 | 1 | - | - | 2 | MME486 |
| 6 | Metal Cutting and Machining Technology | MME470 | 3 | 3 | 1 | | MGE376 |
| | | | 15 | | | | |

Fifth Year

Ninth Semester Courses

| No | Course Name | Code | Units | Weekly Hours | | | Prerequisite |
|----|----------------------------------|--------|-----------|--------------|----------|-----------|--------------|
| | | | | Lecture | Tutorial | Practical | |
| 1 | Manufacturing Process Laboratory | MME571 | 1 | - | - | 2 | MME477 |
| 2 | Polymeric Materials | MME520 | 3 | 3 | 1 | | MGE225 |
| 3 | Non Destructive Testing | MME510 | 3 | 3 | 1 | | - |
| 4 | Elective Course I | MME580 | 3 | 3 | 1 | | - |
| 5 | MME Project- Seminar | MME591 | 2 | | | | - |
| | | | 12 | | | | |



| Tenth Semester Courses | | | | | | | |
|------------------------|----------------------------------|--------|-------|--------------|----------|-----------|--------------|
| No | Course Name | Code | Units | Weekly Hours | | | Prerequisite |
| | | | | Lecture | Tutorial | Practical | |
| 1 | Composite Materials | MME528 | 3 | 3 | 1 | | MGE225 |
| 2 | Fracture Mech.& Failure Analysis | MME518 | 3 | 3 | 1 | | MME428 |
| 3 | Welding Engineering | MME570 | 3 | 3 | 1 | | MME487 |
| 4 | MME Project-Part II | MME592 | 4 | | | | - |
| | | | 13 | | | | |

B. Elective Courses for Mechanic Materials Science & Production Engineering Section

لشعبة هندسة ميكانيكا علم المقررات الهندسية الاختيارية
المواد والإنتاج (يتم اختيار مقرر بـ 3 وحدات)

| No. | Course Name | Designation | Units | عنوان المقرر |
|-----|------------------------------|-------------|-------|--------------|
| 1. | Nano-Materials | MME580 | 3 | |
| 2. | Solar Energy | MME580 | 3 | |
| 3. | Light Alloys | MME580 | 3 | |
| 4. | Principles of Heat Treatment | MME580 | 3 | |
| 5. | X-Ray Diffraction | MME580 | 3 | |

| | | | |
|-------|--|---|--------------------|
| Total | | 3 | إجمالي عدد الوحدات |
|-------|--|---|--------------------|



المحتوي العلمي للمقررات الدراسية الخاصة بشعبة هندسة ميكانيكا علم المواد والإنتاج

Description of Courses Content for Mechanic Materials Science & Production Engineering Section

MME 486 Physical Metallurgy I (3 Units)

Prerequisite: MGE 225

Crystal structure, imperfections, voids and stacking sequence. Plastic deformation and annealing, recovery, recentralization and grain growth. Solid solution, Hume rothery rules. Binary phase diagrams, miscibility gap, eutectic, eutectoid, peritectic phase diagram. Fe-C Systems, structure of steels, cast iron, heat treatments, grading and classification of steels. Solidification .of metals, thermodynamics, kinetics and casting defects

MME 422 Strength of Materials II (2 Units)

Prerequisite: MGE 221

Complex stress- strain relationship - Deflection of beams - Moment curvature relation - Boundary conditions - Double integration method - Singularity function and moment area method - Strain energy for various loadings and Castiliano's theorem - Buckling of columns - Euler's and Rankine Gordon's formula - Theory of thick cylinders - Springs curved bars - Failure elastic theories - Introduction to plastic stress and Strain relationship - Introduction to mechanics of composite

MME 421 Engineering Alloys (3 Units)

Prerequisite: MME 486

Classification of engineering alloys and its application according to its uses, steels, cast-irons, effect of composition and heat treatment, tool steels, alloys for wear resistance, materials of high coefficient of friction, oxidation resistance alloys and materials which used elevated temperature, nickel alloys, heat resistant alloys, stainless steels, copper alloys, aluminium alloys, .materials of special electric Properties, magnetic materials



