برنامج الدرجة الجامعية المتوسطة	
التخصص	هندسة الإتصالات الجوية
رقم المادة الدراسية	٠٢٠٣٠٠١١١
اسم المادة الدراسية	الدوائر الكهربائية
عدد الساعات المعتمدة	(٣)
عدد الساعات النظرية	(٣)
عدد الساعات العملية	(0)

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

Brief Course Description:
Voltage, Current, and Resistance, Ohm's Law, Energy and Power, Series-Parallel Circuits, Introduction to Alternating Current and Voltage, Capacitors, Inductors, RLC Circuits and Resonance. Electrical Measurements.

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

1. Define and study current and voltage sources.
2. Use Ohm and Kirchhoff's laws for analyzing DC electrical circuits.
3. Study the elements of AC circuits.
4. Study the RLC in AC circuits.

Detailed Course Description:

Unit Number	Unit Name	Unit Content	Time Needed
1.	**Voltage, Current, and Resistance**	• Atomic Structure • Electrical Charge • Voltage, Current, and Resistance • Voltage and Current Sources • Resistors • The Electric Circuit • DC Circuit Measurements • Electrical Safety	
2.	**Ohm's Law, Energy and Power**	• The Relationship of Current, Voltage, and Resistance • Calculating Current • Calculating Voltage • Calculating Resistance • Energy and Power • Power in an Electric Circuit • Resistor Power Ratings • Energy Conversion and Voltage Drop in Resistance • Power Supplies	
3.	**Series Circuits**	• Resistors in Series • Current in a Series Circuit • Total Series Resistance • Application of Ohm's Law • Voltage Sources in Series • Kirchhoff's Voltage Law • Voltage dividers • Power in Series Circuits	

4.	**Parallel Circuits**	• Resistors in Parallel • Voltage in a Parallel Circuit • Kirchhoff's Current Law • Total Parallel Resistance • Application of Ohm's Law • Current Sources in Parallel • Current Dividers • Power in Parallel Circuits	
5.	**Series-Parallel Circuits**	• Identifying Series-Parallel Relationships • Calculations of Series-Parallel Resistive Circuits • Voltage Dividers with Resistive Loads • The Wheatstone Bridge • The Superposition Theorem	
6.	**Introduction to Alternating Current and Voltage**	• The Sinusoidal Waveform • Sinusoidal Voltage Sources • Sinusoidal Voltage and Current Values • Angular Measurement of a Sine Wave • The Sine Wave Formula • Introduction to Phasors • Analysis of AC Circuits • Superimposed DC and AC Voltages • Nonsinusoidal Waveforms • The Oscilloscope • Concepts of phasors, complex numbers, rectangular and polar forms of complex numbers, mathematical operations. • Three-phase voltage and current • Y and Δ connections • Line and phase voltages and currents • Power calculations in three-phase circuits	

		• Generation of three phase voltage • Inter connections of three phase voltage and currents in star connection (Y) and delta connection (Δ) • Mesh method of connection loads with alternator • Active, reactive and apparent power in three phase circuits • Analysis of balanced phase circuits • Balanced and unbalanced three phase circuits. • AC circuit measurement	
7.	**Capacitors**	• The Basic Capacitor • Types of Capacitors • Series Capacitors • Parallel Capacitors • Capacitors in DC Circuits • Capacitors in AC Circuits	
8.	**Inductors**	• The Basic Inductor • Types of Inductors • Series and Parallel Inductors • Inductors in DC Circuits • Inductors in AC Circuits	
9.	**RLC Circuits and Resonance**	• RC Circuits • RL Circuits • RLC Circuits • Resonance circuit	

Evaluation Strategies:

Exams		Percentage	Date
Exams	midterm Exam	40%	--/--/----
	Final Exam	50%	--/--/----
Homework and Projects		10%	
Discussions and lecture Presentations			

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

Teaching Methodology:

- Lecture

Text Books & References:

Text Books :

