

برنامج تكنولوجيا هندسة الطيران

التخصص	هندسة هياكل ومحركات الطائرات Airframe & Powerplant Engineering
رقم المادة الدراسية	20607127
اسم المادة الدراسية	اصلاح هياكل الطائرات Aircraft Structure Repair
عدد الساعات المعتمدة	(3)
عدد الساعات النظرية	(3)
عدد الساعات العملية	(0)



وصف المادة الدراسية :

This Subject Describes the Metallic and Non Metallic Construction of Aircraft Structure, the Types of Structural Loads and Stresses Acting on Structural Members, Types of Sheet Metals , Tools , Rivets and Fasteners Used in Repairing structural Parts , Methods and Procedures of Repairing Metallic and Non Metallic Structure ,Welding and Painting Aircraft Structural Parts.

أهداف المادة الدراسية :

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

- 1- Identify Metallic and Non Metallic Aircraft Construction.
- 2- Identify Sheet Metal Tools and Fasteners.
- 3- Understand the Methods and Procedure For Inspection & Repair of Metallic Aircraft Structure.
- 4-Identify the types of Wood Structures.
- 5- Identify the composite Structures.
- 6- Identify Plastic Materials and Fabric Covering.
- 7- Identify the Types and Methods of Welding.
- 8- Deal with Aircraft Painting and Finishing Processes



Subject : Aircraft Structure & repair

رقم الوحدة	اسم الوحدة	محتويات الوحدة	وحدة الزمن
1	Sheet Metal structure	<p><u>Metallic Aircraft construction .</u></p> <ul style="list-style-type: none"> • Stressed and structures. • Type of sheet metal structure. • Structural loads. • stresses <ul style="list-style-type: none"> ○ Tension. ○ Bending . ○ Torsion. ○ Shear. ○ Rivet joint consideration. ○ Bearing strength. ○ Shear versus bearing strength. ○ Transfer of stress within a structure. • Material for sheet metal aircraft construction. <ul style="list-style-type: none"> ○ Aluminum alloys. ○ Alloying agents. ○ Lad aluminum alloy. ○ Heat treatment. ○ Precipitation heat treatment. ○ Annealing. ○ Heat treatment identification. ○ Reheat treatment ○ Nonheat treatable alloys. ○ Strain-hardening and hardness designations. • Magnesium and its alloys. • Titanium and it's alloy • Stainless steel. • Aluminum alloy-faced honeycomb. • Corrosion prevention of sheet metal materials. <ul style="list-style-type: none"> ○ Cladding. ○ Oxide film. ○ Paint finishes <p><u>Sheet metal tools and fasteners</u></p> <ul style="list-style-type: none"> • Fabrication tools for sheet metal structures. • Layout tools. <ul style="list-style-type: none"> ○ Sales. ○ Combination square. ○ Dividers • Marking tools. <ul style="list-style-type: none"> ○ Scribes. ○ Pencils. ○ Felt marking pens. 	4 weeks

- **Punches.**
 - Prick punch.
 - Center punch.
 - Transfer punch
 - Pin punch.
- **Cutting tools.**
 - Metal-cutting power tools.
 - Kett's saw.
 - Reciprocating saws.
 - Nibblers.
 - Non-powered hand cutting tools.
 - Aviation snips.
 - Files
 - Deburring tools.
- **Shop tools**
 - Squaring shear
 - Throatless shears.
 - Rotary punch press.
 - Band saw
 - Disc sander.
 - Scroll shear,
- **Drills**
 - Drill motors.
 - Electric drill motors.
 - Pneumatic drill motors.
 - Drill attachment and special drills.
 - Right angle drill and attachment
 - Snack attachment.
 - Extension drills.
 - Spring drill stops.
 - Drill presses.
 - Twist drills.
- **Forming tools.**
 - Press brakes
 - Cornice brakes.
 - Bar folding machine.
 - Box brake.
 - Slip roll former.
 - Compound curve tools.
 - Stretch press.
 - Drop hammer.
 - Hydro press.
 - Shirnkners and stretchers.
 - Sandbags

رقم الوحدة	اسم الوحدة	محتويات الوحدة	وحدة الزمن
2	Aircraft welding	<p>Welding processes</p> <ul style="list-style-type: none"> • Fusion welding processes <ul style="list-style-type: none"> ○ General evaluation of welds. ○ Oxidation ○ Oxyacetylene welding. ○ Electric arc welding ○ Shielded metal arc welding. ○ Gas metal arc welding. ○ Gas metal arc welding. ○ Tungsten inert gas welding. • Electrical resistance welding <ul style="list-style-type: none"> ○ Spot welding ○ Seam welding. • Types of welded joints <ul style="list-style-type: none"> ○ Butt joints ○ Tee joints ○ Lap joints ○ Corner joints ○ Edge joints. • Expansion and contraction of metal. • Evaluating welding joints <ul style="list-style-type: none"> ○ Parts of the weld. ○ Proportion of the weld. ○ Formation of the weld. • Brazing and soldering. <ul style="list-style-type: none"> ○ Torch brazing ○ Torch brazing of aluminum and magnesium. ○ Torch soldering. ○ Soft soldering ○ Hard soldering . • Soldering of electrical wires and connections. <p>Basic gas welding .</p> <ul style="list-style-type: none"> • Gases . <ul style="list-style-type: none"> ○ Acetylene gas ○ Oxygen . • Equipment . <ul style="list-style-type: none"> ○ Pressure regulator ○ Oxygen ○ Acetylene ○ Hoses ○ Torches. ○ Equal pressure Torch. ○ Injector torch. ○ Torch lighters 	4 weeks

رقم الوحدة	اسم الوحدة	محتويات الوحدة	وحدة الزمن
		<ul style="list-style-type: none"> ○ Filler rods. ○ Oxyacetylene welding goggles. ○ Welding gloves. ○ Equipment setup. ○ Handling gas cylinders. ○ Attaching the regulators. ○ Connecting the torch. ○ Selecting the torch tip and rod sizes. ○ Use of the oxyacetylene torch. ○ The puddle. ○ Filler rod added to the puddle ○ Oxyacetylene cutting. <ul style="list-style-type: none"> ● Shutting down the equipment. 	
3	Aircraft Painting and Finishing	<p><u>Fabric finishing processes.</u></p> <ul style="list-style-type: none"> ● Dope finish. <ul style="list-style-type: none"> ○ Rejuvenation. ○ Application of dope. ○ Difficulties with dope. ○ Dope. Adhesion. ○ Blushing. ○ Pinholes. ○ Sags and runs. ○ Orange peel. ○ Fisheyes ● Polyurethane finish. <p><u>Aircraft painting processes</u></p> <ul style="list-style-type: none"> ● Metal and composite finishing. <ul style="list-style-type: none"> ○ Stripping. ○ Compound blasting. ● Corrosion removal and prevention. ● Finishing materials. <ul style="list-style-type: none"> ○ Primers. ○ Wash primers ○ Synthetic enamels. ○ Acrylic lacquer. ○ Polyurethane. ○ Acrylic urethane ● Special finishes and finishing products <ul style="list-style-type: none"> ○ High-visibility finished. ○ Wrinkle finish. ○ Flat black lacquer. ○ Wing walk compound. ○ Acid proof paint. 	(3) weeks

