برنامج الدرجة الجامعية المتوسطة

التخصص	**هندسة صيانة الطائرات**
رقم المادة الدراسية	**020605111**
اسم المادة الدراسية	**مبادئ علوم الطيران**
عدد الساعات المعتمدة	***(2)***
عدد الساعات النظرية	***(2)***
عدد الساعات العملية	***(0)***

وصف المادة الدراسية :

This Subject Deals With General Aviation Sciences Which Cover The Following ***Items:***

Arithmetic, algebra, geometry, Matter, mechanics, kinematics, dynamics, fluid mechanics, thermodynamics, optics, wave motion and sound.

أهداف المادة الدرسية :

بعد دراسة هذه المادة يتوقع من الطالب أن يكون قادراً على تحقيق الأهداف التالية:

1- Identify Number Systems and Calculations.

2- Understand Algebra Equations.

3- Computing Area, Volume.

4- Deal with Geometry and Tri Goniometric Function.

5- Deals with Physics Concepts Related to Matter and Energy.

6- Understand Concept of Physics Related to Work, Power, Force & motion.

Subject: General Aviation Sciences

رقم الوحدة	اســـــم الـوحـــــدة	محتويـــــــــــات الوحـــــــدة	الزمن
1	**Mathematics**	**Arithmetic** ○ Arithmetical terms and signs, ○ methods of multiplication and division, ○ fractions and decimals, ○ factors and multiples, ○ weights, measures and conversion factors, ○ ratio and proportion, ○ averages and percentages, ○ Areas and volumes, square, cubes, square and cube roots. **ALGEBRA** • Evaluating simple algebraic expressions. ○ Addition. ○ Subtraction. ○ Multiplication and division. ○ Use of brackets. ○ Simple algebraic fractions. • Linear equations and their solutions. ○ Indices and powers. ○ Negative and fractional indices. ○ Binary and other applicable numbering systems. ○ Simultaneous equations and second degree equations with one unknown. ○ Logarithms. **GEOMETRY** • Simple geometrical constructions. • Graphical representation; nature and uses of graphs, graphs of equations/functions. • Simple trigonometry; trigonometrically relationships, use of tables and rectangular and polar coordinates.	**(6)Week**
2	**Physics**	**MATTER** • Nature of matter: • The chemical elements. • Structure of atoms. • Molecules. • Chemical compounds	**(10)Week**

- States: solid, liquid and gaseous.
- Changes between states.

MECHANICS

- Statics
  - Forces, moments and couples, representation as vectors.
  - Centre of gravity.
  - Elements of theory of stress, strain and elasticity: tension, compression, shear and torsion.
  - Nature and properties of solid, fluid and gas
  - Pressure and buoyancy in liquids (barometers).
- Kinetics.
  - Linear movement: uniform motion in a straight line, motion under constant acceleration (motion under gravity).
  - Rotational movement: uniform circular motion (centrifugal/centripetal forces).
  - Periodic motion: pendulum movement.
  - Simple theory of vibration, harmonics and resonance;
  - Velocity ratio, mechanical advantage and efficiency.
- Dynamics
  - Mass; Force, inertia, work, power, energy (potential, kinetic and total energy), heat, efficiency.
  - Momentum, conservation of momentum; Impulse.
  - Gyroscopic principles.
  - Friction: nature and effects, coefficient of friction (rolling resistance).
- Fluid dynamics.
  - Specific gravity and density.
  - Viscosity, fluid resistance, effects of streamlining.
  - Effects of compressibility on fluids.
  - Static, dynamic and total pressure: Bernoulli's Theorem, Venturi.

Thermodynamics.

- Temperature: thermometers and temperature scales: Celsius, Fahrenheit and Kelvin; Heat definition.
- Heat capacity, specific heat.
- Heat transfer: convection, radiation and conduction.
- Volumetric expansion.
- First and second law of thermodynamics
- Gases: ideal gases laws; specific heat at constant volume and constant pressure, work done by expanding gas.
- Isothermal, adiabatic expansion and compression, engine cycles, constant volume and constant pressure, refrigerators and heat pumps.
- Latent heats of fusion and evaporation, thermal energy, heat of combustion.

		Optics (Light) o Nature of light; speed of light. o Laws of reflection and refraction: reflection at plane surfaces, reflection by spherical mirrors, refraction, lenses. o Fibre optics. **Wave Motion and Sound** • Wave motion. o Mechanical waves. o Sinusoidal wave motion. o Interference phenomena. o Standing waves. • Sound: o Speed of sound. o Production of sound. o Intensity. o Pitch and quality. o Doppler Effect.	

الامتحانات	***نسبةالامتحان من العلامة الكلية***	***التاريخ***
الأمتحان المتوسط	***40%***	***التاريخ : الاسبوع العاشر***
أعمال الفصل	***10%***	***التاريخ : / /***
الامتحانات النهائية	***50%***	***التاريخ : الاسبوع السادس عشر***

طرق التدريس:

يحدد عضو التدريس الطريقة المستخدمة من خلال (محاضرة ، عرض، مناقشات، مختبرات)

الكتب والمراجع:

EASA 147, PART 66, Modules 1 &2, 2014.

برنامج الدرجة الجامعية المتوسطة	
التخصص	هندسة صيانة الطائرات
رقم المادة الدراسية	020605121
اسم المادة الدراسية	أساسيات كهرباء الطيران
عدد الساعات المعتمدة	(2)
عدد الساعات النظرية	(2)
عدد الساعات العملية	(0)

وصف المادة الدراسية :

This Subject Deals With Electrical Fundamental for Aviation Which Cover The Following ***Items:***

Electrical Terminology in Aviation, DC Sources of Electricity, Power in Aero-plane, Static Electricity and Conduction, Generation of Electricity, Capacitance/Capacitor, Electron Theory, Resistance/Resistor.

أهداف المادة الدرسية :

بعد دراسة هذه المادة يتوقع من الطالب أن يكون قادراً على تحقيق الأهداف التالية:

1- Identify Electrical Terminology in Aviation, DC Sources of Electricity and Power in Aircraft.

2- Understand Static Electricity and Conduction, Generation of Electricity.

3- Deals with Capacitance/Capacitor.

4- Understand Concept of Electron Theory.

5- Deal with Resistance/Resistor.

Subject: Principle of Aviation Electricity

رقم الوحدة	اســـــم الـوحـــــدة	محتويـــــــــــات الوحـــــــدة	الزمن
1	**Electron Theory**	• Structure and distribution of electrical charges within: atoms, molecules, ions, compounds. • Molecular structure of conductors, semiconductors and insulators.	**1 week**
2	**Static Electricity and Conduction**	• Static electricity and distribution of electrostatic charges. • Electrostatic laws of attraction and repulsion. • Units of charge, Coulomb's Law. • Conduction of electricity in solids, liquids, gases and a vacuum.	**2 week**
3	**Electrical Terminology**	• The following terms, their units and factors affecting them: potential difference, electromotive force, voltage, current, resistance, conductance, charge, conventional current flow, electron flow.	**1 week**
4	**Generation of Electricity**	• Production of electricity by the following methods: light, heat, friction, pressure, chemical action, magnetism and motion.	**1 week**
5	**DC Sources of Electricity**	• Construction and basic chemical action of: primary cells, secondary cells, lead acid cells, nickel cadmium cells, other alkaline cells. • Cells connected in series and parallel. • Internal resistance and its effect on a battery. • Construction, materials and operation of thermocouples. • Operation of photo-cells.	**3 weeks**
6	**DC Circuits**	• Ohms Law, Kirchhoff's Voltage and Current Laws. • Calculations using the above laws to find resistance, voltage and current. • Significance of the internal resistance of a supply.	**1 week**
7	**Resistance/Resistor**	• Resistance and affecting factors. ○ Specific resistance. ○ Resistor color code, values and tolerances, preferred values, wattage ratings.	**2 weeks**

		○ Resistors in series and parallel. ○ Calculation of total resistance using series, parallel and series parallel combinations. ○ Operation and use of potentiometers and rheostats. ○ Operation of Wheatstone Bridge. • Positive and negative temperature coefficient conductance. ○ Fixed resistors, stability, tolerance and limitations, methods of construction; ○ Variable resistors, thermistors, voltage dependent resistors; ○ Construction of potentiometers and rheostats; ○ Construction of Wheatstone Bridge.	
8	**Power**	• Power, work and energy (kinetic and potential); • Dissipation of power by a resistor; • Power formula. • Calculations involving power, work and energy.	**1 week**
9	**Capacitance/Capacitor**	• Operation and function of a capacitor. • Factors affecting capacitance area of plates, distance between plates, number of plates, dielectric and dielectric constant, working voltage, voltage rating. • Capacitor types, construction and function. • Capacitor color coding. • Calculations of capacitance and voltage in series and parallel circuits. • Exponential charge and discharge of a capacitor, time constants. • Testing of capacitors.	**2 weeks**
10	**Resistive (R), Capacitive (C) and Inductive (L) Circuits**	• Phase relationship of voltage and current in L, C and R circuits, parallel, series and series parallel. • Power dissipation in L, C and R circuits. • Impedance, phase angle, power factor and current calculations. • True power. • Apparent power and reactive power calculations.	**1 week**
11	**Filters**	• Operation, application and uses of the following filters: low pass, high pass, band pass, band stop.	**1 week**

الامتحانات	نسبةالامتحان من العلامة الكلية	التاريخ
الامتحان المتوسط	40%	التاريخ : الاسبوع العاشر
أعمال الفصل	10%	التاريخ : / /
الامتحانات النهائية	50%	التاريخ : الاسبوع السادس عشر

طرق التدريس:

يحدد عضو التدريس الطريقة المستخدمة من خلال (محاضرة ، عرض، مناقشات، مختبرات)

الكتب والمراجع:

EASA 147, PART 66, Modules 3, 2014.

برنامج الدرجة الجامعية المتوسطة

التخصص	هندسة صيانة الطائرات
رقم المادة الدراسية	20605122٠
اسم المادة الدراسية	مختبر اساسيات كهرباء الطيران
عدد الساعات المعتمدة	(1)
عدد الساعات النظرية	(0)
عدد الساعات العملية	(3)

وصف المادة الدراسية :

Airborne Sources of Electrical Power AC & DC, Servicing and Maintenance of Power Source, Voltage Regulation, Power Rectification & Transformation . A/C Batteries Servicing & Maintenance, A/C Electrical Circuits, Wiring Installation, A/C Electrical Components Controlling & Protection Devices. A/C Lighting Systems, A/C Motors Servicing & Maintenance.

أهداف المادة الدرسية :

بعد دراسة هذه المادة يتوقع من الطالب أن يكون قادراً على تحقيق الأهداف التالية:

1- Know the A/C Power Sources.

2- Service the A/C Generators Including the 100 hour & Routine Inspection.

3- Carry Out the Servicing of Voltage Regulators.

4- Check in the Workshops Using he DMM the Serviceability of Diodes and Transformers.

5- Know How to Us DMM.

6- Measure AC & DC Voltage Using the Voltmeter.

7- Measure AC & DC Current Using the Ammeter.