1. Thomas L. Floyd " principles of electric circuits" ,Prentice Hall, 2007, ISBN-10: 0132383519

References:

1. Robert L. Boylested "introductory circuit analysis" prentice-hall Inc 1997
2. Thomas L. Floyd " principles of electric circuits" charlese, Merrill publishing company,1981
3. Noel M. Morris and Frank W.Senior "electric circuits analysis" USA NY,1977

برنامج الدرجة الجامعية المتوسطة	
التخصص	**هندسة الإتصالات الجوية**
رقم المادة الدراسية	**٠٢٠٣٠٠١١٢**
اسم المادة الدراسية	**مختبر دوائر كهربائية**
عدد الساعات المعتمدة	**(١)**
عدد الساعات النظرية	**(٠)**
عدد الساعات العملية	**(٣)**

Brief Course Description:
DC circuit analysis, Ac circuit analysis, Resonance. Electrical measurements.
The Oscilloscope and its applications in measurements.

Course Objectives:
Upon the completion of the course, the student will be able to:
1. Measure voltages and currents to verify KVL and KCL.
2. Identify shorts and opens in a malfunctioning circuit, and define and verify the equivalent resistance of a given network
3. Measure the inductance of an inductor.
4. Measure the capacitance of a capacitor.
5. To be familiar with an AC oscilloscope measurement
6. Identify resonance circuit.

Detailed Course Description:

Lab Number	Lab Name	Lab Content	Time Needed
1.	**Resistor and color code**		2weeks
2.	**Series DC circuits**		2 weeks
3.	**Series and parallel DC circuits**		2 weeks
4.	**Superposition principles**		2 weeks
5.	**The Oscilloscope**		3 weeks
6.	**RLC components**		3 weeks
7	**Resonant circuits**		2 weeks

Evaluation Strategies:

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

Teaching Methodology:

- Laboratory

Text Books & References:

References:

1. Robert L. Boylested "introductory circuit analysis" printce-hall Inc 1997
2. Thomas L. Floyd " principles of electric circuits" charlese, Merrill publishing company,1981
3. Noel M. Morris and Frank W.Senior "electric circuits analysis" USA NY,1977

برنامج الدرجة الجامعية المتوسطة	
التخصص	**هندسة الإتصالات الجوية**
رقم المادة الدراسية	**٠٢٠٤٠٠١١١**
اسم المادة الدراسية	**أجهزة إلكترونية**
عدد الساعات المعتمدة	**(٣)**
عدد الساعات النظرية	**(٣)**
عدد الساعات العملية	**(٠)**

Brief Course Description:

This course covers the basic subjects in electronics and you will study: Semiconductor theory , the diode , special purpose diodes , diode applications , bipolar junction transistor (BJT) , field effect transistor (FET) , operational amplifiers, thyristor and other devices.

Course Objectives:

Upon the completion of the course, the student will be able to:
1. Explain the basic structure of atoms.
2. Define and discuss semiconductors, conductors, insulators .
3. Identify the bias and applications of diode, zener ,varactor, and other special diodes.
4. Study of BJT & FET ,oscillators ,operational amplifiers, thyristors and other device

Detailed Course Description:

Unit Number	Unit Name	Unit Content	Time Needed
1.	**Introduction to Semiconductors**	• Atomic structure • Semiconductors • Conductors • Insulators • Covalent bonds • Conduction in semiconductors • Intrinsic and extrinsic • semiconductors • N-type and p- type • Semiconductors	2 weeks
2.	**The Diode**	• P-N junction • Biasing the diode • Voltage – current characteristicof diode • DC load line • Operating point • DC and AC resistance • Comparison between siliconand germanium diodes • Data sheet of diode	3 weeks
3.	**Special - Purpose Diodes**	• Zener diode (symbol , structure , principle of operation • Zener diode applications (regular and limiter) • Varactor diode. Light- emittingdiode (LED), photodiode	2 weeks
4.	**Applications of The Diode**	• Half – wave and full – wave rectifiers • Filters and regulators in power supply circuits.	1 weeks
5.	**Bipolar Junction Transistor (BJT)**	• Introduction • Structure and principle of operation • Characteristics and parameters • Regions of operation • The DC operation point (load line)	3 weeks