MME 440 Metallurgical Thermodynamics (2 Units)

Prerequisite: MGE 341

The Behaviour of Gases; gas mixtures of ideal gases, the thermodynamic treatment of imperfect gases, deviation from ideality and equations of state, the van der Waals gas. Reactions involving Gases; reaction equilibrium in a gas mixture and the equilibrium constant, the effects of temperature and pressure on the equilibrium constant, reaction equilibrium in the system $\text{SO}_2(\text{g})-\text{SO}_3(\text{g})-\text{O}_2(\text{g})$, equilibrium in $\text{H}_2\text{O}-\text{H}_2$ and CO_2-CO mixtures, gaseous reaction equilibrium and fugacity. Reactions involving Pure Condensed Phases and a Gaseous Phase; free energy variation with temperature, Ellingham diagrams, the effect of phase diagram, the oxides of carbon, graphical representation of equilibrium in the system metal-oxygen-carbon. The Behaviour of Solutions; Raoult's law and Henry's law, the activity of a component in solution, the Gibbs-Durham equation, the free energy of solution, the properties of Raoultian ideal solutions, non-ideal solutions, regular solutions. Free Energy-Composition and Phase Diagrams of Binary Systems. Reaction Equilibrium in Systems Containing Components in Condensed Solutions

MME 477 Production Engineering II (2 Units)

Prerequisite: MGE 376

Metal casting; moulding materials, core making, various casting processes. Welding processes and equipment's, types of welds. Lathe machine, lathe machine components, cutting speed. Forging processes and defects. Rolling of metals and defects. Extrusion processes. Drawing of rods, wires and tubes



MME 420 Finite Element Methods I (3 Units) Prerequisite: MGE231&MGE341

Introduction: basic concept of the finite element method, comparison with finite difference method; Variation methods: calculus of variation, the Rayleigh-Ritz and Galerkin methods; Finite Element analysis of 1-D problems: formulation by different approaches (direct, potential energy and Galerkin); Derivation of elemental equations and their assembly, solution and its post-processing. Applications in heat transfer, fluid mechanics and solid mechanics. Bending of beams, analysis of truss and frame. Finite element analysis of 2-D problems: finite element modelling of single variable problems, triangular and rectangular elements; Applications in heat transfer, fluid mechanics and solid mechanics; Numerical considerations: numerical integration, error analysis, mesh refinement. Plane stress and plane strain problems; Bending of plates; Eigen value and time dependent problems; Discussion about preprocessors, post processors and finite element packages

MME 487 Physical Metallurgy II (3 Units) Prerequisite: MME 486

Diffusion in substitutional solid solutions and interstitial solid solutions, theories of phase transformation, phase transformation of steel on heating, eutectoid transformation, Binaite transformation, transformation associated with steel tempering, heat treatment of metals and .alloys, chemical thermal treatment of metals and alloys, hardenability of steels



MME 488 Extractive Metallurgy (2 Units) Prerequisite: MGE225&MME440

Introduction of extractive metallurgy, Mineral Dressing (Processing), Concentration (Separation), Types of Concentration Processes. Calcination, Roasting, Agglomeration. Pyrometallurgy, Hydrometallurgy, Electrometallurgy. Application of extractive procedures; Pyrometallurgical extraction of iron, Hydrometallurgical extraction of copper

MME 429 Ceramic Materials (3 Units) Prerequisite: MME 428

Introduction: ceramic materials in relation to metals & polymers: (interatomic spacing & bonding, crystal structures, imperfections. Glass-structure, composition transformation range, crystallization. Ceramic microstructures and mechanical, thermal, electrical, optical and nuclear properties. Ceramics Powder Processing, shaping techniques, Drying and Sintering, methods of glass shaping, Applications of ceramics. Cement, their manufacture and hydration behavior, Refractories, their types, manufacturing and applications. Engineering ceramics; their classes, manufacturing and applications