8- Measure Resistance and Continuity Check Using the Ohmmeter.

9- Servicing & Maintenance of A/C Batteries.

10- Perform the Inspection on Lead Acid Battery.

11- Perform the Inspection on Lead Nickel –Cadmium Battery.

12- Perform Wire Installation.

13- Know & Recognize the A/C Controlling & Protection Devices.

14- Know, Inspect & Maintain the A/C External Lighting Systems.

15- Know the A/C Motors AC & DC.

16- Service the A/C Motors Performing the 100 Hour Inspecting

رقم الوحدة	اسم الوحدة	محتويات الوحدة	وحدة الزمن
1.	**A/C Power Sources**	Identify the Methods of Producing Electricity on A/C . Identify the Principle of Operation of the Power Sources Identify the construction o systems	***1week***
2.	**Generator & Motors**	Identify the principle of operation. Identify the types of generators and motors Identify the construction of generator and motors	***1week***
3.	**Voltage Regulators**	He student will recognize the different types of the voltage regulator Perform installation and adjustment	***1week***
4.	**Diodes & transformer**	Check the serviceability of the diode by using DMM Check the serviceability of transistor by using DMM	***1week***
5.	**Know How to Us DMM**	measure voltage by using DM	***1week***
6.	**Measure AC & DC Voltage Using the Voltmeter**	Voltage Measurements in Workshop.	***1week***
7.	**Measure AC & DC Current Using the Ammeter**	Current Measurements in Workshop Following the Listed Procedure. Predetermined Values to Measure.	***1week***
8.	**Measure Resistance and Continuity Check Using the Ohmmeter**	Resistance Measurements in Workshop Following the Listed Procedure. Continuity Check Using DMM.	***1week***
9.	**Servicing & Maintenance of A/C Batteries**	Inspection and Servicing of A/C Batteries.	***1week***

10.	**Perform the Inspection on Lead Acid Battery**	Cleaning Testing & Charging of Lead Acid Battery Deep Cycle.	***1week***
11.	**Perform the Inspection on Lead Nickel-Cadmium Battery**	Cleaning Testing & Charging of Nick –Cad Battery Deep Cycle.	***1week***
12.	**Perform Wire Installation**	Wires & Cables on A/C. Single Wire , Free Wire & Bundles Looming and Lacing. Cable Termination Spicing 7 Crimping.	***1week***
13.	**A/C Controlling & Protection Devices**	Types of Controlling Devices, Switches & Their Types and Uses. Purpose & Types of Protection Devices Used on A/C.	***1week***
14.	**A/C External Lighting Systems**	Types of All External Lighting on A/C. Identify the Location and the Checks Carried Out on All the Lighting Systems.	***1week***
15.	**A/C & DC Moors Servicing & Maintenance**	Types of the A/C & DC Motors Scheduled Maintenance.	***1week***
16.	**100 hr Inspection of A/C Motors**	100 hr Inspection on Motors Using the Manuals	***1week***

طرق التقييم المستخدمة:

الامتحانات	نسبةالامتحان من العلامة الكلية	التاريخ
اعمال الفصل	30%	التاريخ :
الامتحان المتوسط	20%	التاريخ : الاسبوع الثامن
الامتحان النهائي	50%	التاريخ : الاسبوع السادس عشر
المشروع والوظائف		
المناقشات وتقديم المحاضرات		

طرق التدريس:

يحدد عضو التدريس الطريقة المستخدمة من خلال (محاضرة ، عرض، مناقشات، مختبرات)

الكتب والمراجع:

EASA 147, PART 66, Modules 3, 2014

برنامج الدرجة الجامعية المتوسطة

التخصص	هندسة صيانة الطائرات
رقم المادة الدراسية	20605123٠
اسم المادة الدراسية	أساسيات الات الطيران
عدد الساعات المعتمدة	(2)
عدد الساعات النظرية	(2)
عدد الساعات العملية	(0)

وصف المادة الدراسية :

This Subject Deals With Aviation Machines Which Cover The Following ***Items:***

AC Motors, AC Generators, Transformers, Inductance/Inductor, DC Motor/Generator Theory, AC Theory, Magnetism.

أهداف المادة الدرسية :

بعد دراسة هذه المادة يتوقع من الطالب أن يكون قادراً على تحقيق الأهداف التالية:

1- Deal with AC Motors, AC Generators.

3- Deals with Transformers, Inductance/Inductor.

4- Understand Concept of DC Motor/Generator Theory, AC Theory.

5- Understand the Theory of Magnetism.

Subject: Fundamental of Aviation Machines

رقم الوحدة	اســـــم الـوحـــــدة	محتويـــــــــــات الوحـــــــدة	الزمن
1	**Magnetism**	• Theory of magnetism: ○ Properties of a magnet. ○ Action of a magnet suspended in the Earth's magnetic field. ○ Magnetization and demagnetization. ○ Magnetic shielding. ○ Various types of magnetic material. ○ Electromagnets construction and principles of operation. ○ Hand clasp rules to determine: magnetic field around current carrying conductor. • Magneto motive force ○ Field strength, magnetic flux density, permeability, hysteresis loop, retentively, coercive force reluctance, saturation point, eddy currents. ○ Precautions for care and storage of magnets.	**3 weeks**
2	**Inductance/Inductor**	• Faraday's Law. • Action of inducing a voltage in a conductor moving in a magnetic field. • Induction principles. • Effects of the following on the magnitude of an induced voltage: magnetic field strength, rate of change of flux, number of conductor turns. • Mutual induction. • The effect the rate of change of primary current and mutual inductance has on induced voltage. • Factors affecting mutual inductance: number of turns in coil, physical size of coil, permeability of coil, position of coils with respect to each other. • Lenz's Law and polarity determining rules. • Back emf, self induction. • Saturation point. • Principle uses of inductors.	**3weeks**

3	**DC Motor/Generator Theory**	• Basic motor and generator theory. • Construction and purpose of components in DC generator. • Operation and factors affecting output and direction of current flow in DC generators. • Operation and factors affecting output power, torque, speed and direction of rotation of DC motors. • Series wound, shunt wound and compound motors. • Starter Generator construction.	**2weeks**
4	**AC Theory**	• Sinusoidal waveform: phase, period, frequency, cycle. • Instantaneous, average, root mean square, peak, peak to peak current values and calculations of these values, in relation to voltage, current and power. • Triangular/Square waves. • Single/3 phase principles.	**1 week**
5	**Transformers**	• Transformer construction principles and operation. • Transformer losses and methods for overcoming them. • Transformer action under load and no-load conditions. • Power transfer, efficiency, polarity markings. • Calculation of line and phase voltages and currents. • Calculation of power in a three phase system. • Primary and Secondary current, voltage, turns ratio, power, efficiency. • Auto transformers.	**2weeks**
6	**AC Generators**	• Rotation of loop in a magnetic field and waveform produced. • Operation and construction of revolving armature and revolving field type AC generators. • Single phase, two phase and three phase alternators. • Three phase star and delta connections advantages and uses. • Permanent Magnet Generators.	**3 weeks**
7	**AC Motors**	• Construction, principles of operation and characteristics of: AC synchronous and induction motors both single and poly-phase. • Methods of speed control and direction of rotation. • Methods of producing a rotating field: capacitor, inductor, shaded or split pole.	**2weeks**

الامتحانات	نسبةالامتحان من العلامة الكلية	التاريخ
الامتحان المتوسط	40%	التاريخ : الاسبوع العاشر
أعمال الفصل	10%	التاريخ : / /
الامتحانات النهائية	50%	التاريخ : الاسبوع السادس عشر

طرق التدريس:

يحدد عضو التدريس الطريقة المستخدمة من خلال (محاضرة ، عرض، مناقشات، مختبرات)

الكتب والمراجع:

EASA 147, PART 66, Modules 3, 2014.

برنامج الدرجة الجامعية المتوسطة

التخصص	هندسة صيانة الطائرات
رقم المادة الدراسية	20605124٠
اسم المادة الدراسية	مختبر اساسيات الات الطيران
عدد الساعات المعتمدة	(1)
عدد الساعات النظرية	(0)
عدد الساعات العملية	(3)

وصف المادة الدراسية :

Identification of various types of electrical machines components, measurement of electrical machines characteristics like losses, efficiency, speed control, and external connections.

أهداف المادة الدرسية :

بعد دراسة هذه المادة يتوقع من الطالب أن يكون قادراً على تحقيق الأهداف التالية:

1. Make connection of all type of electrical machines, motors, generators and transformers.

2. Measure; power, current, voltage and power factor of electrical machines.

3. Measure speed of different types motor.

4. Draw the characteristics of transformers, motors and generators.

5. Calculate the parameters of electrical machines.

رقم الوحدة	اسم الوحدة	محتويات الوحدة	وحدة الزمن
1.	**Transformers**	• Experiments on transformers no- load test, • short- circuit test and loading test. • Cage type , Capacitor-start motor, shaded- pole type	1week
2.	**1-phase motors**	• Experiments on single – phase induction motors split phase type	1 week
3.	**3-phase motors**	• Experiments on three – phase induction motors; wound rotor type and squirrel	2 weeks
4.	**Synchronous machines**	• Experiments on synchronous machines ; synchronous generator (alternator) and synchronous motor	2 weeks
5.	**DC motors**	• Experiments on DC motors ks ;shunt, series, compound	4 weeks
6.	**DC generators**	• Experiments on DC generators ;shunt, series, compound	4 weeks

طرق التقييم المستخدمة:

الامتحانات	نسبةالامتحان من العلامة الكلية	التاريخ
اعمال الفصل	30%	التاريخ :
الامتحان المتوسط	20%	التاريخ : الاسبوع الثامن
الامتحان النهائي	50%	التاريخ : الاسبوع السادس عشر
المشروع والوظائف		
المناقشات وتقديم المحاضرات		

طرق التدريس:

يحدد عضو التدريس الطريقة المستخدمة من خلال (محاضرة ، عرض، مناقشات، مختبرات)

الكتب والمراجع:

EASA 147, PART 66, Modules 3, 2014.

برنامج الدرجة الجامعية المتوسطة	
التخصص	هندسة صيانة الطائرات
رقم المادة الدراسية	20605131٠
اسم المادة الدراسية	اساسيات الالكترونيات
عدد الساعات المعتمدة	(2)
عدد الساعات النظرية	(٢)
عدد الساعات العملية	(٠)

وصف المادة الدراسية :

This Subject Deals with Fundamental of electronics in Aircraft Which Cover The Following ***Items:***

Semiconductors, System Control (Servomechanisms), Printed Circuit Boards.

أهداف المادة الدرسية :

بعد دراسة هذه المادة يتوقع من الطالب أن يكون قادراً على تحقيق الأهداف التالية:

1- Identify Semiconductors.

2- Understand the concept of System control (Servomechanisms).

4- Deals with Printed Circuit Boards.