		• BJT as an amplifier and as switch • Voltage divider bias and other bias methods • Basic circuits connection • (C.E, C.C, C.B) amplifier • Data sheet of a BJT	
6.	**Field – Effect Transistor (FET)**	• Introduction. • Structure and principle ofoperation of junction field effect transistor (JFET). • JFET characteristics, Parameters and biasing. • Structure and principle of operation of metal oxide semiconductor field effect transistor (MOSFET). • Enhancement and depletion types. • MOSFET characteristics, Parameters and biasing. • FET amplification, connections modes (C.S, C.D, C.G,)amplifiers, data sheet of a JFET and a MOSFET.	2 week
7.	**Oscillators**	• Introduction • Negative and positive feedback, (basic circuit, principle of operation, oscillation frequency calculation for the following oscillators. Phase – shift oscillator • Colpitts and Hartley oscillators	**1 week**
8.	**Operational Amplifiers**	• Symbol, terminals and basic op- amp representations (idea and practical)	1 week
9.	**Thyristor and Other Devices**	• Structure ,principle of operation k • Characteristics curves and applications of the following devices: (Four – layer device, SCR (Silicon – controlled rectifier), siac, triac, Uninjunction transistor (UJT), and phototransistor	1 wee
10	**Introduction to Electronic Measurements**	• Applications of oscilloscope in electronic measurements	1 week

Evaluation Strategies:

Exams		Percentage	Date
Exams	midterm Exam	40%	--/--/----
	Final Exam	50%	--/--/----
Homework and Projects		10%	
Discussions and lecture Presentations			

Teaching Methodology:

- Lecture

Text Books & References:

- **Text books:**
  1- Thomas L. Floyd – electronic devices – prentice hall international - sixth edition – 2002.

- **References**:

1. Thomas L. Floyd, electrical devices, prentice hall international, 6th edition , 2002.
2. Basic operational Amplifiers and Linear Integrated Circuits , David Buchla ,Prentice Hall , 1999.
3. Electronics fundamental and Experiments, Cynthia B. Leshin, David Buchla, Tjomas L. Floyd, prentice hall international ,1999.

برنامج الدرجة الجامعية المتوسطة	
التخصص	**هندسة الإتصالات الجوية**
رقم المادة الدراسية	**٠٢٠٤٠٠١١٢**
اسم المادة الدراسية	**مختبر أجهزة إلكترونية**
عدد الساعات المعتمدة	**(١)**
عدد الساعات النظرية	**(٠)**
عدد الساعات العملية	**(٣)**

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		

Evaluation Strategies:

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

Teaching Methodology:

- ❖ Laboratory

Text Books & References:

References:

1. Instructional Lab. Sheets
2. Thomas L. Floyd – " Principles of electric circuits" Electron flow version - prentice hall International – eighth edition 2006.
3. Robert L. Boy listed - Introductory circuit analysis - prentice hall International 1997.
4. Experiments in electronics Fundamentals and electric circuits fundamentals – David Buchla -. prentice hall 2000.

برنامج الدرجة الجامعية المتوسطة	
التخصص	**هندسة الإتصالات الجوية**
رقم المادة الدراسية	**٠٢٠٤٠٠١١٣**
اسم المادة الدراسية	**أساسيات رقمية**
عدد الساعات المعتمدة	***(٢)***
عدد الساعات النظرية	***(٢)***
عدد الساعات العملية	***(0)***

Brief Course Description:

Study of numerical systems, theory of Boolean algebra and logic circuits, applications to different types of circuits, study of flip-flops, counters, registers and accumulators, digital system memory including ROM, RAM, and EPROM.

Course Objectives:

After studying this course the student should:

1. To be familiar with number systems and its conversion.
2. To understand logic functions, gates, and Boolean algebra.
3. To understand combinational circuits.
4. To understand sequential logic circuits.
5. To be familiar with different types of memory..

