



# Engineering Program

Specialization	Airports Electrical Systems
Course Number	20303121
Course Title	Power Supply Systems in the Airports
Credit Hours	2
Theoretical Hours	2
Practical Hours	0



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

**Brief Course Description:**

- ❖ The main purpose of this course is to introduce the student with various types of power supplies and how to maintain and operate each of them in order to assure the availability of the electrical Current for each load in the airport

**Course Objectives:**

By the completion of this course the student will be able to:

1. Explain and describe the operating principles, functions, constructions and characteristics of airport electrical systems.
2. Describe the main components of airport electrical systems.
3. Explain the main concepts of airport electrical systems.
4. Explain and describe the main parts of airport electrical systems.
5. Maintain and operate each of the power supplies in the airport



## Detailed Course Description:

Unit Number	Unite name	Unite content	Time Needed
1.	<b>Power supply systems and their installations</b>	<ul style="list-style-type: none"> <li>▪ Introduction</li> <li>▪ Requirements of power supply reliability, current,</li> <li>▪ Voltage, capital costs and electrical noise.</li> <li>▪ Types and block diagrams of power installation.</li> <li>▪ A.C permitted break with one standby supply, No break with two standby supply.</li> <li>▪ D.C power installations, permitted break with one</li> <li>▪ standby supply. No break with two standby supplies</li> </ul>	
2.	<b>Standby power Generation Station</b>	<ul style="list-style-type: none"> <li>▪ Diesel four stroke engine</li> <li>▪ Generators, construction and principle of operation.</li> <li>▪ Brushless alternator</li> <li>▪ Load shedding system used at airport.</li> <li>▪ Generator's protection (Mechanical and Electrical)</li> </ul>	

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			Time Needed
3.	<b>Uninterrupted Power Supply (UPS)</b>	<ul style="list-style-type: none"> <li>▪ Construction</li> <li>▪ Operating Principle</li> <li>▪ Block Diagram</li> </ul>	
4.	<b>Automatic transfer Switch (ATS)</b>	<ul style="list-style-type: none"> <li>▪ Construction</li> <li>▪ Operating principle</li> <li>▪ Wiring diagram</li> </ul>	
5.	<b>Batteries</b>	<ul style="list-style-type: none"> <li>▪ Types</li> <li>▪ Construction</li> <li>▪ Principle of operation</li> <li>▪ Chemical reaction and maintenance</li> <li>▪ Series and parallel combination of batteries</li> </ul>	
6.	<b>Invertors and Converters</b>	<ul style="list-style-type: none"> <li>▪ Construction</li> <li>▪ Operation</li> <li>▪ Block diagram</li> </ul>	
7.	<b>Airport Lighting Systems (Locations and function)</b>	<ul style="list-style-type: none"> <li>▪ Approach lighting systems(ALS)</li> <li>▪ Runway lighting systems (RLS)</li> <li>▪ Taxiway Lighting systems(TLS)</li> <li>▪ Precision Approach Path Indicator (PAPI)</li> </ul>	
8.	<b>Terminal lighting systems</b>	<ul style="list-style-type: none"> <li>▪ Lighting Types</li> <li>▪ Distribution system</li> <li>▪ Terminal lighting block diagrams</li> </ul>	
		<ul style="list-style-type: none"> <li>▪</li> </ul>	
		<ul style="list-style-type: none"> <li>▪</li> </ul>	

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

### Evaluation Strategies

Exams		Percentage	Date
Exams	First Exam	20%	--/--/----
	Second Exam	20%	--/--/----
	Final Exam	50%	--/--/----
Homework and Projects		10%	
Discussions and lecture Presentations			

### Teaching Methodology:

- ❖ Lectures

### Text Books & References:

#### Textbook:

1. I.C.A.O Annex 14 – 1995.
2. A text book of electrical technology B. L. Theraja, A. K. Theraja- R.A.M.

#### References:

1. Diesel Plant operation hand book – MC GRAW HILL – 1991.
2. Basic Electrical Power Distribution – Rochelle Park, New Jersey , 1971.
3. Precision Approach Bath Indicator – PPL – 600
4. Electrical Instrumentation B.A.GREGORY THE MACMILAN PRESS LTD,LONDON.
5. EQUIPMENTS MANUAL.and diagrams sheet for Airport power stations.



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



# Engineering Program

Specialization	Airports Electrical Systems
Course Number	20303128
Course Title	Airfield Measurements and Instrumentations Workshop
Credit Hours	1
Theoretical Hours	0
Practical Hours	3



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

**Brief Course Description:**

- ❖ The main purpose of this workshop course is to introduce the student with various types of power supplies and its measurements, and how to maintain and operate each of them in order to assure the availability of the electrical Current for each load in the airport, measurement equipments ,Airfield generators and Instrumentations.