Subject: Electronic Fundamentals

رقم الوحدة	اســـــم الـوحـــــدة	محتويـــــــــــات الوحـــــــدة	الزمن
1)	**Semiconductors**	• Diodes ○ Diode symbols. ○ Diode characteristics and properties. ○ Diodes in series and parallel. ○ Main characteristics and use of silicon controlled rectifiers (thyristors), light emitting diode, photo conductive diode, varistor, rectifier diodes. ○ Functional testing of diodes. • Transistors ○ Transistor symbols; Component description and orientation. ○ Transistor characteristics and properties. • Integrated Circuits ○ Description and operation of logic circuits and linear circuits/operational amplifiers;	**8 weeks**
2)	**Printed Circuit Boards**	• Description and use of printed circuit boards.	**2 week**
3)	**System control (Servomechanisms)**	• Understanding of the following terms: ○ Open and closed loop systems, feedback, follow up, analogue transducers. • Principles of operation and use of the following synchro system components/features: ○ Resolvers, differential, control and torque. ○ transformers, inductance and capacitance transmitters	**5 weeks**

الامتحانات	***نسبةالامتحان من العلامة الكلية***	***التاريخ***
الامتحان المتوسط	***40%***	***التاريخ : الاسبوع العاشر***
أعمال الفصل	***10%***	***التاريخ : / /***
الامتحانات النهائية	***50%***	***التاريخ : الاسبوع السادس عشر***

طرق التدريس:

يحدد عضو التدريس الطريقة المستخدمة من خلال (محاضرة ، عرض، مناقشات، مختبرات)

الكتب والمراجع:

EASA 147, PART 66, Modules 4, 2014.

برنامج الدرجة الجامعية المتوسطة	
التخصص	هندسة صيانة الطائرات
رقم المادة الدراسية	20605132٠
اسم المادة الدراسية	مختبر اساسيات الالكترونيات
عدد الساعات المعتمدة	(1)
عدد الساعات النظرية	(0)
عدد الساعات العملية	(3)

Brief Course Description:

Lab in support of the basic electronics course, experiments in basic electronics have to cover all electronics devices (diode, zener diode, diode applications, BJT,op – amp ,oscillators ,SCR).

Course Objectives:

Upon the completion of the course, the student will be able to:

1. Become familiar with electronics devices and using data sheet.
2. Demonstrate how to test electronic devices by using AVO meter or through DC measurements.
3. Construct electronic circuit.
4. Investigate characteristics curves.
5. Calculate the value the values of currents and voltage and compare them with measured values

Detailed Course Description:

Lab Number	Lab Name	Lab Content	Time Needed
1.	▪ The Diode	▪ Forward and reverse biasing, characteristic curve, data sheet	
2.	▪ The Zener Diode	▪ Breakdown voltage, regulation, characteristic curve, data sheet	
3.	▪ Rectification Circuits with Filter and Regulator	▪ Half – wave and full – wave, ripple factor, line and load regulation	
4	▪ A BJT testing by using AVO meter, and how to determine the specifications of transistor through data sheets		
5.	▪ A BJT with Voltage – Divider Bias		
6	▪ A BJT as a switch		
7	▪ Common Emitter Amplifier Circuit		
8.	▪ Common Collector Amplifier Circuit		
9	▪ Common Base Amplifier Circuit		
10.	▪ Common Source Amplifier Circuit		
11	▪ Operational Amplifier as Inverting and Non-inverting Amplifier		
12	▪ Operational Amplifier as Differentiator and Integrator		
13	▪ RC Phase – Shift Oscillator		
14.	▪ SCR as a switch		
15.	▪ Servomotors	Understanding of the following terms: transmitters ,Open and closed loop systems, feedback, follow up, analogue	

		transducers.	
16.	• Printed circuits & IC's		

طرق التقييم المستخدمة:

الامتحانات	***نسبةالامتحان من العلامة الكلية***	***التاريخ***
اعمال الفصل	***30%***	***التاريخ :***
الامتحان المتوسط	***20%***	***التاريخ : الاسبوع الثامن***
الامتحان النهائي	***50%***	***التاريخ : الاسبوع السادس عشر***
المشروع والوظائف		
المناقشات وتقديم المحاضرات		

طرق التدريس:
يحدد عضو التدريس الطريقة المستخدمة من خلال (محاضرة ، عرض، مناقشات، مختبرات)
الكتب والمراجع:

EASA 147, PART 66, Modules 4, 2014.

برنامج الدرجة الجامعية المتوسطة	
التخصص	هندسة صيانة الطائرات
رقم المادة الدراسية	٠2060 ٥١٤١
اسم المادة الدراسية	أنظمة وأجهزة قياس الكترونية
عدد الساعات المعتمدة	(3)
عدد الساعات النظرية	(2)
عدد الساعات العملية	(3)

وصف المادة الدراسية :

This Subject Deals With Electronic Instrument Systems and digital techniques Which Cover The Following ***Items:***

Electronic Instrument System, Data Conversion and Buses, Fiber Optics Basic, Computer Structure, Electromagnetic Environment, Software Management Control.

Electronic Displays, Electrostatic Sensitive Devices, Typical Electronic/Digital Aircraft Systems, Logic Circuits.

أهداف المادة الدرسية :

بعد دراسة هذه المادة يتوقع من الطالب أن يكون قادراً على تحقيق الأهداف التالية:

1- Identify Electronic Instrument System, Fiber Optics, Basic Computer Structure.

2- Understand Electromagnetic Environment, Software Management Control.

3- Deal with Electronic Displays.

4- Deals with Typical Electronic/Digital Aircraft Systems.

5- Understand Concept of Logic Circuits.

Subject: Digital Techniques /Electronic Instrument Systems

رقم الوحدة	اســـــم الـوحـــــدة	محتويـــــــــــات الوحـــــــدة	الزمن
1	**Electronic Instrument Systems**	• Typical systems arrangements and cockpit layout of electronic instrument systems.	**1 week**
2	**Numbering Systems**	• Numbering systems: binary, octal and hexadecimal. • Demonstration of conversions between the decimal and binary, octal and hexadecimal systems and vice versa.	**1 weeks**
3	**Data Conversion**	• Analogue Data, Digital Data; • Operation and application of analogue to digital, and digital to analogue converters, inputs and outputs, limitations of various types.	**1 weeks**
4	**Data Buses**	• Operation of data buses in aircraft systems, including knowledge of ARINC and other specifications. • Aircraft Network/Ethernet.	**1 weeks**
5	**Logic Circuits**	• Identification of common logic gate symbols, tables and equivalent circuits. • Applications used for aircraft systems, schematic diagrams.	**2 weeks**
6	**Basic Computer Structure**	• Computer terminology (including bit, byte, software, hardware, CPU, IC, and various memory devices such as RAM, ROM, PROM). • Computer technology (as applied in aircraft systems).	**2 weeks**
7	**Fiber Optics**	• Advantages and disadvantages of fiber optic data transmission over electrical wire propagation; • Fiber optic data bus; • Fiber optic related terms; • Terminations; • Couplers, control terminals, remote terminals; • Application of fiber optics in aircraft systems.	**1 weeks**
8	**Electronic Displays**	• Principles of operation of common types of displays used in modern aircraft, including Cathode Ray Tubes, Light Emitting Diodes and Liquid Crystal Display.	**1 weeks**
9	**Electrostatic Sensitive Devices**	• Special handling of components sensitive to electrostatic discharges. • Awareness of risks and possible damage, component and personnel anti-static protection devices.	**1 weeks**
10	**Software Management Control**	• Awareness of restrictions, airworthiness requirements and possible catastrophic effects of unapproved changes to software programmers.	**1 weeks**
11	**Electromagnetic**	• Influence of the following phenomena on maintenance practices for electronic system:	**2 weeks**

	Environment	○ EMC-Electromagnetic Compatibility ○ EMI-Electromagnetic Interference ○ HIRF-High Intensity Radiated Field ○ Lightning/lightning protection.	
12	**Typical Electronic/Digital Aircraft Systems**	• ACARS-ARINC Communication and Addressing and Reporting System EICAS-Engine Indication and Crew Alerting System FBW-Fly-by-Wire FMS-Flight Management System IRS-Inertial Reference System; • ECAM-Electronic Centralized Aircraft Monitoring EFIS-Electronic Flight Instrument System GPS-Global Positioning System TCAS-Traffic Alert Collision Avoidance System Integrated Modular Avionics Cabin Systems Information Systems.	**2 weeks**

الامتحانات	***نسبةالامتحان من العلامة الكلية***	***التاريخ***
الامتحان المتوسط	***40%***	***التاريخ : الاسبوع العاشر***
أعمال الفصل	***10%***	***التاريخ : / /***
الامتحانات النهائية	***50%***	***التاريخ : الاسبوع السادس عشر***

طرق التدريس:

يحدد عضو التدريس الطريقة المستخدمة من خلال (محاضرة ، عرض، مناقشات، مختبرات)

الكتب والمراجع:

EASA 147, PART 66, Modules 5, 2014.

برنامج الدرجة الجامعية المتوسطة	
التخصص	هندسة صيانة الطائرات
رقم المادة الدراسية	٠20608231
اسم المادة الدراسية	Aircraft Material and Hardware
عدد الساعات المعتمدة	(3)
عدد الساعات النظرية	(٣)
عدد الساعات العملية	(٠)

وصف المادة الدراسية :

تطبق هذه الخطة الدراسية اعتباراً من بداية العام الجامعي 2018/2017

*This Subject Deals With **Aircraft Material and Hardware** Which Cover The Following **Items:***

Aircraft Materials (Ferrous/ non Ferrous) & Composite and Non-Metallic Materials. Corrosion. Fasteners, Pipes and Unions, Springs, Bearings, Transmissions, Control Cables, Electrical Cables and Connectors.

أهداف المادة الدرسية :

بعد دراسة هذه المادة يتوقع من الطالب أن يكون قادراً على تحقيق الأهداف التالية:

1- Identify Aircraft Materials (Ferrous/ non Ferrous) & Composite and Non-Metallic Materials.

2- Understand Corrosion.

4- Deal with Fasteners, Pipes and Unions, Springs, Bearings, Transmissions, Control Cables, Electrical Cables and Connectors.