رقم الوحدة	اسم الوحدة	محتوي الوحدة	وحدة الزمن
		<ul style="list-style-type: none"> ○ Float bottom compound. ○ Fuel tank sealer. ○ Tank preparation. ○ Seam paste. ○ High temperature finishes. ○ Engine enamel ○ Heat resistant aluminum paint. ○ Rot-INHIBITING sealer ○ Spar varnish. ○ Tube oil. ○ Thinners and reducers. ○ Nitrate dope thinner. ○ Retarder ○ Butyrate Dofe thinner ○ Anti-blush thinner. ○ Enamel reducer. ○ Acetone . ○ Rejuvenator. ○ Spot putty and sanding superfacer. ○ <p><u>Finishing equipment and safety.</u></p> <ul style="list-style-type: none"> ● Paint room. ● Air supply ● Painting and spray equipment <ul style="list-style-type: none"> ○ High volume /low pressure(HVLP) ○ Electrostatic systems. ○ Powder coating systems. ○ Spray guns. ○ Suction guns. ○ Pressure guns. ○ Airless guns. ● Respirators and masks ● Mixing and viscosity measurement equipment. ● Spray gun operation. <ul style="list-style-type: none"> ○ Applying the finish. ○ Sequence for painting an airplane ○ Cleaning the equipment ○ Spray paint. ○ Common finish problems ● Masking and applying the trim <ul style="list-style-type: none"> ○ Masking for the trim. ● Laying out registration numbers. <ul style="list-style-type: none"> ○ Description ○ Application. ● Decals, markings and placards. ● Safety in the paint shop. 	

رقم الوحدة	اسم الوحدة	محتوى الوحدة	وحدة الزمن
4	Wood composite and transparent plastic structure	<ul style="list-style-type: none"> • Plywood skin repairs <ul style="list-style-type: none"> ○ Splayed patch. ○ Surface patch. ○ Plug patch. ○ Scarfed patch • Miscellaneous repair <p>Composite structure .</p> <ul style="list-style-type: none"> • Composite elements. • Reinforcing repairs. • Fiberglass (glass cloth) <ul style="list-style-type: none"> ○ Aramid. ○ Carbon /graphite. ○ Boron. ○ Ceramic. • Fiber science • Fabric orientation. <ul style="list-style-type: none"> ○ Warp. ○ Weft/fill ○ Selvage edge. ○ Bias. ○ Fabric style. ○ Unidirectional. ○ Bi-directional /multi-directional. ○ Mats. ○ Fabric weaves • Matrix systems. <ul style="list-style-type: none"> ○ Thermoplastic resins. ○ Thermosetting resins. ○ Polyester resins. ○ Epoxy resins. ○ Adhesives • Pre-impregnated materials <ul style="list-style-type: none"> ○ Fillers. ○ Metal matrix composites. • Core materials. <ul style="list-style-type: none"> ○ Honeycombs cores. ○ Foam cores. ○ Wood cores. • Types of repair-reinforced composites. • Laminated composites. <ul style="list-style-type: none"> ○ Interplay hybrid laminates. • Sandwich composites. 	3 weeks

- **Working with resins and catalysts.**
- **Safety considerations.**
 - Material safety data sheets (MSDS)
 - Personal protection.
 - Fire protection,
 - Solvent safety tips.
- **Manufacturing processes.**
 - Compression molding.
 - Vacuum bagging.
 - Filament winding
 - Wet lay-up.
 - Electrical bonding.
- **Composite finishes**
 - Composite inspection
 - Visual inspection
 - Tap test.
 - Ultrasonic inspection.
 - Radiography
 - Thermography.
 - Dye penetrant
 - Acoustic emission testing.
- **Machining composites.**
 - Cutting fabric.
 - Drilling composites.
 - Drilling aramid.
 - Drilling fiberglass or carbon graphite.
 - Sanding.
 - Routers.
 - Holes saws.
 - Water-jet cutting .
 - Band saws.
 - Hydraulic press cutting
 - Laser cutting.
- **Composite repair.**
 - Types of repairs.
- **Assessment and preparation**
 - Damage assessment.
 - Cosmetic defect.
 - Impact damage.
 - Cracks.
 - Hole damage.
 - Materials preparation.
 - Surface preparation. Damage

	<p>removal.</p> <ul style="list-style-type: none">○ Routing .○ Step cutting.○ Scarf cutting .○ Cleaning○ Water removal. <ul style="list-style-type: none">● General repair processes.<ul style="list-style-type: none">○ Fiber orientation. ○ Applying pressure.○ Method of curing.○ Room temperature.cure.○ Heat curing.○ Vacuum bagging process.○ Mechanically fastened repairs with precured patches.○ Potted repairs.○ Undercut potted repair○ Mislocated potting compound.○ Laminate structure repair○ Laminate cosmetic repair.○ Delamination repair.● Laminate damage to one surface.<ul style="list-style-type: none">○ Laminate daage through the part.○ Sandwich structure repairs.○ Puncture repair.○ Honeycomb core repairs.○ Aluminum alloy-faced honeycomb.○ Maintenance entries. <p><u>Transparent plastic materials .</u></p> <ul style="list-style-type: none">● Types of transparent plastic.● Storage procedures● Forming procedures and techniques.<ul style="list-style-type: none">○ Heating.○ Forms.○ Simple curve forming.○ Compound-curing forming.○ Stretch forming.○ Mail and female die forming.○ Vacuum forming without forms.○ Vacuum-forming with a female form.○ Sawing.	
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		<ul style="list-style-type: none"> • Drilling <ul style="list-style-type: none"> ○ Cementing. ○ Application of cement. ○ .application of pressure. ○ Curing . • Repairs. <ul style="list-style-type: none"> ○ Temporary repairs. ○ Permanent repairs. ○ Polishing and finishing. ○ Cleaning. ○ Protection • Windshield installation 	
5	Aircraft Fabric covering	<p><u>Fabric covering processes</u></p> <ul style="list-style-type: none"> • FAA approval criteria <ul style="list-style-type: none"> ○ Manufacturers service manual. ○ Supplemental type certificates. ○ Advisory circular 43-13-1B. ○ .FAA field approvals. • Fabric-covering products. <ul style="list-style-type: none"> ○ Parts manufacturer approvals ○ Fabric orientation. ○ Organic fabric materials. ○ Inorganic fabric materials. • Finishing materials. <ul style="list-style-type: none"> ○ Reinforcing tape. ○ Surface tape. ○ Rib lacing cord. ○ Machine sewing threads ○ Hand sewing threads. ○ Draining grommets and inspection rings. ○ Finishing dope. ○ Thinners. ○ Dope retarders. ○ Fungicidal paste. ○ Aluminum paste. ○ Rejuvenator. ○ <p><u>Covering procedures.</u></p> <ul style="list-style-type: none"> • Determining fabric strength. <ul style="list-style-type: none"> ○ Seyboth fabric strength. ○ Maule test instrument 	2 Weeks