**Course Objectives:**

By the completion of this course the student will be able to:

1. Explain and describe the operating principles, functions, constructions and characteristics of airport electrical systems.
2. Describe the main components of airport electrical systems and measurements.
3. Explain the main concepts of airport electrical systems and Instrumentations.
4. Explain and describe the main parts of airfield electrical systems.
5. Maintain and operate each of the power supplies in the airport , power measurements..
6. Explain the principles of work of various measuring devices.

**Detailed Course Description:**

Lab Number	Lab name	Lab content	Time Needed
1.	<b>Airport Electrical Systems and power supply system</b>	<ul style="list-style-type: none"> <li>▪ Main components, .Principle of Operation</li> </ul>	
2.	<b>Measurement of Power in single phase</b>	<ul style="list-style-type: none"> <li>▪ Measuring current, voltage, power and frequency in single-phase systems, calculating power factor</li> </ul>	
3.	<b>Measurement of Power in three phase</b>	<ul style="list-style-type: none"> <li>▪ Measuring current, voltage, power and frequency in three-phase systems, calculating power factor</li> </ul>	

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4.	<b>Measurement of energy in 1-phase and 3-phase system</b>	<ul style="list-style-type: none"> <li>▪ Constructing the single phase circuit and measuring consumed energy using KWH meter</li> <li>▪ Constructing the three phase circuit and measuring consumed energy using KWH meter</li> </ul>	
5.	<b>Uninterruptible Power supply (UPS)</b>	<ul style="list-style-type: none"> <li>▪ Construction and Principle of operation, Batteries Connection and construction.</li> </ul>	
6.	<b>PAPI Calibration Devices, and Maintainans</b>	<ul style="list-style-type: none"> <li>▪ Degree device, bobble device, Mega-Ohm METER, CLAMP METER.</li> </ul>	
7.	<b>Distribution substations</b>	<ul style="list-style-type: none"> <li>▪ Single Line diagram, construction, principle of Operation</li> </ul>	
8.	<b>Diesel power stations operation (field visit)</b>	<ul style="list-style-type: none"> <li>▪ Design, construction, principle of operation</li> </ul>	
9.	<b>Automatic Transfer Switch (A.T.S) (field visit).</b>	<ul style="list-style-type: none"> <li>▪ Construction and principle of operation</li> </ul>	
10.	<b>Inverters and converters</b>	<ul style="list-style-type: none"> <li>▪ Construction, principle of operation</li> </ul>	

**Evaluation Strategies:**

Exams		Percentage	Date
Exams	Assignments	30%	--/--/----
	Mid-term Exam	20%	--/--/----
	Final Exam	50%	--/--/----
Homework and Projects			
Discussions and lecture Presentations			

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



**Teaching Methodology:**

❖ Laboratory

**Textbook:**

1.I.C.A.O Annex 14 – 1995.

2.A text book of electrical technology B. L. Theraja, A. K. Theraja- R.A.M.

**References:**

1.Diesel Plant operation hand book – MC GRAW HILL – 1991.

2.Basic Electrical Power Distribution – Rochelle Park, New Jersey , 1971.

3. Precision Approach Bath Indicator – PPL – 600

4.Thomas L. Floyd – electronic devices – prentice hall international - sixth edition – 2002 .

5.Laboratory Exercise Manual For Electronic Devices – David Buchla – Prentice Hall – 1995 .

6.Electronics Fundamentals and Experiments – Cynthia B. Leshin, David Buchla, Thomas L. Floyd - Prentice Hall – 1999

7.Electrical Instrumentation B.A.GREGORY THE MACMILAN PRESS LTD,LONDON.

8.EQUIPMENTS MANUAL.and diagrams sheet for Airport power stations.





# Engineering Program

<b>Specialization</b>	Airports Electrical Systems
<b>Course Number</b>	20303231
<b>Course Title</b>	Airport Lighting Systems ( 1)
<b>Credit Hours</b>	2
<b>Theoretical Hours</b>	2
<b>Practical Hours</b>	0



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

### Brief Course Description:

- ❖ This course introduces the students with the basic principles, functions, lighting areas, lamps types, signs and markers as well as heliport lighting system of airfield lighting systems

### Course Objectives:

On completion of this course the student will be able to:

1. Explain the basic principles, functions and characteristics of airfield lighting systems, and the (ICAO) standards of airfield lighting systems.
2. Describe lamps used in the airfield lighting systems.
3. Describe the approach lighting systems (ALS).
4. Describe the runway lighting systems (RW).
5. Describe the taxiway lighting systems (TW).
6. Describe the beacon lighting systems.
7. Describe the signs and markers.
8. Describe the wind cone system.
9. Describe the flood lighting system.
10. Describe the obstruction lighting system.
11. Heliport Lighting System