Subject: Aircraft Material and Hardware

رقم الوحدة	اســـــم الـوحـــــدة	محتويـــــــــــات الوحـــــــدة	الزمن
1)	**Aircraft Materials — Ferrous**	• Characteristics, properties and identification of common alloy steels used in aircraft; Heat treatment and application of alloy steels. • Testing of ferrous materials for hardness, tensile strength, fatigue strength and impact resistance.	**1 week**
2)	**Aircraft Materials — Non-Ferrous**	• Characteristics, properties and identification of common non-ferrous materials used in aircraft; Heat treatment and application of non-ferrous materials; • Testing of non-ferrous material for hardness, tensile strength, fatigue strength and impact resistance.	**1 week**
3)	**Aircraft Materials — Composite and Non-Metallic**	• Composite and non-metallic other than wood and fabric. o Characteristics, properties and identification of common composite and non-metallic materials, other than wood, used in aircraft; Sealant and bonding agents; o The detection of defects/deterioration in composite and non-metallic material; Repair of composite and non-metallic material. • Wooden structures. o Construction methods of wooden airframe structures; o Characteristics, properties and types of wood and glue used in airplanes; o Preservation and maintenance of wooden structure; o Types of defects in wood material and wooden structures; o The detection of defects in wooden structure; o Repair of wooden structure. • Fabric covering o Characteristics, properties and types of fabrics used in airplanes; o Inspections methods for fabric; o Types of defects in fabric; o Repair of fabric covering.	**3weeks**
4)	**Corrosion**	• Chemical fundamentals; Formation by, galvanic action process, microbiological, stress. • Types of corrosion and their identification; Causes of corrosion; Material types, susceptibility to corrosion.	**1 week**
5)	**Fasteners**	• Screw threads. o Screw nomenclature; o Thread forms, dimensions and tolerances for standard threads used in aircraft; o Measuring screw threads.	**3weeks**

		• Bolts, studs and screws ○ Bolt types: specification, identification and marking of aircraft bolts, international standards; ○ Nuts: self locking, anchor, standard types; ○ Machine screws: aircraft specifications; ○ Studs: types and uses, insertion and removal; ○ Self tapping screws, dowels. • Locking devices ○ Tab and spring washers, locking plates, split pins, pal-nuts, wire locking, quick release fasteners, keys, circlips, cotter pins. • Aircraft rivets ○ Types of solid and blind rivets: specifications and identification, heat treatment.	
6)	**Pipes and Unions**	• Identification of, and types of rigid and flexible pipes and their connectors used in aircraft; • Standard unions for aircraft hydraulic, fuel, oil, pneumatic and air system pipes.	**1 week**
7)	**Springs**	• Types of springs, materials, characteristics and applications.	**1 week**
8)	**Bearings**	• Purpose of bearings, loads, material, construction; • Types of bearings and their application.	**1 week**
9)	**Transmissions**	• Gear types and their application; • Gear ratios, reduction and multiplication gear systems, driven and driving gears, idler gears, mesh patterns; • Belts and pulleys, chains and sprockets.	**1 week**
10)	**Control Cables**	• Types of cables; • End fittings, turnbuckles and compensation devices; • Pulleys and cable system components; • Bowden cables; • Aircraft flexible control systems.	**1 week**
11)	**Electrical Cables and Connectors**	• Cable types, construction and characteristics; • High tension and co-axial cables; • Crimping; • Connector types, pins, plugs, sockets, insulators, current and voltage rating, coupling, identification codes.	**2weeks**

الامتحانات	نسبةالامتحان من العلامة الكلية	التاريخ
الامتحان المتوسط	40%	التاريخ : الاسبوع العاشر
أعمال الفصل	10%	التاريخ : / /
الامتحانات النهائية	50%	التاريخ : الاسبوع السادس عشر

طرق التدريس:

يحدد عضو التدريس الطريقة المستخدمة من خلال (محاضرة ، عرض، مناقشات، مختبرات)

الكتب والمراجع:

EASA 147, PART 66, Modules 6, 2014.

برنامج الدرجة الجامعية المتوسطة	
التخصص	هندسة صيانة الطائرات
رقم المادة الدراسية	20608211٠
اسم المادة الدراسية	تمارين صيانة
عدد الساعات المعتمدة	(3)
عدد الساعات النظرية	(3)
عدد الساعات العملية	(0)

وصف المادة الدراسية :

This Subject Deals With Maintenance Practices Which Cover The Following ***Items:***

Abnormal Events, Safety Precautions-Aircraft and Workshop, Workshop Practices, Engineering Drawings, Diagrams and Standards, Fits and Clearance, Deal with Tools, Avionic General Test Equipment, Electrical Wiring Interconnection System (EWIS), Welding, Brazing, Soldering and Bonding.

Riveting, Pipes and Hoses, Springs, Bearings, Transmissions, Aircraft Weight and Balance. Control Cables, Material handling, Aircraft handling and Storage, Disassembly, Inspection, Repair and Assembly Techniques, Maintenance Procedures.

أهداف المادة الدرسية :

بعد دراسة هذه المادة يتوقع من الطالب أن يكون قادراً على تحقيق الأهداف التالية:

1- Identify Abnormal Events, Safety Precautions-Aircraft and Workshop, Workshop Practices.

2- Understand Engineering Drawings, Diagrams and Standards, Fits and Clearances.

3- Deal with Tools, Avionic General Test Equipment, Electrical Wiring Interconnection System (EWIS), Welding, Brazing, Soldering and Bonding.

4- Deals with Riveting, Pipes and Hoses, Springs, Bearings, Transmissions.

5- Understand Aircraft Weight and Balance.

6- Deal with Control Cables, Material handling, Aircraft handling and Storage, Disassembly, Inspection, Repair and Assembly Techniques.

Subject: Maintenance Practices

رقم	اسم الوحدة	محتويات الوحدة	الزمن

الوحدة			
1.	**Safety Precautions- Aircraft and Workshop**	• Aspects of safe working practices including precautions to take when working with electricity, gases especially oxygen, oils and chemicals. • Instruction in the remedial action to be taken in the event of a fire or another accident with one or more of these hazards including knowledge on extinguishing agents.	**1 week**
2.	**Workshop Practices**	• Care of tools, control of tools, use of workshop materials; • Dimensions, allowances and tolerances, standards of workmanship. • Calibration of tools and equipment, calibration standards.	
3.	**Tools**	• Common hand tool types. • Common power tool types. • Operation and use of precision measuring tools. • Lubrication equipment and methods. • Operation, function and use of electrical general test equipment.	**1 week**
4.	**Avionic General Test Equipment**	• Operation, function and use of avionic general test equipment	
5.	**Engineering Drawings, Diagrams and Standards**	• Drawing types and diagrams, their symbols, dimensions, tolerances and projections. • Identifying title block information. • Microfilm, microfiche and computerized presentations. • Specification 100 of the Air Transport Association (ATA) of America. • Aeronautical and other applicable standards including ISO, AN, MS, NAS and MIL. • Wiring diagrams and schematic diagrams.	**1 week**
6.	**Fits and Clearances**	• Drill sizes for bolt holes, classes of fits. • Common system of fits and clearances. • Schedule of fits and clearances for aircraft and engines. • Limits for bow, twist and wear. • Standard methods for checking shafts, bearings and other parts.	**1 week**
7.	**Electrical Wiring Interconnection System (EWIS)**	• Continuity, insulation and bonding techniques and testing. • Use of crimp tools: hand and hydraulic operated. • Testing of crimp joints. • Connector pin removal and insertion. • Co-axial cables: testing and installation precautions. • Identification of wire types, their inspection criteria and damage tolerance.	**2 weeks**

		• Wiring protection techniques: o Cable looming and loom support. o Cable clamps. o Protective sleeving techniques including heat shrink wrapping, shielding. • EWIS installations, inspection, repair, maintenance and cleanliness standards.	
8.	**Riveting**	• Riveted joints, rivet spacing and pitch. • Tools used for riveting and dimpling. • Inspection of riveted joints.	**1 week**
9.	**Pipes and Hoses**	• Bending and belling/flaring aircraft pipes. • Inspection and testing of aircraft pipes and hoses. • Installation and clamping of pipes	
10	**Springs**	• Inspection and testing of springs.	**1 week**
11	**Bearings**	• Testing, cleaning and inspection of bearings; • Lubrication requirements of bearings; • Defects in bearings and their causes.	
12	**Transmissions**	• Inspection of gears, backlash; • Inspection of belts and pulleys, chains and sprockets; • Inspection of screw jacks, lever devices, push-pull rod systems.	**1 week**
13	**Control Cables**	• Swaging of end fittings; • Inspection and testing of control cables; • Bowden cables; aircraft flexible control systems.	
14	**Material handling**	• Sheet Metal o Marking out and calculation of bend allowance; o Sheet metal working, including bending and forming; o Inspection of sheet metal work. • Composite and non-metallic o Bonding practices; o Environmental conditions; o Inspection methods.	**1 week**
15	**Welding, Brazing, Soldering and**	• Soldering methods; inspection of soldered joints. • Welding and brazing methods; Inspection of welded and brazed joints; Bonding methods and inspection of bonded	**1 week**

	Bonding	joints.	
16	**Aircraft Weight and Balance**	• Centre of Gravity/Balance limits calculation: use of relevant documents • Preparation of aircraft for weighing; Aircraft weighing.	
17	**Aircraft Handling and Storage**	• Aircraft taxiing/towing and associated safety precautions; • Aircraft jacking, chocking, securing and associated safety precautions; • Aircraft storage methods; • Refueling/defueling procedures; • De-icing/anti-icing procedures; • Electrical, hydraulic and pneumatic ground supplies. • Effects of environmental conditions on aircraft handling and operation.	**1 week**
18	**Disassembly, Inspection, Repair and Assembly Techniques**	• Types of defects and visual inspection techniques; Corrosion removal, assessment and reproduction; • General repair methods, Structural Repair Manual; Ageing, fatigue and corrosion control programmers; • Non-destructive inspection techniques including, penetrate, radiographic, eddy current, ultrasonic and horoscope methods; • Trouble shooting techniques. • Disassembly and re-assembly techniques	**1 week**
19	**Abnormal Events**	• Inspections following lightning strikes and HIRF penetration. • Inspections following abnormal events such as heavy landings and flight through turbulence.	**1 week**
20	**Maintenance Procedures**	• Maintenance planning; • Modification procedures; • Stores procedures; • Certification/release procedures; • Interface with aircraft operation; • Maintenance Inspection/Quality Control/Quality Assurance; • Additional maintenance procedures; • Control of life limited components.	**2 week**

الامتحانات	***نسبةالامتحان من العلامة الكلية***	***التاريخ***

الأول	40%	التاريخ : الاسبوع السادس
أعمال الفصل	10%	التاريخ : / /
الامتحانات النهائية	50%	التاريخ : الاسبوع السادس عشر

طرق التدريس:

يحدد عضو التدريس الطريقة المستخدمة من خلال (محاضرة ، عرض، مناقشات، مختبرات)

الكتب والمراجع:

EASA 147, PART 66, Modules 7, 2014.

برنامج الدرجة الجامعية المتوسطة	
التخصص	هندسة صيانة الطائرات
رقم المادة الدراسية	20608212
اسم المادة الدراسية	مشغل تمارين صيانة عملية
عدد الساعات المعتمدة	(1)
عدد الساعات النظرية	(0)
عدد الساعات العملية	(3)

وصف المادة الدراسية :

Safety precautions- aircraft and workshop/ Workshop practices, TOOLS/ Engineering drawings, Diagrams & Standards, Fits & Clearances, Riveting, Pipes & Hoses, Springs/ Bearings, Transmissions, Control Cables, Material handling, Welding,Brazing, Soldaring & Bonding, Aircraft Weight & Balance, Aircrafthandling& Storage, Disassembly,Inspection, Repair,Assembly Techniques, Abnormal Events / Maintenance prosedures.

أهداف المادة الدرسية :

بعد دراسة هذه المادة يتوقع من الطالب أن يكون قادراً على تحقيق الأهداف التالية:

1- To Identify the types of Hand Tools.

2- To Identify Engineering drawings, Diagrams & Standards.