- **Fabric-covering removal.**
- **Structural inspections**
 - Fuselage and empennage structures
 - Wing structures.
- **Installing the fabric.**
 - Envelope method of wing covering.
 - Blanket of wing covering.
- **Covering the fuselage and tail surface.**
 - Removing the wrinkles.
 - The first coat of dope.
- **Attaching the fabric.**
 - Surface tape application
 - Dope fill coats
 - Aluminum dope coats
 - Finish coats.
 - Inorganic systems.
 - Synthetic fabric installation.
 - Sealing and attaching synthetic fabric.
- **Surface tape application.**
 - Fill coat application.
 - Finish coats.
- **Glass cloth systems.**

Inspection & repair of Fabric covering

- **Inspection**
- **Repair types.**
- **L-shaped tears in the fabric.**
- **Doped-in patch.**
- **Sewed-in patch.**
- **Doped-in panel.**



طرق التقييم المستخدمة:

التاريخ	نسبة الامتحان من العلامة الكلية	الامتحانات
التاريخ : الاسبوع السادس	20%	الأول
التاريخ : الاسبوع الثاني عشر	20%	الثاني
التاريخ : / /	10%	أعمال الفصل
التاريخ : الاسبوع السادس عشر	50%	الامتحانات النهائية
		المشروع والوظائف

طرق التدريس:

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

الكتب والمراجع :

Airframe and Powerplant Technician Airframe Text Book

(By Jeppesen Publisher Edition 2006)



❖ تطبق هذه الخطة الدراسية اعتباراً من بداية العام الجامعي 2009/2008

برنامج تكنولوجيا هندسة الطيران	
التخصص	هندسة هياكل ومحركات الطائرات Airframe & Powerplant Engineering
رقم المادة الدراسية	20607128
اسم المادة الدراسية	مشغل اصلاح هياكل الطائرات Aircraft Structure Repair (Workshop)
عدد الساعات المعتمدة	(1)
عدد الساعات النظرية	(0)
عدد الساعات العملية	(3)



وصف المادة الدراسية :

Recognize Structural Parts , Performing Aircraft Skin and Structural Repair Using Various Types of Rivets and Fastener Use Repair Tool's and Machines for Drilling , Cutting Riveting Bending and Fabricating Structural Parts , As Well As Welding and Painting Metal Parts.

أهداف المادة الدراسية :

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

- 1- To Identify Aircraft Metal Structure Repair.
- 2- To Identify the Types of Wood.
- 3- To Identify Composite Structural.
- 4- To Identify Transparent Plastic Materials.
- 5- To Identify Welding Processes.
- 6- To Identify Inspection of a Good Weld.
- 7- To Identify Aircraft Painting Processes
- 8- To Identify the methods of wing covering.
- 9- To Identify Paint Removal.
- 10- To Identify Finishing Equipments Adjustment.
- 11- To Identify the types of finish defects.



Subject: Aircraft Structure Repair(Workshop)

رقم الوحدة	اسم الوحدة	محتويات الوحدة	وحدة الزمن
1.	Sheet Metal Structures	<ul style="list-style-type: none"> - Cutting a Piece of Metal Using Square – Shear. - Bending a Piece of Sheet Metal. - Hole Drilling - Universal Head Blind Riveting. - Countersinking. - Hole Dimpling - Countersunk Head Blind Riveting. - Patch Repair. - Bad Rivet Removal 	(8) Weeks
2.	Wood , Composite and transparent plastic Structures.	<ul style="list-style-type: none"> -Wood Types - Honeycomb Repair. - Fiber Glass Scarf Repair. - Distinguish Between acrylic and acetate 	(2) Weeks
3.	Aircraft Welding	<ul style="list-style-type: none"> - Welding two Pieces of steel sheets by oxy-acetylene Welding. - Welding two Pieces of steel sheets by metal arc welding. - Welding two pieces of aluminum by spot welding. - Inspection of a Good Weld. 	(3) Weeks
4.	Aircraft Fabric Covering	<ul style="list-style-type: none"> - Hand Sewing the fabric (Baseball Stick) - Types of Wing Fabric Covering 	(1) Weeks
5.	Aircraft Painting and Finishing	<ul style="list-style-type: none"> - Painting. - Paint Removal. - Spray –Gun Adjustment. - Identifying Types of finish Defects. - Design Registration Number 	(2) Weeks



طرق التقييم المستخدمة:

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

طرق التدريس:

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

الكتب والمراجع :

Airframe and Powerplant Technician Airframe Text Book

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❖ تطبق هذه الخطة الدراسية اعتباراً من بداية العام الجامعي 2009/2008

برنامج تكنولوجيا هندسة الطيران

هندسة هياكل ومحركات الطائرات

التخصص

Airframe & Powerplant Engineering

20607231

رقم المادة الدراسية

نظم الكهرباء والالكترونيات والآلات الدقيقة والوقاية من الحريق

اسم المادة الدراسية

**Aircraft Electrical ,Avionics ,Instruments & ire Protection
Systems**

(2)

عدد الساعات المعتمدة

(2)

عدد الساعات النظرية

(0)

عدد الساعات العملية



وصف المادة الدراسية :

Studies about The Types of Power Supply, Controlling, Protection and Functional Operation of Electrical Systems Components Methods and Functional Operation of Fir Protection System.
Studies in Avionics Fundamentals, Basic Radio Components, Communication , Navigation Systems and Related Components, Auto Pilot & Flight Directors, Installation and Maintenance of Avionics Types and Principle of Operation of Aircraft Instruments, Operation and Function of Position and Warning Systems Components.

أهداف المادة الدراسية :

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

- 1- To Identify he Types of Power Supply.
- 2- To Identify the Types of Electrical Wires.
- 3- To Identify the Electrical Systems Components.
- 4- To Study Aircraft Electrical Circuits.
- 5- Identify Fire Detection and Extinguishing Systems.
- 6- Understand the Fundamentals of Avionics.
- 7- Identify the Functional Operation of Autopilots and Flight Director.
- 8- Identify the Installation and Maintenance of Avionics.
- 9- Study the Principles of Instrument Systems and Components.
- 10-Deal with Instrument System Installation Maintenance.
- 11- Identify The Functional Operation of Antiskid Brake Control Systems and Components.
- 12- Know the functional Operation of Indicating and Warning Systems.