**Detailed Course Description:**

Lab Number	Lab name	Lab content	Time Needed
1.	<b>General Introduction to Airfield Lighting systems</b>	<ul style="list-style-type: none"> <li>▪ Categories of airfield Lighting systems CAT.I. CAT.II. CAT.III. A.B.C</li> <li>▪ Standards of (ICAO) for airfield Lighting systems</li> <li>▪ Lamps used in the airfield Lighting systems:</li> <li>▪ (Types: sealed beam hooligan , characteristics, isocandela diagrams)</li> </ul>	
2.	<b>Approach lighting systems (ALS)</b>	<ul style="list-style-type: none"> <li>▪ Simple Approach</li> <li>▪ Precision approach category I</li> <li>▪ Precision approach category II</li> <li>▪ Precision approach category III A.B.C.</li> </ul>	
3.	<b>Runway Lighting systems</b>	<ul style="list-style-type: none"> <li>▪ R\W edge lighting system.</li> <li>▪ Threshold lighting system.</li> <li>▪ Wing bar lighting system.</li> <li>▪ Touch down zone lighting system.</li> <li>▪ Center line lighting system.</li> <li>▪ End line lighting system.</li> <li>▪ Stop line lighting system</li> </ul>	
4.	<b>Taxiway Lighting systems</b>	<ul style="list-style-type: none"> <li>▪ Edge lighting system.</li> <li>▪ Center line lighting system.</li> <li>▪ Stop bar lighting system.</li> <li>▪ Exits lighting system</li> </ul>	

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5.	<b>Beacon Lighting Systems</b>	<ul style="list-style-type: none"> <li>▪ Rotating beacon.</li> <li>▪ Identification beacon</li> <li>▪ Hazard beacon</li> </ul>	
6.	<b>Signs and Markers</b>	<ul style="list-style-type: none"> <li>▪ Signs: applications, locations and characteristics</li> <li>▪ Markers: applications, locations and characteristics</li> </ul>	
7.	<b>Wind cone System</b>	<ul style="list-style-type: none"> <li>▪ Applications</li> <li>▪ Locations</li> <li>▪ Characteristics</li> </ul>	
8.	<b>Flood Lighting System</b>	<ul style="list-style-type: none"> <li>▪ Applications.</li> <li>▪ Locations</li> <li>▪ Characteristics</li> </ul>	
9.	<b>Obstruction Lighting System</b>	<ul style="list-style-type: none"> <li>▪ Applications</li> <li>▪ Locations</li> <li>▪ Characteristics</li> </ul>	
10.	<b>Heliport Lighting System</b>	<ul style="list-style-type: none"> <li>▪ Touch down pad lighting</li> <li>▪ Perimeter lighting</li> <li>▪ Heliport identification beacon</li> <li>▪ Landing direction lights</li> </ul>	

**Evaluation Strategies:**

Exams		Percentage	Date
Exams	First Exam	20%	--/--/----
	Second Exam	20%	--/--/----
	Final Exam	50%	--/--/----
Homework and Projects		10%	
Discussions and lecture Presentations			

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

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**Teaching Methodology:**

1. Lectures
2. PowerPoint presentation
3. Discussion

**Text Books & References:**

**Text books:**

1. Thomas L. Floyd – electronic devices – prentice hall international - sixth edition – 2002.

**References:**

1. International standards and recommended practices airdromes- Anne x 14 volumes 1 (ICAO) second edition 1995.
2. International standards and recommended practices airdromes- Anne x 14 volumes 2 (ICAO) second edition 1995.
3. Visual landing aids- Federal Aviation Administration FAA ACADEMY 1978.
4. Airman's information manual / Fedral Aviation regulation- McGraw Hill 1995.
5. Aviation lighting system Crous-Hinds USA 1981.
6. Aviation lighting system ADB Belgium.
7. Helicopter system CFG ELEC. Airport division England 1994





# Engineering Program

Specialization	Airports Electrical Systems
Course Number	20303233
Course Title	Airport Lighting Systems ( 2)
Credit Hours	3
Theoretical Hours	3
Practical Hours	0



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

**Brief Course Description:**

- ❖ To introduce the student with the types, operation, construction of airfield lighting systems, and lighting systems used in other part of the airport

**Course Objectives:**

by the completion of this course the student will be able to:

1. Explain and describe the operation and construction of the Precision Approach Path Indicator (PAPI) Systems.
2. Explain and describe the operation and construction of the Runway End Identifier Lighting System (REILS).
3. Explain and describe the operation and construction of the Constant Current Regulator (CCR).
4. Explain and describe the operation and construction of the Uninterrupted Power Supply for air field Lighting systems.
5. Describe the types of Cables used in the Airfield Lighting System.
6. Explain and describe the operation and construction the Isolating Transformers.
7. Explain and describe the operation and construction of the Flashers.
8. Explain the main purposes and basic principles of Remote Control system.
9. State the requirements of the Remote Control Systems.
10. Explain the main block diagram of the Remote control system