3- To Identify the Aircraft Weight & Balance, Aircraft handling& Storage.

4- To Identify Fits & Clearances, Riveting, Pipes & Hoses, Springs/ Bearings.

5- To Identify Transmissions, Control Cables, Material handling.

6- To Identify Welding, Brazing, Soldering & Bonding.

7- To Identify Disassembly, Inspection, Repair, Assembly Techniques.

8- To Identify Abnormal Events, Maintenance procedures.

رقم الوحدة	اسم الوحدة	محتويات الوحدة	وحدة الزمن
1.	**safety precautions-aircraft and workshop/ Workshop practices**	• Working with elect. • Working with compressed gaseous. • Working with oils and chemicals • Identification of Fire extinguishing agents. • Care and control of tools in workshop. • Use of workshop materials. • Standards of workshop. • Tools calibration standards.	***1week***
2.	**TOOLS/ Engineering drawings, Diagrams & Standards**	• Identification and use of common hand tools. • Identification and use of power tools. • Operation and use of precision measuring tools. • Use of manual and pressure lubrication equipments. • Identification and use of A/C drawing types. • Use of wiring and schematic diagrams. • Identifying title block information. • Specification 100 of the Air Transport Association (ATA) of America. • Aeronautical and other applicable standards.	***1week***
3.	**Fits & Clearances**	• How to chose the correct drill sizes for bolt holes. • Identifying classes of fits. • Using of standard methods for checking shafts, bearings and other parts.	***1week***
4.	**Riveting**	• Universal head blind riveting. • Countersunk head blind riveting. • Countersinking.	***2week***

		• Hole dimpling. • Patch repair. • Bad rivet removal • Rivet identification. • Rivet edge distance and spacing layout. • Inspection of riveted joint.	
5.	**Pipes & Hoses**	• Bending and flaring aircraft pipes. • Inspection and testing of aircraft pipes and hoses.	***1week***
6.	**Springs/ Bearings**	• Inspection and testing of springs • Testing, cleaning and inspection of bearings. • Lubrication requirements of bearings. • Defects in bearings and there causes.	***1week***
7.	**Transmissions**	• Inspection of gears, backlash. • Inspection of belts, pulleys, chains and sprockets. • Inspection of screw jacks, levers and push-pull rod system.	***1week***
8.	**Control Cables**	• Swaging of cable end fittings. • Inspection and testing of control cables. • Bowden cable, aircraft flexible control systems.	***1week***
9.	**Material handling**	• Cutting a piece of metal using square-shear. • Bending a piece of sheet metal using bend allowance calculation. • Inspection of sheet metal work. • Honey comp repair • Fiber glass scarf repair. • Composite inspection methods.	***1week***
10.	**Welding,Brazing, Soldaring & Bonding**	• Welding by oxy-acetylene. • Welding two pieces of aluminum by spot welding.	***1week***

		• Welding two pieces of steel sheets by metal arc welding. • Inspection of a good welding.	
11.	**Aircraft Weight & Balance**	• Aircraft leveling. • Airplane Condition and Definitions.	***1week***
12.	**Aircrafthandling& Storage**	• Aircraft Towing. • Aircraft Parking. • Aircraft Mooring. • Aircraft refueling	***1week***
13.	**Disassembly,Inspec-tion, Repair,Assembly Techniques**	• Visual inspection techniques. • Corrosion removal, assessment and re- protection. • Liquid -Penetrate inspection. • Fuel filter bowl screen removal, cleaning, installation. • Wheel brake removal, adjustment, and installation. • Using maintenance manual for trouble shooting.	***1week***
14.	**Abnormal Events / Maintenance prosedures**	• Inspection following lightning strike. • Inspection following hard landing. • Maintenance planning. • Modification procedures. • Certification /release procedures. • Control of life limited components.	***1week***

طرق التقييم المستخدمة:

الامتحانات	نسبةالامتحان من العلامة الكلية	التاريخ
اعمال الفصل	30%	التاريخ :
الامتحان المتوسط	20%	التاريخ : الاسبوع الثامن
الامتحان النهائي	50%	التاريخ : الاسبوع السادس عشر
المشروع والوظائف		
المناقشات وتقديم المحاضرات		

طرق التدريس:

يحدد عضو التدريس الطريقة المستخدمة من خلال (محاضرة ، عرض، مناقشات، مختبرات)

الكتب والمراجع

EASA 147, PART 66, Modules 7, 2014.

برنامج الدرجة الجامعية المتوسطة	
التخصص	هندسة صيانة الطائرات
رقم المادة الدراسية	020605212
اسم المادة الدراسية	الديناميكا الهوائية
عدد الساعات المعتمدة	(٢)
عدد الساعات النظرية	(2)
عدد الساعات العملية	(٠)

وصف المادة الدراسية :

This Subject Deals With Aerodynamics Which Cover The Following ***Items:***

Flight Stability and Dynamics, Physics of the Atmosphere, Aerodynamics and Theory of Flight.

أهداف المادة الدرسية :

بعد دراسة هذه المادة يتوقع من الطالب أن يكون قادراً على تحقيق الأهداف التالية:

1- Identify Flight Stability and Dynamics.

2- Understand Physics of the Atmosphere.

3- Understand Concept of Aerodynamics and Theory of Flight.

Subject: Aerodynamics.

رقم الوحدة	اســـــم الـوحـــــدة	محتويـــــــــــات الوحـــــــدة	الزمن
1	**Physics of the Atmosphere**	• International Standard Atmosphere (ISA), application to aerodynamics.	**3 weeks**
2	**Aerodynamics**	• Airflow around a body; • Boundary layer, laminar and turbulent flow, free stream flow, relative airflow, up-wash and downwash, vortices, stagnation; • The terms: camber, chord, mean aerodynamic chord, profile (parasite) drag, induced drag, centre of pressure, angle of attack, wash in and wash out, fineness ratio, wing shape and aspect ratio; • Thrust, Weight, Aerodynamic Resultant; • Generation of Lift and Drag: Angle of Attack, Lift coefficient, Drag coefficient, polar curve, stall; • Aerofoil contamination including ice, snow, frost.	**6 weeks**
3	**Theory of Flight**	• Relationship between lift, weight, thrust and drag; • Glide ratio; • Steady state flights, performance; • Theory of the turn; • Influence of load factor: stall, flight envelope and structural limitations; • Lift augmentation.	**4 weeks**
4	**Flight Stability and Dynamics**	• Longitudinal, lateral and directional stability (active and passive).	**3 weeks**

الامتحانات	نسبةالامتحان من العلامة الكلية	التاريخ
الامتحان المتوسط	40%	التاريخ : الاسبوع العاشر
أعمال الفصل	10%	التاريخ : / /
الامتحانات النهائية	50%	التاريخ : الاسبوع السادس عشر

طرق التدريس:

يحدد عضو التدريس الطريقة المستخدمة من خلال (محاضرة ، عرض، مناقشات، مختبرات)

الكتب والمراجع:

EASA 147, PART 66, Modules 8, 2014.

برنامج الدرجة الجامعية المتوسطة	
التخصص	هندسة صيانة الطائرات
رقم المادة الدراسية	020605213
اسم المادة الدراسية	مختبر الديناميكا الهوائية
عدد الساعات المعتمدة	(٢)
عدد الساعات النظرية	(2)
عدد الساعات العملية	(٠)

وصف المادة الدراسية :

This Subject Deals With Aerodynamics Which Cover The Following ***Items:***

Flight Stability and Dynamics, Physics of the Atmosphere, Aerodynamics and Theory of Flight.

أهداف المادة الدرسية :

بعد دراسة هذا المختبر يتوقع من الطالب أن يكون قادراً على تحقيق الأهداف التالية:

1- Identify Flight Stability and Dynamics.

2- Understand Physics of the Atmosphere.

3- Understand Concept of Aerodynamics and Theory of Flight.

Subject: Aerodynamics lab.

رقم الوحدة	اســـــم الـوحـــــدة	محتويـــــــــات الوحـــــــدة	الزمن
1	Pressure distribution over symmetrical airfoil		١ weeks
2	Centrifugal Flow Compressor Test Rig		١ weeks
3	Calibration of Low-Speed Wind Tunnel		١ weeks
٤	Fluid Flow Studies Using Blower		١ weeks
٥	Calculation of Drag On Wooden Cylinder		١ weeks
٦	Calculation Of Cl And Cd Of Naca 2312 Airfoil		١ weeks
٧	Flow Visualization Technique 39		١ weeks
٨	Axial Flow Fan Test Rig		١ weeks

الامتحانات	نسبةالامتحان من العلامة الكلية	التاريخ
اعمال الفصل	30%	التاريخ :
الامتحان المتوسط	20%	التاريخ : الاسبوع الثامن
الامتحان النهائي	50%	التاريخ : الاسبوع السادس عشر
المشروع والوظائف		
المناقشات وتقديم المحاضرات		

طرق التدريس:

يحدد عضو التدريس الطريقة المستخدمة من خلال (محاضرة ، عرض، مناقشات، مختبرات)

الكتب والمراجع:

EASA 147, PART 66, Modules 8, 2014.

برنامج الدرجة الجامعية المتوسطة

التخصص	هندسة صيانة الطائرات
رقم المادة الدراسية	20605271٠
اسم المادة الدراسية	العوامل البشرية والتشريعات الجوية
عدد الساعات المعتمدة	(٢)
عدد الساعات النظرية	(٢)
عدد الساعات العملية	(0)

وصف المادة الدراسية :

This Subject Deals With Human factor and Aviation legislation which Cover The Following ***Items:***

Regulatory Framework, Approved Maintenance Organizations, Certifying Staff — Maintenance. Human Performance and Limitations, Factors Affecting Performance, Physical Environment. Tasks, Communication, and Hazards in the Work-place, Air operations, Certification of aircraft, parts and appliances,

Social Psychology, Human Error, Continuing airworthiness.

أهداف المادة الدرسية :

بعد دراسة هذه المادة يتوقع من الطالب أن يكون قادراً على تحقيق الأهداف التالية:

1- Identify Regulatory Framework, Approved Maintenance Organizations, Certifying Staff — Maintenance.

2- Understand Human Performance and Limitations, Factors Affecting Performance, Physical Environment.

3- Deal with Tasks, Communication, and Hazards in the Work-place.

4- Deals with Air operations, Certification of aircraft, parts and appliances.

5- Understand Concept of Social Psychology, Human Error, and Continuing airworthiness.