Detailed Course Description:

Unit Number	Unit Name	Unit Content	Time Needed
1.	**NUMBERS SYSTEM AND CODES**	▪ Introduction ▪ Decimal, binary, octal and hexadecimal numbers system ▪ Number system conversion ▪ Binary arithmetic ▪ 1's and 2's complement of binary number ▪ binary coded decimal (BCD) ▪ digital coded (Gray,Excess-3 and ASC II codes)	
2.	**Logic Gates**	▪ The inverter ▪ The AND gate ▪ The OR gate ▪ The NAND gate ▪ The NOR gate ▪ The Exclusive-OR and Exclusive-AND gates ▪ Application of logic gates in industry	
3	**BOOLEAN ALGEBRA AND LOGIC SIMPLIFICATION**	▪ Boolean operation and expressions ▪ Laws and rule of Boolean algebra ▪ De Morgan's theorem ▪ Simplifications using Boolean algebra ▪ Standard forms of Boolean expression ▪ The Karnaugh map ▪ Karnaugh map minimization	
4.	**Combinational Logic**	▪ Implementing combinational logic ▪ The universal property of NAND and NOR gates ▪ Implementation using NAND and NOR gates ▪ Operation with pulse waveforms ▪ Troubleshooting and application	
5	**FUNCTIONS OF COMBINATIONAL LOGIC**	▪ Half adders, full adders, parallel adders ▪ Comparators ▪ Encoders and decoders ▪ Multiplexing ▪ Application	

6	**FLIP-FLOPS**	▪ Sequential logic circuits ▪ Edge-trigged Flip-Flops (S-R, J-K, D) ▪ Master-slave Flip-Flops ▪ Flip-Flop operation characteristic ▪ Flip-Flops application	
7	**COUNTERS**	▪ Asynchronous counters ▪ Synchronous counters ▪ Up/Down synchronous ▪ Cascaded counters ▪ Counter application	
8	**SHIFT REGISTERS**	▪ Basic shift registers functions Week ▪ Serial in / serial out shift registers ▪ Serial in / parallel out shift registers ▪ parallel in / serial out shift registers ▪ parallel in / parallel out shift registers	
9	**MEMORIES**	▪ Basic of semiconductors memories Week ▪ Read-only memories (ROMs) ▪ Programmable ROMs (PROMs and EPROMs) ▪ Read/Write Random –Access Memories(RAMs) ▪ Memory expansion	

Evaluation Strategies:

Exams		Percentage	Date
Exams	midterm Exam	40%	--/--/----
	Final Exam	50%	--/--/----
Homework and Projects		10%	
Discussions and lecture Presentations			

Teaching Methodology:

- Lecture

Text Books & References:

1. Tomas Floyd "Digital Fundamentals" sixth edition, Prentice-Hall, Inc.NJ.,USA,1997
2. William Kleitz, "Digital Electronics a practical approach" third edition, prentice-Hall career &technology Englewood Clifts, NJ.,USA, 1993.
3. Morris Manor: digital design, Prentice Hall

برنامج الدرجة الجامعية المتوسطة	
التخصص	**هندسة الإتصالات الجوية**
رقم المادة الدراسية	**٠٢٠٤٠٠١١٤**
اسم المادة الدراسية	**مختبر أساسيات الرقمية**
عدد الساعات المعتمدة	**(١)**
عدد الساعات النظرية	**(٠)**
عدد الساعات العملية	**(٣)**

Brief Course Description:
Testing and troubleshooting instruments, Logic circuits, adders, comparators, encoders and decoders, flip-flops, counters, registers, memories RAM, ROM, EPROM

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

1. Become familiar with number systems and codes.
2. Construct and test logic circuits.
3. Distinguish between the functions of logic gates.
4. Analyze and understand the functions of combinational logic (adders, subtractors, comparators, Encoders…..etc).
5. Construct and analyze the principle of operation for (flip – flops, counters, shift registers)
6. Analyze the principles of operation of SSSIC oscillator circuit.