Subject : Airframe Electrical & fire protection

رقم الوحدة	اسم الوحدة	محتويات الوحدة	وحدة الزمن
1	Aircraft Electrical Systems.	<p><u>Airborne sources of electrical power</u></p> <ul style="list-style-type: none"> • Generators. • Theory of operation. • Dc generator construction <ul style="list-style-type: none"> ○ Field frame ○ Armature ○ Commutators. ○ Brushes. • Types of Dc generators. <ul style="list-style-type: none"> ○ Series-wound ○ Shunt-wound ○ Compound –wound ○ Starter generator. • Armature reaction. • Generator ratings. • Generator terminals. • Generator voltage regulation. • Dc generator service and maintenance. <ul style="list-style-type: none"> ○ Routine inspection and servicing. ○ Generator overhaul. ○ Disassembly. ○ Cleaning ○ Inspection and repair ○ Reassembly ○ Testing. • Generator systems. • Alternators. • Dc alternator. <ul style="list-style-type: none"> ○ Rotor. ○ Stator. ○ Rectifiers. ○ Brush assembly • Alternator Control . • Dc alternator service and maintenance. • Ac alternators. <ul style="list-style-type: none"> ○ Types of AC alternators ○ Brushless Alternator ○ Alternator ratings ○ Frequency ○ AC alternator maintenance 	(4) weeks

❖ تطبق هذه الخطة الدراسية اعتباراً من بداية العام الجامعي 2009/2008

- **Storage batteries.**
- **Lead-acid battery.**
 - Determining condition of charge.
 - Battery testing
- **Battery ratings.**
 - Capacity.
 - Fire-hour Discharge
 - Cell test.
- **Servicing and charging**
 - Battery charges.
 - Constant- current charging.
 - Constant –voltage charging.
 - On-board battery charging
 - Charging precautions
- **Battery installation.**
- **Nickel-cadmium batteries.**
 - Construction.
 - Chemical changes during discharging.
 - Chemical changes during charge
 - Cell imbalance.
 - Servicing nickel-cadmium batteries.

Aircraft electrical circuits

- **Small single- engine aircraft.**
- **Battery circuit.**
- **Generator circuit.**
- **Alternator circuit**
- **External power circuit**
- **Startor circuit.**
- **Avionics power circuit.**
- **Landing gear circuit.**
- **Alternating current supply.**
- **Small multi engine aircraft.**
- **Paralleling with vibrator-type voltage regulators.**
- **Paralleling with carbon-pile voltage regulators.**
- **Paralleling twin-engine alternator systems.**
- **Large multi-engine aircraft.**
- **Ac alternator drive.**
- **Generator instrumentation and controls.**

- Automated Ac power systems.

Wiring installation

- Wire.
- Wire types.
- Wire size.
- Wire marking.
- Wiring installation.
- Open wiring
- Routing and clamping.
- Conduit.
- Shielding.

- Wiring terminals.
- Connectors.
- Splicing repairs.
- Terminal strips.
- Junction boxes
- Bonding
- Coaxial cable.

Electrical system components

- Switches.
- Switch installation.
- Toggle and rocker switches.
- Rotary switches.
- Precision (micro) switches.
- Relays and solenoids
- Current limiting devices.
- Fuses.
- Circuit breakers.
- Electrical control panels.
- Aircraft lights.
- Exterior lights.
 - Incandescent lamps.
 - Halogen lamps.
 - Xenon lamps.
- Position lights.
- Anti-collision lights.
- Landing and taxi lights.
- Wing inspection lights.
- Interior lights.
- Interior incandescent lighting



		<ul style="list-style-type: none"> • Fluorescent lights. • Maintenance and inspection of lighting systems • Motors. • Dc motors. <ul style="list-style-type: none"> ○ Motor theory. ○ Parallel conductors. ○ Developing torque. ○ Basic Dc motor. ○ Dc motor construction. ○ Armature assembly. ○ Field assembly. ○ Brush assembly. ○ End frame ○ Motor speed, direction, and breaking ○ Changing motor speed. ○ Reversing motor direction. ○ Motor braking. ○ Type of DC motor. ○ Series DC motor ○ Shunt Dc motor ○ Compound Dc motor. ○ Type of duty. ○ Energy losses in motors ○ Inspection and maintenance of Dc motors. ○ Ac motors. ○ Universal motors. ○ Induction motors. ○ Construction . ○ Single phase induction motors. ○ Shaded pole induction motor. ○ Split-phase motors. ○ Capacitors-start motor. ○ Direction of rotation ○ Synchronous motors. 	
2	Fire Protection System	<p><u>Fire detection</u></p> <ul style="list-style-type: none"> • Principle of fire-detection systems. <ul style="list-style-type: none"> ○ Classes of fires. ○ Fire zones. ○ Requirements for overheat and fire-detection systems. • Fire-detection/overheat systems. <ul style="list-style-type: none"> ○ Fenwal systems. ○ Kidde system 	(3) weeks

		<ul style="list-style-type: none"> ○ Lindberg system. ○ Systron-donner system. ○ Flame detectors. ● Smoke and toxic gas detection systems. <ul style="list-style-type: none"> ○ Smoke detectors. ○ Carbon monoxide detectors. ● Fire-detection system inspection and testing <ul style="list-style-type: none"> ○ Spot-type and thermocouple maintenance ○ Continuous-loop maintenance practical. ○ Troubleshooting. <p><u>Fire Extinguishing systems.</u></p> <ul style="list-style-type: none"> ● Fire extinguishing agents <ul style="list-style-type: none"> ○ Carbon dioxide. ○ Halogenated hydrocarbons ● Portable fire extinguishers <ul style="list-style-type: none"> ○ Portable fire extinguisher installations. ○ Portable extinguisher ● Fixed fire-extinguisher installation. <ul style="list-style-type: none"> ○ Conventional systems ○ High-rate discharge system. ● Inspection and servicing. <ul style="list-style-type: none"> ○ Container pressure check. ○ Discharge cartridges ● 727-fire-protection system. 	
3	Avionic systems	<p><u>Avionic Fundamentals</u></p> <ul style="list-style-type: none"> ● Avionics that use radio waves. ● Radio operating principles. <ul style="list-style-type: none"> ○ Electromagnet waves. ○ Frequency, ○ Carrier wave. ○ Modulation. ○ Ground, sky and space waves. ● Basic radio components. <ul style="list-style-type: none"> ○ Transmitters. ○ Amplifiers. ○ Modulation and demodulation. ○ Filters. ○ Antennas. ○ Tuning circuits. 	(3)weeks

- Receivers.
- Speakers and microphones.
- Avionics systems
- Communication radios
- Navigational systems
- Automatic direction finder(ADF)
- Very high frequency omnirange.(VOR).
- Distance measuring equipment (DME).
- Area navigation.
- Transponders.
- Instrument landing system (ILS).
- Emergency locators transmitters(ELT)
- Cockpit voice recorders and flight data recorders.
- Radar altimeter.
- Ground proximity warning system (GPWS).
- Weather radar.
- StormscopeTM
- Tcas-airborne collision avoidance system.
- Types of antennas.
 - OR antennas.
 - Localizer and glideslope.
 - Marker beacon antennas.
 - HF communication antennas.
 - VHF communication antennas.
 - DME/ transponder antennas.
 - ELT antennas.
 - Satellite communications antennas.
 - Tacs antennas.
 - Radiotelephone antennas.

Autopilots and flight directors.

- Types of autopilots.
 - Basic autopilot operation.
 - Sensors.
 - Servos.
 - Small aircraft autopilot.
 - Flight management system (FMS).
- Autopilot maintenance.

Installation and maintenance of avionics .