Subject: Human factor and Aviation legislation

رقم الوحدة	اســـــم الـوحـــــدة	محتويـــــــــــات الوحـــــــدة	الزمن
1	**Introduction**	• The need to take human factors into account; • Incidents attributable to human factors/human error; • 'Murphy's' law.	**1week**
2	**Human Performance and Limitations**	• Vision; • Hearing; • Information processing; • Attention and perception; • Memory; • Claustrophobia and physical access.	**1week**
3	**Social Psychology**	• Responsibility: individual and group; • Motivation and de-motivation; • Peer pressure; • 'Culture' issues; • Team working; • Management, supervision and leadership.	**1week**
4	**Factors Affecting Performance**	• Fitness/health; • Stress: domestic and work related; • Time pressure and deadlines; • Workload: overload and under load; • Sleep and fatigue, shift work; • Alcohol, medication, drug abuse.	**1week**
5	**Physical Environment**	• Noise and fumes; • Illumination; • Climate and temperature; • Motion and vibration; • Working environment.	**1week**
6	**Tasks**	• Physical work; • Repetitive tasks; • Visual inspection; • Complex systems.	**1week**

7	**Communication**	• Within and between teams; • Work logging and recording; • Keeping up to date, currency; • Dissemination of information.	**1week**
8	**Human Error**	• Error models and theories; • Types of error in maintenance tasks; • Implications of errors (i.e. accidents); • Avoiding and managing errors.	**1week**
9	**Hazards in the Workplace**	• Recognizing and avoiding hazards; • Dealing with emergencies.	**1week**
10	**Regulatory Framework**	• Role of the International Civil Aviation Organization; • Role of the European Commission; • Role of EASA; • Role of the Member States and National Aviation Authorities; • Regulation (EC) No 216/2008 and its implementing rules Regulations (EC) No 1702/2003 and (EC) No 2042/2003; • Relationship between the various Annexes (Parts) such as Part-21, Part-M, Part-145, Part-66, Part-147 and EU-OPS.	**1week**
11	**Certifying Staff — Maintenance**	• Detailed understanding of Part-66.	**1week**
12	**Approved Maintenance Organizations**	• Detailed understanding of Part-145 and Part-M Subpart F.	**1week**
13	**Air operations**	• General understanding of EU-OPS. • Air Operators Certificates; • Operator's responsibilities, in particular regarding continuing airworthiness and maintenance; • Aircraft Maintenance Program; • MEL//CDL; • Documents to be carried on board; • Aircraft placarding (markings).	**1week**
14	**Certification of aircraft, parts and appliances**	• General understanding of Part-21 and EASA certification specifications CS-23, 25, 27, 29. • Certificate of Airworthiness; restricted certificates of airworthiness and permit to fly; • Certificate of Registration; • Noise Certificate; • Weight Schedule;	**1week**

		• Radio Station License and Approval.	
15	**Continuing airworthiness**	• Detailed understanding of Part-21 provisions related to continuing airworthiness. • Detailed understanding of Part-M.	**1week**
16	**Applicable National and International Requirements for (if not superseded by EU requirements).**	• Maintenance Programmers, Maintenance checks and inspections; Airworthiness Directives; Service Bulletins, manufacturers service information; Modifications and repairs; Maintenance documentation: maintenance manuals, structural repair manual, illustrated parts catalogue, etc.; • ETOPS, maintenance and dispatch requirements; All Weather Operations, Category 2/3 operations.	**1week**

الامتحانات	نسبة الامتحان من العلامة الكلية	التاريخ
الامتحان المتوسط	40%	التاريخ : الاسبوع العاشر
أعمال الفصل	10%	التاريخ : / /
الامتحانات النهائية	50%	التاريخ : الاسبوع السادس عشر

طرق التدريس:

يحدد عضو التدريس الطريقة المستخدمة من خلال (محاضرة ، عرض، مناقشات، مختبرات)

الكتب والمراجع:

EASA 147, PART 66, Modules 9 & 10, 2014.

التخصص	هندسة صيانة الطائرات
رقم المادة الدراسية	20605171٠
اسم المادة الدراسية	الطائرات التوربينة ومحركاتها
عدد الساعات المعتمدة	(3)
عدد الساعات النظرية	(2)
عدد الساعات العملية	(3)

وصف المادة الدراسية :

This Subject Deals With Turbine Aero-plane Aerodynamics Structure Which Cover The Following ***Items:***

Theory of Flight, Airframe Structures, Air Conditioning and Cabin Pressurization, instruments/ Avionic Systems, Electrical power, equipment and Furnishing.

أهداف المادة الدرسية :

بعد دراسة هذه المادة يتوقع من الطالب أن يكون قادراً على تحقيق الأهداف التالية:

1- Understand Concept of Theory of Flight.

2- Understand Airframe Structures.

3- Deal with Air Conditioning and Cabin Pressurization.

4- Deals with Instruments in particular for Avionic Systems.

5- Identify electrical power in Aero-planes.

6- Get familiar with Equipment and Furnishings for Aero-planes.

Subject: TURBINE AEROPLANE AERODYNAMICS & STRUCTURES.

رقم الوحدة	اسم الوحدة	محتويات الوحدة	الزمن
1	**Theory of Flight**	• Aeroplane Aerodynamics and Flight Controls ○ Operation and effect of: — roll control: ailerons and spoilers, — pitch control: elevators, stabilizers, variable incidence stabilizers and canards, — yaw control, rudder limiters; ○ Control using elevons, ruddervators; ○ High lift devices, slots, slats, flaps, flaperons; ○ Drag inducing devices, spoilers, lift dumpers, speed brakes; ○ Effects of wing fences, saw tooth leading edges; ○ Boundary layer control using, vortex generators, stall wedges or leading edge devices; ○ Operation and effect of trim tabs, balance and antibalance (leading) tabs, servo tabs, spring tabs, mass balance, control surface bias, aerodynamic balance panels.	**3weeks**

		• High Speed Flight ○ Speed of sound, subsonic flight, transonic flight, supersonic flight; ○ Mach number, critical Mach number, compressibility buffet, shock wave, aerodynamic heating, area rule; ○ Factors affecting airflow in engine intakes of high speed aircraft; ○ Effects of sweepback on critical Mach number.	
2	**Airframe Structures — General Concepts**	• Airworthiness requirements for structural strength. ○ Structural classification, primary, secondary and tertiary. ○ Fail safe, safe life, damage tolerance concepts. ○ Zonal and station identification systems. ○ Stress, strain, bending, compression, shear, torsion, tension, hoop stress, fatigue. ○ Drains and ventilation provisions. ○ System installation provisions. ○ Lightning strike protection provision. ○ Aircraft bonding. • Construction methods of: ○ stressed skin fuselage, formers, stringers, longerons, bulkheads, frames, doublers, struts, ties, beams, floor structures, reinforcement, methods of skinning, anti-corrosive protection, wing, empennage and engine attachments. ○ Structure assembly techniques: riveting, bolting, bonding. ○ Methods of surface protection, such as chromating, anodising, painting; Surface cleaning; ○ Airframe symmetry: methods of alignment and symmetry checks.	**3weeks**
3	**Airframe Structures — Aero planes**	• Fuselage ○ Construction and pressurisation sealing; ○ Wing, stabiliser, pylon and undercarriage attachments; ○ Seat installation and cargo loading system; ○ Doors and emergency exits: construction, mechanisms, operation and safety devices; ○ Windows and windscreen construction and mechanisms. • Wings ○ Construction; ○ Fuel storage; ○ Landing gear, pylon, control surface and high lift/drag attachments. • Stabilizers ○ Construction;	**2weeks**

		○ Control surface attachment. • Flight Control Surfaces ○ Construction and attachment; ○ Balancing — mass and aerodynamic. • Nacelles/Pylons ○ Nacelles/Pylons: — Construction, — Firewalls, — Engine mounts.	
4	**Air Conditioning and Cabin Pressurization**	• Air supply ○ Sources of air supply including engine bleed, APU and ground cart. • Air Conditioning ○ Air conditioning systems; ○ Air cycle and vapour cycle machines; ○ Distribution systems; ○ Flow, temperature and humidity control system. • Pressurisation ○ Pressurisation systems; ○ Control and indication including control and safety valves; ○ Cabin pressure controllers. • Safety and warning devices ○ Protection and warning devices.	**2weeks**
5	**Instruments/Avionic Systems**	• Instrument Systems ○ Pitot static: altimeter, air speed indicator, vertical speed indicator; ○ Gyroscopic: artificial horizon, attitude director, direction indicator, horizontal situation indicator, turn and slip indicator, turn coordinator; ○ Compasses: direct reading, remote reading; ○ Angle of attack indication, stall warning systems; ○ Glass cockpit; ○ Other aircraft system indication. • Avionic Systems ○ Fundamentals of system lay-outs and operation of: — Auto Flight — Communications — Navigation Systems.	**2weeks**
6	**Electrical Power**	• Batteries Installation and Operation; • DC power generation; • AC power generation; • Emergency power generation; • Voltage regulation; • Power distribution;	**2 weeks**

		• Inverters, transformers, rectifiers; • Circuit protection; • External/Ground power.	

7	**Equipment and Furnishings**	• Emergency equipment requirements;
		  ○ Seats, harnesses and belts.
		• Cabin lay-out;
		  ○ Equipment lay-out;
		  ○ Cabin Furnishing installation;
		  ○ Cabin entertainment equipment
		  ○ Galley installation;
		  ○ Cargo handling and retention equipment;
		  ○ Airstairs.
			2 weeks

الامتحانات	***نسبةالامتحان من العلامة الكلية***	***التاريخ***
الامتحان المتوسط	***40%***	***التاريخ : الاسبوع العاشر***
أعمال الفصل	***10%***	***التاريخ : / /***
الامتحانات النهائية	***50%***	***التاريخ : الاسبوع السادس عشر***

طرق التدريس:

يحدد عضو التدريس الطريقة المستخدمة من خلال (محاضرة ، عرض، مناقشات، مختبرات)

الكتب والمراجع:

تطبق هذه الخطة الدراسية اعتباراً من بداية العام الجامعي 2018/2017

EASA 147, PART 66, Modules 11, 2014.

برنامج الدرجة الجامعية المتوسطة

التخصص	**هندسة صيانة الطائرات**
رقم المادة الدراسية	***٠20605181***
اسم المادة الدراسية	***الطائرات التوربينة وهياكلها١***

عدد الساعات المعتمدة	(3)
عدد الساعات النظرية	(2)
عدد الساعات العملية	(3)

وصف المادة الدراسية :

This Subject Deals With Turbine Aero-plane Aerodynamics Systems Which Cover The Following ***Items:***

Flight Controls, Landing Gear, Hydraulic Power and lights, Fire Protection, Fuel Systems, Ice and Rain Protection.

أهداف المادة الدرسية :

بعد دراسة هذه المادة يتوقع من الطالب أن يكون قادراً على تحقيق الأهداف التالية:

1- Identify Flight Controls.

2- Deal with Landing Gear, Hydraulic Power and lights.

3- Deals with Fire Protection, Fuel Systems, Ice and Rain Protection.

Subject: TURBINE AEROPLANE AERODYNAMICS & SYSTEMS (1).