MME 489 Metallography Laboratory (1 Units) Prerequisite: MME 486

Specimen preparation for microscopical examination of pure metals and alloys, effect of heat treatment on carbon steel, hardenability of alloys. Alloy steels, tool steels, cast iron, nonferrous metals and alloys



MME 470 Metal Cutting and Machining Technology (3 Units) Prerequisite: MGE 376

Principles of Metal Cutting: Tool Materials, Tool Geometry (ASA, ORS Systems), mechanisms of chip formation, Cutting forces, cutting Temperatures, Tool wear and Tool life, Surface finish and machinability, optimization of cutting parameters, Tool path generation and machining principles, Setting and machining operations on metal cutting machine; lathe, milling, shaping, slotting, planning, drilling, boring, broaching, grinding (cylindrical, surface, centreless), thread rolling and gear cutting machines; Tooling: jigs and fixtures, principles of location and clamping; Batch production: Machining on capstan and turret lathes; Mass production: Machining on single/multi spindle automats, Finishing: microfinishing operations like honing, lapping, superfinishing

MME 571 Manufacturing Process Laboratory (1 Units) Prerequisite: MME 477

Casting: sand preparation, sand testing: specimen preparation, permeability, clay content, grain fineness number, green compression strength, green shear strength, dry strength, hardness. Characterization of materials - solids and fluids. Introduction to primary technology processes involving forging and casting, preparation of foundry sand and molds, Experiments on properties of post casting, fettling, cleaning, deburring, polishing and painting operations. Surface preparation and etching techniques, heat treatment and metallographic studies. Laboratory experiments in fabrication processes : Spot, MIG, ARC and Gas Welding, Testing of Joints



MME 520 Polymeric Materials (3 Units)

Prerequisite: MGE 225

Introduction, definitions, classification, bonding, general physical properties. Viscoelasticity models. Design methodology. Melt Rheology (I) & (II), properties of polymer melts & types of flow. Shaping methods of polymers. Fibre & elastomer technologies. Reinforcements & polymeric composites. Processing – property interactions

MME 510 Non-Destructive Testing (3 Units)

Prerequisite

Introduction; types of defects in metal forming methods, their effect on mech. Properties. Visual aids: Boroscopes, Toboscope and their use in testing. Liquid penetrant methods. Magnetic Particle methods. X-ray radiography. Ultrasonic Technique. Gamma rays radiography. Thickness measurements. Eddy current methods

MME 518 Fracture Mech.& Failure Analysis (3 Units)

Prerequisite: MME 428

Ductile and brittle fractures, Catastrophic fractures Griffith theory of brittle fracture, Ductile to brittle transition temperature, stress concentration factor, modes of crack propagation (mode I, II, and III), Linear elastic fracture mechanics, Stress intensity factor, Plane strain and plane stress fracture toughness, Plastic zone size estimation, Determination of fracture toughness ASTM – E399 test. Correlation of impact energy to fracture toughness. Factors affecting fracture toughness. Ways to improve fracture toughness. Definition of failure, Fundamental sources of failure, Procedure for conducting failure analysis, overload failure, elevated temperature failure, corrosion fatigue



MME 528 Composite Materials (3 Units)

Prerequisite: MGE 225

Introduction, purpose of uses and application of composite materials, composite materials reinforced by fibres, composite materials reinforced by dispersed fine particles, composite materials reinforced by particles, multilayers composite materials, mechanical and physical properties of composite materials, types of composite materials, composite materials reinforced by metallic textiles, manufacture methods of composite materials reinforced by metallic textiles and its application, composite materials reinforced by ceramic textiles, application of ceramic textiles composite materials in: aerospace - cutting tools – electric components, composite materials reinforced by polymer textiles: manufacture methods, application

MME 570 Welding Engineering (3 Units)