Detailed Course Description:

Lab Number	Lab Name	Lab Content	Time Needed
1.	**Testing and troubleshooting instruments**		
2.	**Logic gates**	NOT, OR, AND, NOR, NAND, XOR, XNOR	
3.	**Boolean algebra and Demorgan theorems**		
4.	**Karnaugh maps**		
5.	**Half-adders , full adders , and parallel adders**		
6.	**comparator**		
7.	**encoders**		
8.	**Decoders and seven-segment display**		
9.	**Multiplexer and de-multiplexer**		
10.	**Flip-flop**		
11.	**Asynchronous counters**		
12	**synchronous counters**		
13	**Registers**		

14	**Memories**		
15	**ALU (Arithmetic Logic**		

Evaluation Strategies:

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

Teaching Methodology:

- Laboratory

Text Books & References:

References:

1. William Kleitz, "Digital Electronics a practical approach" third edition, prentice-Hall career &technology Englewood Clifts, NJ.,USA, 1993.
2. Morris Manor: digital design, Prentice Hall

برنامج الدرجة الجامعية المتوسطة	
التخصص	**هندسة الإتصالات الجوية**
رقم المادة الدراسية	**٠٢٠٤٠٢٢٦١**
اسم المادة الدراسية	**معالجات دقيقة**
عدد الساعات المعتمدة	***(٢)***
عدد الساعات النظرية	***(٢)***
عدد الساعات العملية	***(0)***

Brief Course Description:

Introduction to microprocessors architecture, instruction set, assemblers and assembly language programming, software development, microprocessors applications.

Course Objectives:

To study the microprocessor architecture and relate that knowledge to the design of microprocessor based systems.

1. To learn design techniques for designing memory and I/O for microprocessor based systems.
2. To study the instruction set and applies that knowledge to the design of systems.
3. To study and learn some of the various software development tools available for writing and developing programs.
4. To study and learn some of microprocessors applications

Detailed Course Description:

Unit Number	Unit Name	Unit Content	Time Needed
1	**Introduction to microprocessors**	• Computing and microprocessors • Large and small computers • Comparison of typical computers • Semiconductor technologies • Semiconductor memories	
2	**Microprocessor architecture**	• General computer architecture • Registers • Arithmetic unit • Instruction handling area • Stacks • Examples of microprocessor Architecture	
3	**Microprocessor instruction set**	• Computer instruction formats • Addressing Methods • Types of instructions • Microprocessor instruction sets • Examples of microprocessor instruction sets	
4	**Microprocessor assembler**	• Comparison of language levels • Features of assemblers • Features of microprocessor assemblers • Examples of assemblers, Intel 8080 and Motorola 6800	
5	**Assembly language programming**	• Simple programs • Loops and arrays • Arithmetic	
6	**Software development for microprocessors**	The tasks of software development	
7	**Some Applications of Microprocessors**	• Test and instrumentations • Communications • Computers	

		• Industrial • Business Equipment • Transportation • Commercial applications	

Evaluation Strategies:

Exams		Percentage	Date
Exams	midterm Exam	40%	--/--/----
	Assignments	10%	--/--/----
	Final Exam	50%	--/--/----
Homework and Projects			
Discussions and lecture Presentations			

Teaching Methodology:

- Lecture

Text Books & References:

Introduction to microprocessors software, hardware, programming. Lance A Leventhal

برنامج الدرجة الجامعية المتوسطة	
التخصص	**هندسة الإتصالات الجوية**
رقم المادة الدراسية	**٠٢٠٤٠٢٢٦٢**
اسم المادة الدراسية	**مختبر معالجات دقيقة**
عدد الساعات المعتمدة	**(١)**
عدد الساعات النظرية	**(٠)**
عدد الساعات العملية	**(٣)**

Brief Course Description:

Data transfer, Arithmetic Operations, Looping, Subroutines, General programs, Applications.