رقم الوحدة	اســـــم الـوحـــــدة	محتويـــــــــــات الوحـــــــدة	الزمن
1	**Fire Protection**	• Fire and smoke detection and warning systems; • Fire extinguishing systems; • System tests; • Portable fire extinguisher.	**2 weeks**
2	**Flight Controls**	• Primary controls: aileron, elevator, rudder, spoiler; • Trim control; • Active load control; • High lift devices; • Lift dump, speed brakes; • System operation: manual, hydraulic, pneumatic, electrical, fly-by-wire; • Artificial feel, Yaw damper, Mach trim, rudder limiter, gust lock systems; • Balancing and rigging;	**3 weeks**

		• Stall protection/warning system.	
3	**Fuel Systems**	• System lay-out; • Fuel tanks; • Supply systems; • Dumping, venting and draining; • Cross-feed and transfer; • Indications and warnings; • Refueling and defueling; • Longitudinal balance fuel systems.	**3 weeks**
4	**Hydraulic Power**	• System lay-out; • Hydraulic fluids; • Hydraulic reservoirs and accumulators; • Pressure generation: electric, mechanical, pneumatic; • Emergency pressure generation; • Filters; • Pressure Control; • Power distribution; • Indication and warning systems; • Interface with other systems.	**3 weeks**
5	**Ice and Rain Protection**	• Ice formation, classification and detection; • Anti-icing systems: electrical, hot air and chemical; • De-icing systems: electrical, hot air, pneumatic and chemical; • Rain repellent; • Probe and drain heating; • Wiper systems.	**2 weeks**
6	**Landing Gear**	• Construction, shock absorbing; • Extension and retraction systems: normal and emergency; • Indications and warning; • Wheels, brakes, antiskid and auto-braking;	**2 weeks**

		• Tires; • Steering; • Air-ground sensing.	
7	**Lights**	• External: navigation, anti collision, landing, taxiing, ice; • Internal: cabin, cockpit, cargo; • Emergency.	**1 week**

الامتحانات	***نسبةالامتحان من العلامة الكلية***	***التاريخ***
الامتحان المتوسط	***40%***	***التاريخ : الاسبوع العاشر***
أعمال الفصل	***10%***	***التاريخ : / /***
الامتحانات النهائية	***50%***	***التاريخ : الاسبوع السادس عشر***

طرق التدريس:

يحدد عضو التدريس الطريقة المستخدمة من خلال (محاضرة ، عرض، مناقشات، مختبرات)

الكتب والمراجع:

EASA 147, PART 66, Modules 11, 2014.

برنامج الدرجة الجامعية المتوسطة	
التخصص	هندسة صيانة الطائرات
رقم المادة الدراسية	20605281٠
اسم المادة الدراسية	الطائرات التوربينة وهياكلها ٢
عدد الساعات المعتمدة	(3)
عدد الساعات النظرية	(2)
عدد الساعات العملية	(3)

وصف المادة الدراسية :

This Subject Deals With Turbine Aero-plane Aerodynamics (structure & systems) Which Cover The Following ***Items:***

Oxygen, Pneumatics/ Vacuum, Water/ Waste, on board Maintenance Systems, Integrated modular Avionics, Cabin Systems, Information Systems.

أهداف المادة الدرسية :

بعد دراسة هذه المادة يتوقع من الطالب أن يكون قادراً على تحقيق الأهداف التالية:

3- Deal with Oxygen, Pneumatic/Vacuum, Water/Waste Systems.

5- Identify Cabin Systems and Information Systems.

6- Deal with on board maintenance systems and integrated modular Avionics.

Subject: TURBINE AEROPLANE AERODYNAMICS & SYSTEMS (2).

رقم الوحدة	اســـــم الـوحـــــدة	محتويـــــــــــات الوحـــــــدة	الزمن
1	**Oxygen**	• System lay-out: cockpit, cabin; • Sources, storage, charging and distribution; • Supply regulation; • Indications and warnings.	**1 week**
2	**Pneumatic/Vacuum**	• System lay-out; • Sources: engine/APU, compressors, reservoirs, ground supply; • Pressure control. • Distribution; • Indications and warnings; • Interfaces with other systems.	**2 weeks**
3	**Water/Waste**	• Water system lay-out, supply, distribution, servicing and draining; • Toilet system lay-out, flushing and servicing; • Corrosion aspects.	**2week**
4	**On Board Maintenance Systems**	• Central maintenance computers; • Data loading system; • Electronic library system; • Printing; • Structure monitoring (damage tolerance monitoring).	**2week**
5	**Integrated Modular Avionics**	• Bleed Management, Air Pressure Control, Air Ventilation and Control, • Avionics and Cockpit Ventilation Control, Temperature Control, Air Traffic Communication, • Avionics Communication Router, Electrical Load Management, Circuit Breaker Monitoring, Electrical System BITE, • Fuel Management, Braking Control, Steering Control, Landing Gear Extension and Retraction,	**3weeks**

		• Tyre Pressure Indication, Oleo Pressure Indication, Brake Temperature Monitoring	
6	**Cabin Systems**	• The units and components which furnish a means of entertaining the passengers and providing communication within the aircraft (Cabin Intercommunication Data System) and between the aircraft cabin and ground stations (Cabin Network Service). Includes voice, data, and music and video transmissions. • The Cabin Intercommunication Data System provides an interface between cockpit/cabin crew and cabin systems. These systems support data exchange of the different related LRU's and they are typically operated via Flight Attendant Panels. • Data/Radio Communication, In-Flight Entertainment System. • The Cabin Network Service may host functions such as: — Access to pre-departure/departure reports, — E-mail/intranet/Internet access, — Passenger database; • Cabin Core System; • In-flight Entertainment System; • External Communication System; • Cabin Mass Memory System; • Cabin Monitoring System; • Miscellaneous Cabin System. • Aircraft General Information System; • Flight Deck Information System; • Maintenance Information System; • Passenger Cabin Information System; • Miscellaneous Information System.	**4 weeks**
7	**Information Systems**	• Aircraft General Information System; • Flight Deck Information System; • Maintenance Information System; • Passenger Cabin Information System; • Miscellaneous Information System.	**2weeks**

الامتحانات	نسبةالامتحان من العلامة الكلية	التاريخ
الأمتحان المتوسط	40%	التاريخ : الاسبوع العاشر
أعمال الفصل	10%	التاريخ : / /
الامتحانات النهائية	50%	التاريخ : الاسبوع السادس عشر

طرق التدريس:

يحدد عضو التدريس الطريقة المستخدمة من خلال (محاضرة ، عرض، مناقشات، مختبرات)

الكتب والمراجع:

EASA 147, PART 66, Modules 11, 2014.

برنامج الدرجة الجامعية المتوسطة	
التخصص	هندسة صيانة الطائرات
رقم المادة الدراسية	020605282
اسم المادة الدراسية	المحركات التوربينة الغازية
عدد الساعات المعتمدة	(3)
عدد الساعات النظرية	(3)
عدد الساعات العملية	(0)

وصف المادة الدراسية :

This Subject Deals With Gas Turbine Engine Which Cover The Following ***Items:***

Lubrication Systems, Fuel Systems, Air Systems, Starting and Ignition Systems, Engine Indication Systems, Power Augmentation Systems, Engine Performance, Inlet, Turbine Section, Exhaust, Lubricants and Fuels, Compressors, Combustion Section, Bearings and Seals, Fire Protection Systems, Auxiliary Power Units (APUs), Understand Turbo-shaft Engines, Turbo-prop Engines, Power-plant Installation, Engine Monitoring and Ground Operation, Engine Storage and Preservation.

أهداف المادة الدرسية :

بعد دراسة هذه المادة يتوقع من الطالب أن يكون قادراً على تحقيق الأهداف التالية:

1- Identify Lubrication Systems, Fuel Systems, Air Systems, Starting and Ignition Systems, Engine Indication Systems, Power Augmentation Systems.

2- Understand Engine Performance, Inlet, Turbine Section, Exhaust, Lubricants and Fuels.

3- Deal with Compressors, Combustion Section, Bearings and Seals.

4- Deals with Fire Protection Systems, Auxiliary Power Units (APUs)

5- Understand Turbo-shaft Engines, Turbo-prop Engines.

6- Deal with Power-plant Installation, Engine Monitoring and Ground Operation, Engine Storage and Preservation.

Subject: Gas Turbine Engine.

الزمن	محتويـــــــــات الوحـــــــدة	اســـــم الـوحـــــدة	رقم الوحدة

1	**Fundamentals**	• Potential energy, kinetic energy, Newton's laws of motion, Brayton cycle; • The relationship between force, work, power, energy, velocity, acceleration; • Constructional arrangement and operation of turbojet, turbofan, turbo-shaft, turboprop.	**1 week**
2	**Engine Performance**	• Gross thrust, net thrust, choked nozzle thrust, thrust distribution, resultant thrust, thrust horsepower, equivalent shaft horsepower, specific fuel consumption; • Engine efficiencies; • By-pass ratio and engine pressure ratio; • Pressure, temperature and velocity of the gas flow; • Engine ratings, static thrust, influence of speed, altitude and hot climate, flat rating, limitations.	**1 week**
3	**Inlet**	• Compressor inlet ducts • Effects of various inlet configurations; • Ice protection.	
4	**Compressors**	• Axial and centrifugal types; • Constructional features and operating principles and applications; • Fan balancing; • Operation: • Causes and effects of compressor stall and surge; • Methods of air flow control: bleed valves, variable inlet guide vanes, variable stator vanes, rotating stator blades; • Compressor ratio.	**2week**
5	**Combustion Section**	• Constructional features and principles of operation.	
	Turbine Section	• Operation and characteristics of different turbine blade types; • Blade to disk attachment; • Nozzle guide vanes;	**1 week**

		• Causes and effects of turbine blade stress and creep.	
6	**Exhaust**	• Constructional features and principles of operation; • Convergent, divergent and variable area nozzles; • Engine noise reduction; • Thrust reversers.	
7	**Bearings and Seals**	• Constructional features and principles of operation.	
8	**Lubricants and Fuels**	• Properties and specifications; • Fuel additives; • Safety precautions.	**2 week**
9	**Lubrication Systems**	• System operation/lay-out and components	
10	**Fuel Systems**	• Operation of engine control and fuel metering systems including electronic engine control (FADEC); • Systems lay-out and components.	
11	**Air Systems**	• Operation of engine air distribution and anti-ice control systems, including internal cooling, sealing and external air services.	**3 weeks**
12	**Starting and Ignition Systems**	• Operation of engine start systems and components; • Ignition systems and components; • Maintenance safety requirements.	
13	**Engine Indication Systems**	• Exhaust Gas Temperature/Inter-stage Turbine Temperature; • Engine Thrust Indication: Engine Pressure Ratio, engine turbine discharge pressure or jet pipe pressure systems; • Oil pressure and temperature; • Fuel pressure and flow; • Engine speed; • Vibration measurement and indication;	

		• Torque; • Power.	
14	**Power Augmentation Systems**	• Operation and applications; • Water injection, water methanol; • Afterburner systems.	**2 week**
15	**Turbo-prop Engines**	• Gas coupled/free turbine and gear coupled turbines; • Reduction gears; • Integrated engine and propeller controls; • Over-speed safety devices.	
16	**Turbo-shaft Engines**	• Arrangements drive systems, reduction gearing, couplings, control systems.	
17	**Auxiliary Power Units (APUs)**	• Purpose, operation, protective systems.	
18	**Power-plant Installation**	• Configuration of firewalls, cowlings, acoustic panels, engine mounts, anti-vibration mounts, hoses, pipes, feeders, connectors, wiring looms, control cables and rods, lifting points and drains.	**1 week**
19	**Fire Protection Systems**	• Operation of detection and extinguishing systems.	**1 week**
20	**Engine Monitoring and Ground Operation**	• Procedures for starting and ground run-up; • Interpretation of engine power output and parameters; • Trend (including oil analysis, vibration and boroscope) monitoring; • Inspection of engine and components to criteria, tolerances and data specified by engine manufacturer; • Compressor washing/cleaning; • Foreign Object Damage.	**2 week**
21	**Engine Storage and Preservation**	• Preservation and depreservation for the engine and accessories/systems.	