**Detailed Course Description:**

Unit Number	Content	Notes	Time Needed
1.	<b>Precision Approach Path Indicator Systems (PAPI, APAPI)</b>	<ul style="list-style-type: none"> <li>▪ Construction</li> <li>▪ Location</li> <li>▪ Operation</li> <li>▪ Adjustment</li> </ul>	
2.	<b>The Runway End Identifier Lighting System (R.E.I.L.S)</b>	<ul style="list-style-type: none"> <li>▪ Construction</li> <li>▪ Location.</li> <li>▪ Operation</li> <li>▪ Block Diagram</li> </ul>	
3.	<b>Constant Current Regulator (C.C.R)</b>	<ul style="list-style-type: none"> <li>▪ C.C.R. Types: Thyristor Type, Contactor type Autotransformer type</li> <li>▪ Construction</li> <li>▪ Operation</li> </ul>	
4.	<b>Uninterrupted Power Supply (U.P.S)</b>	<ul style="list-style-type: none"> <li>▪ Construction</li> <li>▪ Operation</li> <li>▪ Block diagram</li> </ul>	
5.	<b>Cables used in the Airfield Lighting Systems</b>	<ul style="list-style-type: none"> <li>▪ Types</li> <li>▪ Characteristics</li> <li>▪ Calculation of loop insulation</li> </ul>	
6.	<b>Isolating Unit Transformers</b>	<ul style="list-style-type: none"> <li>▪ Types</li> <li>▪ Construction.</li> <li>▪ Operation.</li> </ul>	



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7.	<b>Flashers used in the Airfield Lighting System</b>	<ul style="list-style-type: none"> <li>▪ Construction.</li> <li>▪ Location.</li> <li>▪ Operation</li> <li>▪ Introduction</li> <li>▪ Requirements for remote control system.</li> <li>▪ Fault-indication and alarm.</li> <li>▪ General block diagram</li> </ul>	
8.	<b>Basic principles of Remote Control System</b>	<ul style="list-style-type: none"> <li>▪ Introduction</li> <li>▪ Requirements for remote control system.</li> <li>▪ Fault-indication and alarm.</li> <li>▪ General block diagram</li> </ul>	
9.	<b>Communication and Tower lighting Systems</b>	<ul style="list-style-type: none"> <li>▪ Location.</li> <li>▪ Types</li> <li>▪ Construction</li> <li>▪ Block Diagram</li> </ul>	
10.	<b>Radar station and Navi-aids station lighting system</b>	<ul style="list-style-type: none"> <li>▪ Location</li> <li>▪ Distribution</li> <li>▪ Construction</li> <li>▪ Block diagram</li> </ul>	

**Evaluation Strategies:**

Exams		Percentage	Date
Exams	First Exam	20%	--/--/----
	Second Exam	20%	--/--/----
	Final Exam	50%	--/--/----
Homework and Projects		10%	
Discussions and lecture Presentations			

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

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**Teaching Methodology:**

- ❖ Lectures

**Text Books & References:**

**Text books:**

1. International standards and recommended practices airdromes – Annex 14, volume 1 and 2 (I.C.A.O) second edition – 1995.
2. Airman's information/Federal Aviation regulations-Mc Graw- Hill- 1995.

**References:**

1. Precision approach path indicator (PAPI)- Aviation Lighting systems A.D.B –Company BELGIUM.





# Engineering Program

Specialization	Airports Electrical Systems
Course Number	20303234
Course Title	Airport lighting systems lab
Credit Hours	1
Theoretical Hours	0
Practical Hours	3



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

### Brief Course Description:

- ❖ The purpose of this course is to gain necessary skills by the student in the air filed lighting systems by introducing him with the location of loop components. input and output voltage and current of constant current regulator. Loop fault insulation . alignment of precision approach path indicator units. Airfield lighting simulator systems

### Course Objectives:

On completion of this course the students will be able to:

1. Observe the location of loop components, the input voltage and the output current of constant current regulator. \
2. Perform experiments for loop fault insulation.
3. Perform experiments for alignment of precision approach path indicator PAPI units
4. Adjust the output current of the constant current regulator (CCR)
5. Calculate the insulation for different loops
6. Observe the airfield simulator systems



**Detailed Course Description:**

Unit Number	Lab name	Lab content	Time Needed
1.	Series lamp loop familiarization	<ul style="list-style-type: none"> <li>▪ Location of individual loop components: constant current regulator (CCR) unit transformer and lamp units</li> <li>▪ Relationship between loop current and the individual lamp current.</li> <li>▪ Voltage relationship across individual lamp and the total loop voltage</li> </ul>	
2.	Measurements of loop fault insulation	<ul style="list-style-type: none"> <li>▪ Over load in series circuits</li> <li>▪ Open circuits in one leg</li> <li>▪ Open circuits in both legs</li> <li>▪ Multiple grounding</li> </ul>	
3.	Alignment of precision approach path indicator (PAPI) unit	<ul style="list-style-type: none"> <li>▪ Introduction: description of main components, photometric</li> <li>▪ Preliminary remarks</li> <li>▪ Setting angle</li> <li>▪ Aiming in azimuth</li> <li>▪ Checking slope angel of the lights beams</li> </ul>	
4.	Constant current regulator	<ul style="list-style-type: none"> <li>▪ Main power source voltage measurements</li> <li>▪ Open series lighting loop</li> <li>▪ Adjustment of potentiometers, output current measurements</li> </ul>	