- Cleaning of electrical equipment.
- Routing wires.
- Switches and circuit breakers.
- Bonding and shielding.

		<ul style="list-style-type: none"> • Static dischargers. • Installation methods. <ul style="list-style-type: none"> ○ General precautions. ○ Static loads. ○ Antenna installation. 	
4	Aircraft instrument systems	<p><u>Principles of instrument systems</u></p> <ul style="list-style-type: none"> • Pressure-measuring instruments. • Principles of pressure measurements. • Special pressure instrument. • Temperature-measuring instruments. <ul style="list-style-type: none"> ○ Nonelectrical temperature instrument. • Mechanical movement measurement. <ul style="list-style-type: none"> ○ Accelerometer. ○ Synhrosopes. ○ Tachometers • Gyroscopic instruments. <ul style="list-style-type: none"> ○ Gyroscopic theory. ○ Gyroscopic instrument. • Direction-indicating instruments. <ul style="list-style-type: none"> ○ Magnetic compass. ○ Remote indicating compass. ○ Salved gyro compass. • Instrument pneumatic systems. <ul style="list-style-type: none"> ○ Venture systems. ○ Vacuum pump systems. ○ Positive pressure systems • Pilot-static system. <ul style="list-style-type: none"> ○ Mechanical indicators. ○ Direct current electrical indicators. ○ Capacitance fuel quantity systems. • Fuel system monitoring instrument. <ul style="list-style-type: none"> ○ Fuel pressure indicators. ○ Fuel injection system flowmeter. ○ Volume flow measurement. ○ Mass flow measurement. • Electrical instruments. <ul style="list-style-type: none"> ○ Electrical attitude director indicators (EADI). ○ Electrical horizontal situation indicator (EHSI) ○ Auxiliary instruments. ○ Outside air temperature. ○ Lock. 	(3)weeks

		<p><u>Instrument system installation and maintenance practices .</u></p> <ul style="list-style-type: none"> • Layout panel • Equipment and instrument mounting . • Power requirements. • Range marking <ul style="list-style-type: none"> ○ Airspeed indicators ○ Carburetor air temperature indicator. ○ Cylinder head temperature. ○ Manifold pressure (MAP gauge). ○ Fuel pressure. ○ Engine oil pressure. ○ Reciprocating engine tachometer. ○ Turbine engine tachometer. ○ Exhaust gas temperature turbine engine. ○ Torquemeter. ○ Dual tachometer-helicopter. ○ As producer(N1) tachometer , turboshaft helicopter. • Compass swing. • Pilot-static system test. <ul style="list-style-type: none"> ○ Leakage test. ○ Entrapped moisture removal. 	
5	Position and Warning System	<p><u>Antiskid brake control systems</u></p> <ul style="list-style-type: none"> • System operation. • System components. <ul style="list-style-type: none"> ○ Wheel-speed sensors. ○ Control valves ○ Control unit • System tests. <ul style="list-style-type: none"> ○ Ground test. ○ In-flight test. ○ System maintenance. ○ Wheel-speed sensor ○ Control unit. ○ Control valve. • Electrical instruments. <ul style="list-style-type: none"> ○ Electrical attitude director indicators (EADI). ○ Electrical horizontal situation indicator (EHSI) ○ Auxiliary instruments. 	(3) weeks

- Outside air temperature.
- Lock.

Indicating and warning systems

- **Stall warning indicator.**
 - Electrical stall warning.
 - Non-electric stall warning.
- **Angle –of-attack indicators.**
- **Remote position indicating systems**
 - Direct current.
 - Alternating current.
- **Configuration warning systems.**
 - Takeoff configuration warning system
 - Landing gear configuration warning system
 - Mach /airspeed warning system
 - Ground proximity warning system (GPWS)
 - Engine indication and crew alerting system (EICAS).

طرق التقييم المستخدمة:

التاريخ	نسبة الامتحان من العلامة الكلية	الامتحانات
التاريخ : الاسبوع السادس	20%	الأول
التاريخ : الاسبوع الثاني عشر	20%	الثاني
التاريخ : / /	10%	أعمال الفصل
التاريخ : الاسبوع السادس عشر	50%	الامتحانات النهائية
التاريخ : الاسبوع السادس		المشروع والوظائف

طرق التدريس:

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

الكتب والمراجع :

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❖ تطبق هذه الخطة الدراسية اعتباراً من بداية العام الجامعي 2009/2008

برنامج تكنولوجيا هندسة الطيران

هندسة هياكل ومحركات الطائرات

Airframe & Powerplant Engineering

20607133

النظم الهيدروليكية ووقود للطائرات

Aircraft Hydraulic & Fuel Systems

التخصص

رقم المادة الدراسية

اسم المادة الدراسية

عدد الساعات المعتمدة

عدد الساعات النظرية

عدد الساعات العملية

(2)

(2)

(0)



وصف المادة الدراسية :

Describes the Law of Physics Related to Hydraulic System , Hydraulic Power System Functional Operation , Components Principles of Operation and Construction , Controlling Valves and Pumps Functions , Inspection and Servicing Wheel Brakes and Landing Gear System .As Well As The Study of A/C Fuel System and Related Components

أهداف المادة الدراسية :

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

- 1- To Identify the Hydraulic System Components.
- 2- To Perform the Operational Check for Hydraulic System
- 3- To Understand the Principles of Hydraulic and Pseudraulic Power Systems.
- 4- To Identify Landing Gear Systems Operation and Maintenance.
- 5- To Identify Functional Operation of Brake System and Related Components.
- 6- To Identify & Inspect Brakes, Wheels, Tires and Tubes.
- 7- To Identify Functional Operation of Fuel System and Related Components.
- 8- To Perform Fuel System Inspection & Servicing.



Subject : Aircraft Hydraulic and Fuel System

رقم الوحدة	اسم الوحدة	محتويات الوحدة	وحدة الزمن
1	Hydraulic and Pneumatic Power Systems.	<p><u>Principle of hydraulic power</u></p> <ul style="list-style-type: none"> • Static fluid pressure. • Pascal's law. • Relationship between pressure, force and area. • Relationship between area and volume <p><u>Hydraulic system component and design.</u></p> <ul style="list-style-type: none"> • Hydraulic fluid. <ul style="list-style-type: none"> ○ Viscosity. ○ Chemical stability. ○ Flash point. ○ Fire point • Types of hydraulic fluid. <ul style="list-style-type: none"> ○ Intermixing of fluids ○ Vegetable-base fluid. ○ Mineral base fluid. ○ Compatibility with A/C material. ○ Health & handling ○ Synthetic fluid. • Basic hydraulic systems <ul style="list-style-type: none"> ○ Open hydraulic systems. ○ Closed hydraulic systems <p><u>Hydraulic power systems</u></p> <ul style="list-style-type: none"> • Evolution of the hydraulic system. <ul style="list-style-type: none"> ○ Double acting actuator and two way selector valve. ○ Engine driven pup and pump control valve. ○ Unloading valve and accumulator. ○ Hand pump and standpipes. ○ Filters and thermal relief valves. ○ Special types of aircraft hydraulic systems. ○ Open-center system. ○ Hydraulic power pack system. • Hydraulic System components <ul style="list-style-type: none"> ○ Reservoir.. ○ Unpressurized reservoirs. ○ Pressurized reservoirs. 	6 weeks