الامتحانات	نسبةالامتحان من العلامة الكلية	التاريخ
الأمتحان المتوسط	40%	التاريخ : الاسبوع العاشر
أعمال الفصل	10%	التاريخ : / /
الامتحانات النهائية	50%	التاريخ : الاسبوع السادس عشر

طرق التدريس:

يحدد عضو التدريس الطريقة المستخدمة من خلال (محاضرة ، عرض، مناقشات، مختبرات)

الكتب والمراجع:

EASA 147, PART 66, Modules 15, 2014

برنامج الدرجة الجامعية المتوسطة

التخصص	**هندسة صيانة الطائرات**

رقم المادة الدراسية	020605283
اسم المادة الدراسية	مشغل المحركات التوربينة الغازية
عدد الساعات المعتمدة	(1)
عدد الساعات النظرية	(0)
عدد الساعات العملية	(3)

وصف المادة الدراسية :

Exhaust Section, Airborne Auxiliary Power Unit and power plant, turbine engines and fuel controls, ignition system and Air cycle, engines control and indication Systems.

Oil cycle, fire protection system, specialized workshop tasks.

أهداف المادة الدرسية :

بعد دراسة هذه المادة يتوقع من الطالب أن يكون قادراً على تحقيق الأهداف التالية:

1- To Identify the exhaust Section.

2- To Identify Airborne Auxiliary Power Unit and power plant.

3- To Identify the turbine engines and fuel controls.

4- To Identify ignition system and Air cycle.

5- To Identify engines control and indication Systems.

6- To Identify oil cycle.

7- To Identify fire protection system.

8- To Identify specialized workshop tasks.

رقم الوحدة	اسم الوحدة	محتويات الوحدة	وحدة الزمن
1.	**Airborne Auxiliary power unit**	• description & operation • Checking Oil Level • FOD Inspection. • description & operation Fuel Supply System • Perform APU Shutdown Procedure • Perform APU Starting Procedure	***1week***
.	**power plant**	• Engine control & indication in the cockpit • Engine cowlings opening & closing. • Engine Ground Run • Engine Description • Engine Shut Down • Engine Prestart Inspection &Operation Check Of Engine	***1week***
3.	**Turbine engine**	• Bearing Cleaning and handling • Bearing Inspection • Combustion Section Description & Operation • Inspect combustion chamber • Compressor Section Description & Operation • Inspect Compressor Stator Casing • Inspect Compressor Rotor • Removal of Compressor contaminants • Identify Turbine Disc And Casing • Identify Turbine Rotor And Operation • Inspect First Stage Turbine Nozzle Assembly.	***3week***
4.	**Fuel &Controls**	• Engine fuel &control components • Removing & Inspecting Engine Main Supply Filter • Fuel Heater Removal • Adjust FCU	***1week***

		• Inspection Of Fuel Manifold Assembly • Replace Fuel Recovery Hose	
5.	**Ignition System**	• Ignition System- Description & Operation • Inspection Ignition System • Installed High energy igniter plug • Remove High energy igniter plug	***1week***
6.	**AIR System**	• Explain Engine Anti – icing • Install Engine Anti – icing System • Install Variable Geometry Actuators • Removal Variable Geometry Actuators • Removal Engine Anti – icing System	***1week***
7.	**Engine Control**	• Fuel control linkage adjustment. • Engine controls components • Engine controls fault isolation • Control box removal • Control box installation.	***1week***
8.	**Engine indicating system**	• Engine Indicating System Description & Operation • Thermocouple Harness Installation • Thermocouple Harness Removal • Oil Pressure Transmitter Removal	***1week***
9.	**Exhaust section**	• Inspect Exhaust Cone • Exhaust Section Description & Operation • Exhaust Section Inspection • Lubricate Thrust Reverser	***1week***
10.	**OIL Cycle**	• Engine Oil Change • Inspect Magnetic Drain Plug. • Replace Engine Oil Filter • CHECK OIL FLTER • REPLACE PRESSURE RELIEF VALVE • REMOVE OIL TANK	***1week***

11.	**Fire prtection system**	• Fire Detection System Description & Operation • Fire Extinguishing System Description & Operation. • Fire Protection Testing	***1week***
13.	**Specialized workshop tasks**	• Turbine Engine description • Explain Newton's Third low • Convergent & Divergent Ducts • gross net thrust • thrust distribution • thrust compared with horsepower • Energy	***1week***

طرق التقييم المستخدمة:

الامتحانات	***نسبةالامتحان من العلامة الكلية***	***التاريخ***
اعمال الفصل	***30%***	***التاريخ :***
الامتحان المتوسط	***20%***	***التاريخ : الاسبوع الثامن***
الامتحان النهائي	***50%***	***التاريخ : الاسبوع السادس عشر***
المشروع والوظائف		
المناقشات وتقديم المحاضرات		

طرق التدريس:

يحدد عضو التدريس الطريقة المستخدمة من خلال (محاضرة ، عرض، مناقشات، مختبرات)

الكتب والمراجع

EASA 147, PART 66, Modules 15, 2014.

برنامج الدرجة الجامعية المتوسطة

التخصص	هندسة صيانة الطائرات
رقم المادة الدراسية	20605284٠
اسم المادة الدراسية	مراوح دفع الطائرا
عدد الساعات المعتمدة	(2)
عدد الساعات النظرية	(2)
عدد الساعات العملية	(0)

وصف المادة الدراسية :

This Subject Deals With Propellers Which Cover The Following ***Items:***

Propeller Construction, Propeller Pitch Control, Propeller Synchronizing, Propeller Storage and Preservation, Propeller Maintenance, Propeller Ice Protection.

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أهداف المادة الدرسية :

بعد دراسة هذه المادة يتوقع من الطالب أن يكون قادراً على تحقيق الأهداف التالية:

1- Identify Propeller Construction.

2- Understand Propeller Pitch Control.

3- Computing Propeller Synchronizing.

4- Deal Propeller Storage and Preservation.

5- Deals with Propeller Maintenance.

6- Understand Concept of Propeller Ice Protection.

Subject: Propellers.

رقم الوحدة	اســـــم الـوحـــــدة	محتويـــــــــــات الوحـــــــدة	الزمن
1	**Fundamentals**	• Blade element theory • High/low blade angle, reverse angle, angle of attack, rotational speed; • Propeller slip; • Aerodynamic, centrifugal, and thrust forces; • Torque; • Relative airflow on blade angle of attack; • Vibration and resonance.	**3weeks**
2	**Propeller Construction**	• Construction methods and materials used in wooden, composite and metal propellers; • Blade station, blade face, blade shank, blade back and hub assembly; • Fixed pitch, controllable pitch, constant speeding propeller; • Propeller/spinner installation.	**3weeks**
3	**Propeller Pitch**	• Speed control and pitch change methods, mechanical and electrical/electronic; • Feathering and reverse pitch;	**2weeks**

	Control	• Over-speed protection.	
4	**Propeller Synchronizing**	• Synchronizing and synchro-phasing equipment.	**1 week**
5	**Propeller Ice Protection**	• Fluid and electrical de-icing equipment.	**2 week**
6	**Propeller Maintenance**	• Static and dynamic balancing; • Blade tracking; • Assessment of blade damage, erosion, corrosion, impact damage, delamination; • Propeller treatment/repair schemes; • Propeller engine running.	**3weeks**
7	**Propeller Storage and Preservation**	• Propeller preservation and depreservation.	**2 weeks**

الامتحانات	***نسبةالامتحان من العلامة الكلية***	***التاريخ***
الامتحان المتوسط	***٤0%***	***التاريخ : الاسبوع العاشر***
أعمال الفصل	***10%***	***التاريخ : / /***
الامتحانات النهائية	***50%***	***التاريخ : الاسبوع السادس عشر***

طرق التدريس:

يحدد عضو التدريس الطريقة المستخدمة من خلال (محاضرة ، عرض، مناقشات، مختبرات)

الكتب والمراجع:

تطبق هذه الخطة الدراسية اعتباراً من بداية العام الجامعي 2018/2017

برنامج الدرجة الجامعية المتوسطة

EASA 147, PART 66, Modules 17, 2014.

هندسة صيانة الطائرات	هندسة صيانة الطائرات
رقم المادة الدراسية	020605285
اسم المادة الدراسية	مشغل مراوح دفع الطائرات
عدد الساعات المعتمدة	(1)
عدد الساعات النظرية	(0)
عدد الساعات العملية	(3)

وصف المادة الدراسية :

Propellers Identification, Force Analysis, Blades & Equipment, Inspection & Running, Installation and Removing.

أهداف المادة الدرسية :

بعد دراسة هذه المادة يتوقع من الطالب أن يكون قادراً على تحقيق الأهداف التالية:

1- To Identify the Propellers.

2- To Identify Force Analysis.

3- To Identify Blades & Equipment.

4- To Identify Inspection & Running.

5- To Identify Installation and Removing.

رقم الوحدة	اسم الوحدة	محتويات الوحدة	وحدة الزمن
1.	**Propellers Identification**	• Description & operation. • Feathering check . • Nomenclature of propeller .set propeller at (low ,high, reveres)blade angle .	***3 weeks***
2.	**Force Analysis**	• Define forces acting on the propeller • Distinguish propeller construction • Distinguish propeller types •	***3 weeks***

3.	**Blades & Equipment**	• Synchronizing & synchophasing equipment • Electrical de – icing equipment • Blade tracking • Static balancing	***4 weeks***
4.	**Inspection & Running**	• Propeller visual inspection • Propeller engine running • Propeller preservation • Propeller depreservation	***4 weeks***
5.	**Installation and Removing**	• Fixed pitch propeller installed • Fixed pitch propeller removed.	***2 weeks***

طرق التقييم المستخدمة:

الامتحانات	***نسبةالامتحان من العلامة الكلية***	***التاريخ***
اعمال الفصل	***30%***	***التاريخ :***
الامتحان المتوسط	***20%***	***التاريخ : الاسبوع الثامن***
الامتحان النهائي	***50%***	***التاريخ : الاسبوع السادس عشر***
المشروع والوظائف		

تطبق هذه الخطة الدراسية اعتباراً من بداية العام الجامعي 2018/2017

المناقشات وتقديم المحاضرات		

طرق التدريس:

يحدد عضو التدريس الطريقة المستخدمة من خلال (محاضرة ، عرض، مناقشات، مختبرات)

الكتب والمراجع

EASA 147, PART 66, Modules 17, 2014.