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5.	<b>Constant current regulator Maintenance</b>	<ul style="list-style-type: none"><li>▪ Replacing control board assembly</li><li>▪ Measurement of SCRs</li><li>▪ Remote control of external voltage, measurements</li></ul>	
6.	<b>Measurements and calculation of insulation different loop</b>	<ul style="list-style-type: none"><li>▪ Run way loops</li><li>▪ Taxi way loops</li><li>▪ PAPI loops</li><li>▪ Approach loops</li><li>▪ Marker loops</li></ul>	
7.	<b>Airfield lighting simulator</b>	<ul style="list-style-type: none"><li>▪ Category I lighting system</li><li>▪ Category II lighting system</li><li>▪ Category III lighting system</li></ul>	
8.	<b>Airfield lighting simulator Maintenance</b>	<ul style="list-style-type: none"><li>▪ Construction, Measurements and Maintenance</li></ul>	



**Evaluation Strategies:**

Exams		Percentage	Date
Exams	Assignments	30%	--/--/----
	Mid-term Exam	20%	--/--/----
	Final Exam	50%	--/--/----
Homework and Projects			
Discussions and lecture Presentations			

**Teaching Methodology:**

- ❖ Laboratory

**Text Books & References:**

**References :**

1. Advisory circulars –U.S. department of transportations . Federal aviation administration 1962
2. Instruction manual –L 812 constant current regulator- course hinds- U.S.A 1980
3. Precision approach path indicator type- Pp1-600 LADB- Belgium
4. High intensity approach lighting system – laboratory projects FAA
5. Visual landing aids manual – 40123 FAA 1978



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





# Engineering Program

<b>Specialization</b>	<b>Airports Electrical Systems</b>
<b>Course Number</b>	<b>20303271</b>
<b>Course Title</b>	<b>Terminals Electro-Mechanical Equipment</b>
<b>Credit Hours</b>	<b>3</b>
<b>Theoretical Hours</b>	<b>3</b>
<b>Practical Hours</b>	<b>0</b>



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

**Brief Course Description:**

- ❖ This course describes various types of equipment used by passengers as well as others. The student will be introduced with those equipment and to draw their block diagrams, and their principles of operation

**Course Objectives:**

On the completion of this course the student will be able to:

1. Explain and the function of the passenger loading air bridges, meter detector gates, luggage search equipment, center clock system, baggage handling system, automatic sliding doors.
2. Explain the block and wiring diagrams
3. Identify the types and components of the related systems



**Detailed Course Description:**

Lab Number	Content	Notes	Time Needed
1.	<b>Elevator and Escalators</b>	<ul style="list-style-type: none"> <li>▪ Introduction</li> <li>▪ Types of elevators &amp; escalators used at Queen Ali International airport</li> <li>▪ Electrical and mechanical components of elevators &amp; escalators</li> <li>▪ Electrical diagrams and principle of operations</li> </ul>	
2.	<b>Baggage handling systems</b>	<ul style="list-style-type: none"> <li>▪ Introduction</li> <li>▪ Classification of the baggage handling systems</li> <li>▪ Electrical and mechanical components of them.</li> <li>▪ Electrical diagrams and principle of operations</li> </ul>	
3.	<b>Weight scale system</b>	<ul style="list-style-type: none"> <li>▪ Introduction</li> <li>▪ Electrical and mechanical components of the weight scale system</li> <li>▪ Block diagrams, electrical diagrams and principle of operations</li> </ul>	
4.	<b>Automatic sliding doors</b>	<ul style="list-style-type: none"> <li>▪ Introduction</li> <li>▪ Electrical and mechanical components of automatic sliding doors</li> <li>▪ Block diagrams, principle of operations, and service procedure.</li> </ul>	
5.	<b>Passenger loading Air bridges</b>	<ul style="list-style-type: none"> <li>▪ Introduction</li> <li>▪ Electrical and mechanical components of them.</li> <li>▪ Electrical diagrams and principle of operations</li> </ul>	

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6.	<b>Metal detector gates</b>	<ul style="list-style-type: none"> <li>▪ Introduction</li> <li>▪ Electrical components.</li> <li>▪ Block diagrams</li> <li>▪ Wiring diagrams and principle of operations</li> </ul>	
7.	<b>Central Clock system</b>	<ul style="list-style-type: none"> <li>▪ Introduction</li> <li>▪ Master clock main components</li> <li>▪ Slave clock main components</li> <li>▪ Electrical diagrams.</li> <li>▪ Adjustment of the central clock system</li> <li>▪ principle of operations</li> </ul>	
8.	<b>Luggage inspection system</b>	<ul style="list-style-type: none"> <li>▪ Introduction</li> <li>▪ Theory of operation and Operation</li> <li>▪ Radiation safety</li> <li>▪ Service information</li> <li>▪ Adjustment instructions</li> </ul>	
9.	<b>Fire Alarm and Fire fighting system</b>	<ul style="list-style-type: none"> <li>▪ Introduction</li> <li>▪ Fire alarm system</li> <li>▪ Fire detection</li> <li>▪ Fire fighting, hallon gas system</li> <li>▪ Block diagram and operation</li> </ul>	
10.	<b>Hydraulic systems principles</b>	<ul style="list-style-type: none"> <li>▪ Introduction</li> <li>▪ Hydraulic system components</li> <li>▪ Control system</li> <li>▪ Operation</li> </ul>	
11.	<b>Air conditioning and heating system</b>	<ul style="list-style-type: none"> <li>▪ Introduction</li> <li>▪ Air conditioning and heating system components</li> <li>▪ Control system</li> <li>▪ Operation</li> </ul>	