❖ تطبق هذه الخطة الدراسية اعتباراً من بداية العام الجامعي 2009/2008

- **Filter.**
 - **Pumps.**
 - Hand pumps
 - Powered pumps.
 - Constant displacement pump.
 - Variable displacement pump.
 - valves

 - Flow control valves.
 - Selector valves
 - Check valves.
 - Sequence valves.
 - Priority vales.
 - Quick disconnect valves.
 - Hydraulic fuses
 - Pressure control valves.
 - Relief vales.
 - Pressure regulators
 - Pressure reducers.
 - Accumulators.
 - Air valve
 - Actuators.
 - Linear actuators.
 - Rotary actuators.
- **Seals**
 - One-way seals
 - Two-way seals
 - Backup rings.
 - Seal materials
 - O-ring installation.
 - Wipers.
- **Large aircraft hydraulic systems**

Ai craft pneumatic systems

- **High-pressure systems.**
- **Medium-pressure systems.**
- **Low-pressure systems**
- **Pneumatic system components.**
 - Relief valves.
 - Control valves.
 - Check valves.
 - Restrictors.
 - Filters.
 - Desiccant /moisture separator.

		<ul style="list-style-type: none"> ○ Shuttle vales. ● Emergency backup system. ● Typical pneumatic power system. <ul style="list-style-type: none"> ○ Component ● Pneumatic power system maintenance 	
2	Aircraft Landing Gear Systems	<p><u>Landing gear systems and maintenance</u></p> <ul style="list-style-type: none"> ● Landing gear types. ● Landing gear arrangement. <ul style="list-style-type: none"> ○ Tail wheel-type landing gear. ○ Tricycle-type landing gear ● Fixed or retractable landing gear. ● Shock absorbing and non-absorbing landing gear. ● Aircraft wheels. <ul style="list-style-type: none"> ○ Wheel construction. ○ Wheel inspection ● Nose wheel steering systems. <ul style="list-style-type: none"> ○ Small aircraft. ○ Large aircraft. ○ Shimmy dampers. ● Landing gear alignment, support and retraction. <ul style="list-style-type: none"> ○ Wheel alignment. ○ Support ● Small aircraft retraction systems. ● Large aircraft retraction systems. <ul style="list-style-type: none"> ○ Emergency extension systems. ○ Landing gear safety devices. ● Landing gear rigging and adjustments. <ul style="list-style-type: none"> ○ Gear latches. ○ Gear door clearance. ○ Drag and side brace adjustment ○ Landing gear retraction check . <p><u>Aircraft brakes .</u></p> <ul style="list-style-type: none"> ● Types of brakes. ● Brake construction ● Brake actuating systems ● Brakes inspection and service. ● Malfunction and damage ● Anti-skid brakes control systems 	5 weeks

		<p><u>Aircraft tires and tubes .</u></p> <ul style="list-style-type: none"> • Tires classification. • Tire types. • Tire construction • Tire inspection on the aircraft. • Tire removal. • Tire inspection off of the aircraft. • Tire repair and retreading . • Tire storage. • Aircraft tubes. • Tire mounting. • Tire balancing. • Operation and handling tips 	
3	Aircraft Fuel Systems	<p><u>A/C fuels and fuel system requirements.</u></p> <ul style="list-style-type: none"> • Characteristics of aviation fuels. • Reciprocating engine fuel. <ul style="list-style-type: none"> ○ Volatility. ○ Vapor lock. ○ Carburetor icing. ○ Aromatic fuels. ○ Detonation . ○ Preignition. ○ Octane and performance numbers. ○ Purity . • Fuel identification. • Turbine engine fuels. <ul style="list-style-type: none"> ○ Volatility. ○ Fuel types. ○ Problems with water n turbine fuel. ○ Fuel contamination. • Basic fuel systems requirements <p><u>Fuel system operation.</u></p> <ul style="list-style-type: none"> • Small single-engine aircraft fuel systems. • Gravity-feed systems. • Pump feed system • High-wing airplane using a fuel injection system. • Small multi-engine aircraft fuel systems. • Large reciprocating-engine aircraft fuel systems • Jet transport aircraft fuel systems. • Helicopter fuel systems. • Aircraft fuel system components. 	5 weeks

	<ul style="list-style-type: none"> ○ Tanks. ○ Fuel lines and fitting, ○ Fuel valves , ○ Fuel pumps. ○ Filters. ○ Fuel heaters and ice prevention systems. ○ Fuel system indicators. <ul style="list-style-type: none"> ● Jet transport aircraft fuel systems. <p><u>Fuel system repair , testing and servicing .</u></p> <ul style="list-style-type: none"> ● Fuel tanks repair and testing ● Trouble shooting the fuel system ● Fuel Tank repair, ● Fire safety. ● Fire safety . ● Fire hazards. ● Checking for fuel system contaminates ● Fuel procedures. ● Defueling ● Review of safety procedures. 	
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طرق التقييم المستخدمة:

التاريخ	نسبة الامتحان من العلامة الكلية	الامتحانات
التاريخ : الاسبوع السادس	20%	الأول
التاريخ : الاسبوع الثاني عشر	20%	الثاني
التاريخ : / /	10%	أعمال الفصل
التاريخ : الاسبوع السادس عشر	50%	الامتحانات النهائية
التاريخ : الاسبوع السادس		المشروع والوظائف

طرق التدريس:

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

الكتب والمراجع :

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برنامج تكنولوجيا هندسة الطيران	
هندسة هياكل ومحركات الطائرات Airframe & Powerplant Engineering	التخصص
20607234	رقم المادة الدراسية
مشغل النظم الهيدروليكية ووقود الطائرات Aircraft Hydraulic & Fuel Systems (Workshop)	اسم المادة الدراسية
(1)	عدد الساعات المعتمدة
(0)	عدد الساعات النظرية
(3)	عدد الساعات العملية



وصف المادة الدراسية :

To Perform Hydraulic System Functional Operation, Components Inspection Maintenance, Removal & Installation, Wheels and Brake System Inspection, Removal & Installation of Components, Landing Gear System and Shock Strut Operational Check, Servicing and Inspection, Fuel System Servicing, Component Replacement and System Troubleshooting.

أهداف المادة الدراسية :

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

- 1-To Identify the Hydraulic System Components
- 2-To Identify Hydraulic Fluid Types
- 3-To Identify Hydraulic Components Dismantling and Assembly
- 4- To Identify the Landing Gear Systems Components.
- 5- To Identify the Landing Gear Removal and Installation.
- 6- To Identify Wheel Brake Removal, Adjustment, and Installation.
- 7-To Identify Brake Inspection and Servicing
- 8- To Identify Shock Struts Servicing.
- 9- To Identify Tires Inspection.
- 10- To Identify the Fuel System Components.
- 11- To Identify the Fuel System Components Removal, Installation and Inspection.
- 12- To Identify Fuel System Servicing.