Prerequisite: MME 487

Introduction to welding: General survey and classification of welding processes, Safety and hazards in welding, Power sources for arc welding. Welding consumables: fluxes, gases and filler materials. Electrodes: types, coatings and its functions, selection of electrodes, designation of electrodes as per Indian standard. Metal transfer and its importance in welding, various forces acting on a molten droplet. Gas welding processes and equipment: Shielded metal arc welding, Submerged arc welding Gas tungsten arc welding, Gas metal arc welding, & its variants, Electro slag welding and Electro gas welding, Plasma arc welding, Resistance welding, & its variants. Modern welding processes: Electron beam welding, Ultrasonic welding, Laser welding, Explosive welding, Friction stir welding, Soldering and brazing. Weldability of commonly used materials: Carbon steels, Stainless steels, Cast iron, Cu and its alloys, Al and alloys. Defects in welds, Non-destructive testing of welds



MME 580 Nano-Materials (3 Units)

Prerequisite: MGE 225

Introduction, Fundamentals of nanoscience and Nanotechnology, types of nanomaterials. Synthesis of nano-crystalline powders. Preparation of bulk nano-crystalline materials. Characterization of nano-systems. Nanomaterials Applications: Nanotubes, nanowires, and nanodevices-introduction – Functional Nanostructures

MME 580 Solar Energy (3 Units)

Prerequisite

Solar Energy: Basic properties of solar energy. Applications of solar energy. Transformation of solar energy. Solar heat collectors. Solar photovoltaic collectors. Application of solar collectors examples. Solar power plant. Economics of solar collectors. Trends in solar energy utilization

MME 580 Light Alloys (3 Units)

Prerequisite: MME 487

The light metals: introduction, production of aluminium, magnesium and titanium. Physical metallurgy of aluminium alloys, wrought aluminium alloys, cast aluminium alloys, Magnesium alloys: introduction, melting and casting, wrought magnesium alloys, application of magnesium alloys. Titanium alloys: introduction, alpha alloy, alpha/beta alloys, beta alloys, castings, and applications



أعضاء هيئة تدريس هندسة الميكانيكا الطيران والقوى والانتاج

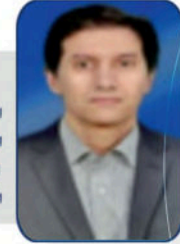


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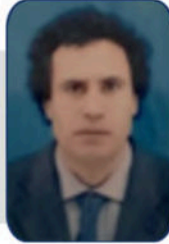
المؤهل العلمي : دكتوراه في الهندسة الميكانيكية-2014 - جامعة شيفيلد - بريطانيا
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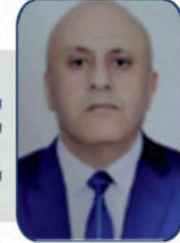
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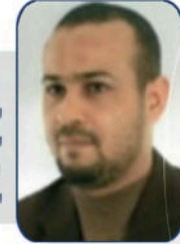
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شكر وتقدير

الي الفريق الذي تولى إعداد دليل كلية الهندسة للعام الدراسي 2024/2023 ف لم يكن ليتسنى إعداد هذا الدليل بدون المساندة والمساهمات القيمة والمتكاملة التي قدمتها الأقسام المختلفة، وبهذه المناسبة فإنني أعرب عن إمتناني إلي الفريق الذي تولى إعداد هذا الدليل وعلى الجهود الرائع لإظهار هذا العمل الي الوجود ويتكون الفريق من:

تصميم وإخراج: أمل مسعود عطاف

تصوير: فرج عبداللطيف حسين

فريق العمل المتكامل من الأقسام المختلفة:

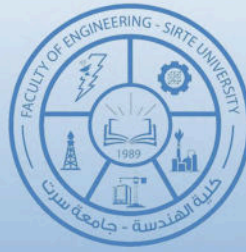
عميد كلية الهندسة
رئيساً
عضوا
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د. امحمد صالح الحسوني
د. محمد المهدي شقلوف
د. صالح مخلوف الصداقي
أ. مصباح مسعود ابوبنينة
أ. عبدالمجيد محمد سالم
أ. عبدالكريم خليفة شر الطريق
أ. سالم محمد إشتيوي
أ. عبدالله بشير عبدالله
محمد امبارك خليفة

Faculty of Engineering

Prospectus





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Faculty of Engineering Prospectus

Sirte University-Faculty of Engineering

2024