**Evaluation Strategies:**

Exams		Percentage	Date
Exams	First Exam	20%	--/--/----
	Second Exam	20%	--/--/----
	Final Exam	50%	--/--/----
Homework and Projects		10%	
Discussions and lecture Presentations			

**Teaching Methodology:**

- ❖ Lectures

**Text Books & References:**

1. Matthew's conveyer company REXNORO
2. Otis elevators company "Elevators and escalators", George Stakosch
3. Hi-scan 6040 TS V3-9080 TS. Luggage inspection system instruction and technical manual-Germany.
4. Friskem-design 500, USA
5. UMC 2000 digital weight indicator
6. Dyrotronics system 3-USA 1980 (Manual)



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



# Engineering Program

<b>Specialization</b>	<b>Airports Electrical Systems</b>
<b>Course Number</b>	<b>20303161</b>
<b>Course Title</b>	<b>Flight Navigation Systems</b>
<b>Credit Hours</b>	<b>2</b>
<b>Theoretical Hours</b>	<b>2</b>
<b>Practical Hours</b>	<b>0</b>



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

### Brief Course Description:

- ❖ The main purpose of this course is to introduce the student with flight principles as well as the services air traffic, in addition how to deal with the main flight instruments and Navigation Systems, Communications in the Airports.

### Course Objectives:

By the completion of this course the student will be able to:

1. Explain flight principles and describe the air traffic services..
2. Introduce the student with aerodrome control tower.
3. Explain flight information, and flight navigation principles
4. Explain and describe the main parts of communication system (TX, R.X) and explain the Primary Radar and (SSR) Radar principles
5. Describe and explain various flight instruments



**Detailed Course Description:**

Unit Number	Content	Notes	Time Needed
1.	<b>Principles of flight</b>	<ul style="list-style-type: none"> <li>▪ The main parts of an aeroplane</li> <li>▪ What makes an aeroplane fly</li> <li>▪ Forces acting on aeroplane</li> </ul>	
2.	<b>Air Traffic services</b>	<ul style="list-style-type: none"> <li>▪ Objectives of the air traffic services</li> <li>▪ Division of air traffic services</li> <li>▪ Identification of ATS units</li> <li>▪ Services provided</li> </ul>	
3.	<b>Aerodrome Control Tower</b>	<ul style="list-style-type: none"> <li>▪ Aerodrome Control Tower and its personnel</li> <li>▪ General information of the aerodrome control tower</li> </ul>	
	<b>AIS and communication operations</b>	<ul style="list-style-type: none"> <li>▪ Introduction</li> <li>▪ AIS services</li> <li>▪ Operations</li> </ul>	
4.	<b>Flight Information Region</b>	<ul style="list-style-type: none"> <li>▪ Controlled airspace</li> <li>▪ Controlled Zone (CTR)</li> <li>▪ Control area (CTA)</li> <li>▪ (Airways and Terminal control areas) TMA</li> <li>▪ Airways chart</li> </ul>	
5.	<b>Flight Navigation</b>	<ul style="list-style-type: none"> <li>▪ Definition</li> <li>▪ Methods of flight navigation</li> <li>▪ Approach and landing</li> <li>▪ ICAO word spelling and alphabet</li> </ul>	

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



6.	<b>Airports and communications systems</b>	<ul style="list-style-type: none"> <li>▪ Introduction to communication. systems</li> <li>▪ <b>General communication Block DIAGRAM.</b></li> <li>▪ <b>Communications systems locations and operational Functions.</b></li> </ul>	
7.	<b>Principles of communication system (TX, R.X)</b>	<ul style="list-style-type: none"> <li>▪ Principles of of transmitters and receivers</li> <li>▪ Transmitters block diagram</li> <li>▪ Function of each stage of a transmitter</li> <li>▪ Principles of receivers and their types</li> <li>▪ Receiver block diagram (AM)</li> <li>▪ Function of each stage of a receiver</li> </ul>	
8.	<b>Primary Radar and (SSR) Radar principles</b>	<ul style="list-style-type: none"> <li>▪ Types of transmission lines</li> <li>▪ Characteristics of EM waves</li> <li>▪ Principles of primary radar including it definitions and SSR radar principle.</li> </ul>	
9.	<b>Instrument Landing System (ILS) principles</b>	<ul style="list-style-type: none"> <li>▪ Definition</li> <li>▪ Operation</li> <li>▪ ILS categories and its location</li> </ul>	
10.	<b>VOR &amp; DME principle</b>	<ul style="list-style-type: none"> <li>▪ Definition</li> <li>▪ Operation</li> <li>▪ VOR and DME categories and their location</li> </ul>	