Subject : Aircraft Hydraulic and Fuel System (Lab)

رقم الوحدة	اسم الوحدة	محتويات الوحدة	وحدة الزمن
1.	Aircraft Landing Gear Systems	<ul style="list-style-type: none"> - Landing Gear Components Identification - Main Landing Gear Removal and Installation. - Nose Landing Gear Removal and Installation - Wheel Brake Removal , Adjustment , and Installation - Brake Bleeding - Aircraft Brake, Wheel Removal and Installation. - Master Cylinder Servicing. - Aircraft Brake Inspection. - Shock Strut Servicing. - Aircraft Tires Inspection. 	(7) Weeks
2.	Hydraulic Power System	<ul style="list-style-type: none"> - Hydraulic System Components Identification - Hydraulic Fluid Identification - Engine Driven Pump Dismantling and Assembly. - Filter Elements. 	(4) Weeks
3.	Aircraft Fuel Systems	<ul style="list-style-type: none"> - Aircraft Fuel System Components Identification. - Fuel Tanks Identification. - Fuel Leaks Classification. - Removal and Installation of Fuel Tank. -Fuel Filter Bowl Screen Removal, Cleaning, and Installation. -Gravity Refueling. - Detection of Fuel Contaminants. 	(5) Weeks

طرق التقييم المستخدمة:

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

طرق التدريس:

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

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برنامج تكنولوجيا هندسة الطيران	
هندسة هياكل ومحركات الطائرات Airframe & Powerplant Engineering	التخصص
20607235	رقم المادة الدراسية
نظم التكييف والتحكم بالضغط داخل الطائرة Cabin Control Systems	اسم المادة الدراسية
(2)	عدد الساعات المعتمدة
(2)	عدد الساعات النظرية
(0)	عدد الساعات العملية



وصف المادة الدراسية :

This Subject Discuss the Physiology of The Human Body That Determines the Atmospheric Conditions Required for Life , How Oxygen and Cabin Altitude are Controlled to Provide a Livable Atmosphere for the Aircraft Occupants , and How the Comfort Needs of the Passengers and Crew are Met , Also it Deals With Operating and Maintenance Aircraft Ice Prevention and Removal Systems , As Well As Procedures and Equipment for Ground Ice and Snow Removal , Rain Control Systems and Methods of Protecting Windscreens from the Effects of Rain.

أهداف المادة الدراسية :

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

- 1- Study the Atmosphere, Pressure and Temperature.
- 2- Identify Aircraft Cabin Pressurization Control System.
- 3- Identify the Types of Oxygen System.
- 4- Understand the Functional Operation of Cabin Climate Control System.
- 5- Identify the Function of Components in Air cycle and Vapor Cycle Cooling Systems.
- 6- Identify the Ice and Rain Control Systems and component Functional Operation.



Subject : cabin Atmosphere Control.

رقم الوحدة	اسم الوحدة	محتويات الوحدة	وحدة الزمن
1	Cabin Atmosphere Control	<p><u>Flight physiology</u></p> <ul style="list-style-type: none"> • The atmosphere. • Human respiration and circulation.. <ul style="list-style-type: none"> ○ Hypoxia. ○ Carbon monoxide poisoning. <p><u>Oxygen and pressurizing systems</u></p> <ul style="list-style-type: none"> • Oxygen system. • Characteristics of oxygen. <ul style="list-style-type: none"> ○ Source of supplement oxygen ○ Oxygen system and components ○ Oxygen system servicing. ○ Prevention of oxygen fire or explosions. • . Pressurization systems. <ul style="list-style-type: none"> ○ Pressurization problems. ○ Source of pressurization. ○ Control of cabin pressure. <p><u>Cabin climate control systems.</u></p> <ul style="list-style-type: none"> • Ventilation systems. • Heating systems <ul style="list-style-type: none"> ○ Exhaust shroud heater.. ○ Electric heating system. ○ Combustion heaters. ○ Compressor bleed air heater. • Aircraft air conditioning systems. <ul style="list-style-type: none"> ○ Air-cycle air conditioning. ○ Vapor -cycle air conditioning. • Service equipment. • System servicing. 	11 weeks
2	Airframe Ice and Rain Control	<p><u>Cabin climate control systems.</u></p> <ul style="list-style-type: none"> • Ice effects. • Ice detection systems. <ul style="list-style-type: none"> ○ Visual detection. ○ Electronic detection. ○ Optical ice detectors. ○ Contaminant /fluid integrity measuring system(C/FIMS™) • Anti-icing systems. 	5 weeks

	<ul style="list-style-type: none"> ○ Thermal anti-icing. ○ Electric anti-icing. ○ Chemical anti-icing. ○ Weeping wing ● De-icing systems. <ul style="list-style-type: none"> ○ Rubber DE-ICER boots system. ○ Electrothermal De-icing. ○ Electro-expulsive separation system. ● Rain control system <ul style="list-style-type: none"> ○ Windshield wiper systems. ○ Chemical rain repellent. ○ Pneumatic rain removal systems. 	
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طرق التقييم المستخدمة:

التاريخ	نسبة الامتحان من العلامة الكلية	الامتحانات
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التاريخ : الاسبوع السادس		المشروع والوظائف

طرق التدريس:

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

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برنامج تكنولوجيا هندسة الطيران	
التخصص	هندسة هياكل ومحركات الطائرات Airframe & Powerplant Engineering
رقم المادة الدراسية	20607237
اسم المادة الدراسية	نظم التحكم بقيادة الطائرة والتفتيش على صلاحيتها Aircraft Flight Control Systems & Airworthiness Inspection
عدد الساعات المعتمدة	(2)
عدد الساعات النظرية	(2)
عدد الساعات العملية	(0)



وصف المادة الدراسية :

Deals With Aircraft Structure Design and Construction, Fuselage And Wings Structures, Powerplant Support Structures , Stability And Control , Primary and Auxiliary Flight Control Systems , Rigging and Alignment of Aircraft Major Structure and Control Surfaces , Forces Acting on Fixed and Rotary Wings Aircraft , Types of Rotor Systems , As Well As The Methods and Procedures of Aircraft Inspection.

أهداف المادة الدراسية :

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

- 1- Identify the Design and Construction of Aircraft
- 2- Distinguish Between Types of Aircraft Structure.
- 3- Identify the Function of Aircraft Major Structural Parts and Control Surface.
- 4- Identify Airplane Axes, Stability and Control
- 5- Perform Control Cables Inspection & Adjustment
- 6- Aircraft Study the Fundamentals of Rotary Wing.
- 7-Identify Required Airworthiness Inspections.
- 8- Know Inspection Guidelines and Procedures



Subject : Aircraft Flight Control Systems & Airworthiness Inspection.