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

**Evaluation Strategies:**

Exams		Percentage	Date
Exams	First Exam	20%	--/--/----
	Second Exam	20%	--/--/----
	Final Exam	50%	--/--/----
Homework and Projects		10%	
Discussions and lecture Presentations			

**Teaching Methodology:**

- ❖ Lectures

**Text Books & References:**

1. Principles of flight Navigation /QNCATC Manual.
- 2 Aeronautical Radio and Navigation /QNCATC Manual

**References:**

1. Communication Systems 4<sup>th</sup> Edition Simon Haykin U.S.A 2000.
2. Thomas L. Floyd – electronic devices – prentice hall international - sixth edition – 2002
3. ICAO Annexes (2, 11, and 10), ICAO document 4444
- 4.Fernuo Manual DME .
- 5.Federal Aviation Academy, Cat. No. 40233, Wilcox manual/ DME 596B.



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



# Engineering Program

Specialization	Airports Electrical Systems
Course Number	20303251
Course Title	Automation Control Technology
Credit Hours	3
Theoretical Hours	3
Practical Hours	0



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



### Brief Course Description:

- ❖ Introduction to MTS-88C microcomputer kit. Microprocessors 6800 Hardware .Programming .I/O devices and Interfaces. PLC construction, I/O devices and Interfaces.S7-200 Programming and interfaces. Motor drives by Logic Gates , PLC and MICOCOMPUTERS .AIRFIELD Lighting control

### Course Objectives:

- 1 .To improve the students' knowledge of microprocessors hardware.
- 2 .To improve the students knowledge of Boolean algebra and control diagrams.
3. Simplification control circuits and applications.
4. To construct combinational logic circuits.
- 5.To perform different speed control manners.
- 6.To increase the students knowledge of addressing modes, programming and applications.
- 7.To improve students knowledge of I/O devices and interfaces .
- 8.**Explain and describe the operating principles, of drives methods, solid state drives, controlled rectifiers drives, machine speed control. Machine Automation**





## Detailed Course Description:

Unit Number	Unite name	Unite content	Time Needed
1.	Introduction to Microcomputer	<ul style="list-style-type: none"> <li>Introduction to flow chart and stored program concept.</li> <li>Introduction to Micoprocessors and microcontroller</li> <li>General architecture</li> </ul>	
2.	6800/8088 Microprocessor	<p>General -6800/8088 micro-processor architecture.</p> <p>Data and index registers.</p> <p>Memory segmentation and addressing mode.</p>	
3.	6800 MPU programming	<ul style="list-style-type: none"> <li>Basic data transfer instruction. Arithmetics , logic ,shift and rotate instruction.</li> <li>Compare jump and.</li> <li>Loop ,instruction , subrouteins ,stacks and handling instructions.</li> </ul>	



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

Unit Number	Lab name	Lab content	Time Needed
4.	Memory Concepts	.Basic concepts of memorys .ROM, RAM, PROM, VRAM, RDRAM and EPROM.	
5.	I/O Interfacing	8255A programmable peripheral interface PPI .I/O instruction and interfacing for 8088 .PIA 6821 for 6800 motorola microprocessors.	
6.	Programmable Logic Controller (PLC)	PLC fundamentals, PLC control device ,relays, pushbutton. limit switches . Relay Logic Gates, Ladder Logic symbol.	
7.	PLC Components	Component of Typical PLC. Terms, Rack, I/O group , WORLD required for I/O tables. PLC SCANNING CYCLES,	
8.	PLC Circuit Diagram Construction	.Logic Circuit Diagram, Relay Ladder Logic Symbol, Control Schemes, Components ,Safety Control Circuit. Siemens S7-200	
9.	General PLC Programming Procedures	.Creation of Ladder Diagram, I/O Programming ,Process Control Description ,Address I/O and Internal bits, Write Ladder Logic . Siemens S7-200 Model	

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

Unit Number	Unite name	Unite content	Time Needed
10	PLC Programming	Basic PLC Programming, Program using Register Function, Input/Output Register, Timer and Counter functions.	
11	PLC Interfacing	PLC Interface unit, Programming the Computer ,writing and entering ladder logic ,Data Move Function .Modifying and Executing a program .Siemens S7-200 model.	
1.	Airfield lighting system control	<b>Airfield lighting system control , Electrical Circuit Diagrams, Control Circuits ,Ladder Diagram .</b>	
2.	Solid state Drives for D.C & A.C motors	<ul style="list-style-type: none"> <li>▪ Basic principle of chopper drive</li> <li>▪ Controlled rectifier drives</li> <li>▪ Solid state drives for induction motors</li> <li>▪ Induction machine speed control</li> </ul>	
3.	Machine Automation principles	<ul style="list-style-type: none"> <li>▪ Machine Automation principles</li> <li>▪ Programmable Logic control principle</li> </ul> Motor drive by logic gate .	
4.	Motor drive by PLC	DC Motor Operation principle, Characteristics , Electric Circuit , Control Circuits and Programe . Siemens S7-200	
5.	Motor drive by Microprocessor	Stepper Motors: -Stepping Motor Defined, Types , -Stepper Motor Control, Microprocessor Interfacing and Control of Stepper Motors .Microprocessor 6800 .	