رقم الوحدة	اسم الوحدة	محتويات الوحدة	وحدة الزمن
1	Aircraft structural Assembly and Rigging	<p><u>Aircraft design and construction.</u></p> <ul style="list-style-type: none"> • Structural design. • Types of aircraft structure. • Airfoil sections. • Transmitting lift into the structure. • Truss-type wing construction. • Stressed-skin wing construction. • Control surface construction. <ul style="list-style-type: none"> ○ Fabric –covered control surface. ○ Metal-covered control surfaces. • Airfoil control and aerodynamic configurations. <ul style="list-style-type: none"> ○ Ailerons. ○ Spoilers. ○ Flaperons and elevons . ○ Winglet's ○ Vortex generators • Empennage structure. • Fuselage structure. • Truss-type fuselage. • Stressed-skin fuselage. <ul style="list-style-type: none"> ○ Monocoque fuselage. ○ Semi-Monocoque fuselage. • Pressurized fuselage • Landing gear. <ul style="list-style-type: none"> ○ Water operations. ○ Snow operations. • Powerplant support structures. <ul style="list-style-type: none"> ○ Piston engines. ○ Turbine engines. ○ Engines mounts. • Access and inspection. <p><u>Airplane Assembly and Rigging .</u></p> <ul style="list-style-type: none"> • Airplane axes. <ul style="list-style-type: none"> ○ Longitudinal axis. ○ Lateral axis ○ Vertical axis. • Stability and Control <ul style="list-style-type: none"> ○ Types of stability ○ Static stability. ○ Dynamic stability. ○ Condition of stability 	10 weeks

❖ تطبق هذه الخطة الدراسية اعتباراً من بداية العام الجامعي 2009/2008

- Positive stability.
- Negative stability.
- Neutral stability.
- Stability about the axis.
- **Control systems.**
- **Longitudinal controls.**
- **Lateral and directional controls.**
- **Auxiliary or trim controls.**
 - Trim tabs
 - Balance tabs.
 - Anti-servo tabs.
 - Servo tabs.
 - Spring tabs.
 - Ground adjustable tabs.
- **Adjustable stabilizer.**
- **High lift devices.**
- **Flaps.**
 - Plain flaps.
 - Split flaps.
 - Slotted flaps.
 - Fowler flaps.
- **Leading edge devices**
 - Slots.
 - Slats.
 - Leading edge flaps.
 - Stall strips.
- **Special wing tips.**
 - Winglets.
 - Wing fence.
- **Canard surface.**
- **T-Tails.**
- **Control systems for large aircraft.**
 - Types of control systems.
 - Boeing 747 control systems.
 - Roll control.
 - Pitch control.
 - Yaw control
- **Airplane assembly and rigging specifications.**
 - Airplane assembly.
 - Wing alignment.
 - Aileron installation.
 - Flap installation.
 - Empennage installation.
- Cable system

- Cable construction.
 - Termination.
 - Woven splice.
 - Nicopress process.
 - Swaged terminals.
 - Proof load test .
 - Cable inspection
 - Installation.
 - Pulleys and fairleads.
 - Travel adjustment and cables tension.
 - Springback.
 - Turnbuckle safetying
- **Push –pull rod system.**
- **Torque tube system.**
- **Control surface balancing.**
- **Biplane assembly and rigging.**
 - Stagger.
 - Decalage.
 - Biplane components .
 - Center section.
 - Cabane struts.
 - Cabane of transverse wires.
 - Landing wire.
 - Lanfing wire,.
 - Flying wires.
 - Interplane struts..
- **Assembly and rigging procedures.**
- **Typical repair operations.**
- **Removal and installation requirements.**
- **Fundamentals of rotary –wing aircraft.**
 - **History of rotary-wing flight.**
 - **Configurations of rotary-wing aircraft.**
 - Gyroplane.
 - Single-rotor helicopter.
 - Dual-rotor helicopter.
 - **Types of rotor systems.**
 - **Main rotor systems.**
 - Fully articulated system.
 - Semi-rigid rotor system.
 - Rigid rotor system.
 - **Force acting on the main rotor.**
 - Gravity.
 - Centrifugal force.
 - Lift.

- **Coriolis effect (conservation of angular momentum.**
- **Helicopter flight conditions..**
 - Hovering flight.
 - Torque.
 - Translating tendency or drift.
 - Density altitude.
 - Ground effect.
 - Vertical ascent and descent
 - Foreword flight.
 - Dissymmetry of lift.
 - Retreating blades stall.
- **Translational lift.**
- **Autorotation.**
- **Rotorcraft Controls.**
 - Direct rotor head tilt.
 - Swash plate control system.
 - Collective pitch control.
 - Throttle control.
 - Cyclic pitch control.
- **Synchronized elevators.**
- **Boosted controls.**
- **Torque compensation.**
- **Stabilizer systems.**
 - Bell stabilizer bar system.
 - Offset flapping hinge.
 - Stability augmentation system (sas).
 - Autopilots.
- **Helicopter vibration.**
 - Types of vibration.
 - Frequency ranges.
 - Low- frequency vibration.
 - High- frequency vibration
 - Condition of vibration.
 - Measurement of vibration.
 - Correction of vibration.
 - Correction of vibration.
 - Blades balancing.
 - Blades tracking.
 - Track adjustment.
- **Helicopter power system.**
- **Powerplant.**
 - Piston engine.
 - Turbine engine.

		<ul style="list-style-type: none"> • Transmission system <ul style="list-style-type: none"> ○ Main rotor transmission ○ Tail rotor drive system ○ Clutch. ○ Centrifugal Clutch. ○ Belt-drive clutch. 	
2	Aircraft Airworthiness inspection	<p><u>Required Airworthiness inspection</u></p> <ul style="list-style-type: none"> • Pre- flight inspections. • Far part 91 required inspections. • Annual inspection. • 100-hours inspection. • Progressive inspection. • Large and turbine powered multi-engine aircraft. • Conformity inspections. • Air carrier & air charter operations. • Part 121 air carrier inspections. • Part 135 air charter inspection • Special inspections • Conditional inspections. <p><u>Inspection guideline and procedures</u></p> <ul style="list-style-type: none"> • Inspection fundamentals. • Inspection guidelines. • Inspection procedures. • Pre-inspection phase, • Examination phase. • Service and repair phase. • Functional check phase. • Return-to-service phase. <p><u>Aircraft maintenance records</u></p> <ul style="list-style-type: none"> • Introduction. • Maintenance record form and content. • Inspection record for and content. • Annual inspection entries. • Progressive inspection & approval aircraft inspection program (AAIP) entries. • Airworthiness direction compliance entries 	6 weeks

طرق التقييم المستخدمة:

التاريخ	نسبة الامتحان من العلامة الكلية	الامتحانات
التاريخ : الاسبوع السادس	20%	الأول
التاريخ : الاسبوع الثاني عشر	20%	الثاني
التاريخ : / /	10%	أعمال الفصل
التاريخ : الاسبوع السادس عشر	50%	الامتحانات النهائية
التاريخ : الاسبوع السادس		المشروع والوظائف

طرق التدريس:

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

الكتب والمراجع :

Airframe and Powerplant Technician Airframe Text Book

(By Jeppesen Publisher Edition 2006)



❖ تطبق هذه الخطة الدراسية اعتباراً من بداية العام الجامعي 2009/2008