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

**Evaluation Strategies:**

Exams		Percentage	Date
Exams	First Exam	20%	--/--/----
	Second Exam	20%	--/--/----
	Final Exam	50%	--/--/----
Homework and Projects		10%	
Discussions and lecture Presentations			

**Teaching Methodology:**

- ❖ Laboratory

**Text Books & References:**

- 1- MTS – 88C microcomputer manual, HEATH KIT 3400 microcomputer manual .
2. - The 8088/8086 microprocessors ,Programming, Interfacing Hardware,Software, and Application 4<sup>th</sup> edition ., Walter Triebel and Avtar Snigh, Prinice-Hall International 2003.
3. Microprocessor Application -Heathkit Educational Systems ,1983 U.S.A .



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





# Engineering Program

Specialization	Airports Electrical Engineering
Course Number	20303252
Course Title	Automation Control Technology Lab
Credit Hours	1
Theoretical Hours	0
Practical Hours	3



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

### Brief Course Description:

- ❖ Introduction to MTS-88C microcomputer kit . Microprocessors 6800, Heath Kit -3400 microcomputer. Hardware .Programming .I/O devices and Interfaces. PLC construction ,I/O devices and Interfaces. Siemens S7-200 Programming and interfaces. Motor drives by Logic Gates , PLC and MICOCOMPUTERS .AIRFIELD Lighting control

### Course Objectives:

- 1.To improve the students' knowledge of microprocessors hardware.
- 2.To improve the students knowledge of Boolean algebra and control diagrams.
- 3.Simplification control circuits and applications.
- 4.To construct combinational logic circuits.
- 5.To perform different speed control manners.
- 6.To Increase the students knowledge of addressing modes, programming and Applications.**
- 7. To improve students knowledge of I/O devices and interfaces .**
8. . Explain and describe the operating principles, of drives methods, solid state drives, controlled rectifiers drives, machine speed control. Machine Automation



**Detailed Course Description:**

Unit Number	Lab name	Lab content	Time Needed
1	Introduction MTS-88C microcomputer teaching systems	<ul style="list-style-type: none"> <li>Basic operation, instruction, and addressing modes .</li> </ul>	
2	Basic 6800 programming with arithmetic and logic instructions	<ul style="list-style-type: none"> <li>micro-computer model ET-3400 icroprocessor 6800</li> </ul>	
3	Introduction to memory interfacing	<ul style="list-style-type: none"> <li></li> </ul>	
4	Writing programs instructions	<b>1. conditional and unconditional jump</b>	
5	Introduction to I/O programing	<b>1. Programmable Peripheral Interface ( PPI ). 8255A/6821 PIA</b>	
6	PLC Construction S7-200	Siemens S7- 200 MODEL	
7	General PLC Programming Procedures	Siemens S7- 200 MODEL	
8	PLC Programming	Siemens S7- 200 MODEL	
9	PLC Interfacing	Siemens S7- 200 MODEL	
10	Airfield lighting system control	Light Control Circuit.	
11	Solid state Drives for D.C & A.C motors	D.C & A.C motors control circuit	
12	Machine Automation principles	<ul style="list-style-type: none"> <li>Machine Automation principles</li> <li>Programmable Logic control principle</li> </ul> Motor drive by logic gate .	
13	Motor drive by PLC	DC Motor drive by PLC	
14	Motor drive by Microprocessor	Stepper Motors: -Stepping Motor Defined, Types , -Stepper Motor Control, Microprocessor Interfacing and Control of Stepper Motors .	

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

**Evaluation Strategies:**

Exams		Percentage	Date
Exams	Assignments	30%	--/--/----
	Mid-term Exam	20%	--/--/----
	Final Exam	50%	--/--/----
Homework and Projects			
Discussions and lecture Presentations			

**Teaching Methodology:**

- ❖ Laboratory

**Text Books & References:**

1- MTS – 88C microcomputer manual , Heathkit 3400 microcomputer manual .

2. The 8088/8086 microprocessors ,Programming, Interfacing Hardware,Software, and Application 4<sup>th</sup> edition ., Walter Triebel and Avtar Snigh, Prinice-Hall International 2003.

3. Microprocessor –Application. Heathkit Educational Systems ,1983 U.S.A .



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