Course Objectives:

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

To illustrate classroom topics using a "hands-on" approach to the design, construction, and testing of a microprocessor-based computer and its associated sections - CPU, memory, I/O, interrupts, and programming

Lab Number	Lab Name	Lab Content
1	Introduction to Microprocessor	
2	Data transfer group	
3	Arithmetic operations	
4	Logic Operation & comparisons	
5	Stack operations	
6	Condition & Unconditional Jumps	
7	Looping	
8	Subroutines	
9	General Programs	
10	Traffic Light Controller calculations	

Evaluation Strategies:

Exams		Percentage	Date
Exams	Midterm Exam	20%	--/--/----
	Reports and participation	30%	--/--/----
	Final Exam	50%	--/--/----
Homework and Projects			
Discussions and lecture Presentations			

Teaching Methodology:

- Laboratory

Text Books & References:

كراسة مختبر بناء المعالج الدقيق و البرمجة / اعداد : كلية الامير فيصل الفنية

2. Introduction to microprocessors software, hardware, programming. Lance A Leventhal

برنامج الدرجة الجامعية المتوسطة	
التخصص	**هندسة الإتصالات الجوية**
رقم المادة الدراسية	**٠٢٠٤٠٢١٢١**
اسم المادة الدراسية	**مبادئ إتصالات**
عدد الساعات المعتمدة	***(٣)***
عدد الساعات النظرية	***(٣)***
عدد الساعات العملية	***(0)***

Brief Course Description:

Telecommunication link configuration, frequency spectrum, measuring units and signal parameters, modulation principles and types(AM, FM, PCM, Delta modulation), and digital modulation, transmitters and receivers.

Course Objectives:

1. To define electrical telecommunications.
2. To familiarize students with the fundamental concepts and terminology of telecommunications.
3. To understand the issues that surrounds the transmission of data, voice, and video.
4. Be able to differentiate between types of analog and digital communications.

Unit NO.	Unit Name	unit Content	time
1	**Introduction**	• Telecommunication history • Telecommunication link configuration • Types of transmission media • Frequency spectrum & voice signal • Telegraph and television signals • Speech signal	2 weeks
2	**Measuring units and signal parameters**	• Power gain and loss • The decibel • Absolute power and power level • Voltage level • Relative power level • The Nipper unit • Signal amplification & attenuation	2 weeks
3	**Amplitude modulation**	• Modulation principle and types • Amplitude modulation principle • Modulation factor • AM spectrum • Power in AM signal • R.M.S value of an AM wave • Bandwidth • Signal-sideband suppressed carrier modulation • AM modulators and demodulators • Linear modulators • CSBSC modulator • Cowan modulator • AM demodulator • Envelope detector	3 weeks

4	**Frequency modulation**	• Principle of F.M • Relation between the modulation index and peak deviation • The FM spectrum • FM modulators(direct method and indirect method) • FM demodulators • Foster-seely discriminators • FM transmitters and receivers	3 weeks
5	**Pulse modulation**	• Principle of pulse modulation • Pulse amplitude modulation(PAM) • Pulse width modulation (PWM) • Pulse position modulation(PPM) • Sampling theory • Quantization • Coding • Delta modulation	2 week
6	**Digital modulation**	• ASK • FSK • Coherent and non coherent FSK • PSK • QPSK • 8PSK • PSK modulators and demodulators • Balanced modulators	2 weeks
7	**Transmitters & receivers**	• Radio transmitter • Transmitter general block diagram • Basic features and characteristics of the transmitter • Amplitude modulation transmitters	2 weeks

		• Low-level transmitters • Self tuning transmitters • Frequency modulation transmitters • Continues wave transmitters • Radio receivers • Tuned radio receivers • The super heterodyne receivers • F.M receivers • Automatic frequency control(AFC)	

Evaluation Strategies:

Exams		Percentage	Date
Exams	Midterm Exam	40%	--/--/----
	Reports and participation	10%	--/--/----
	Final Exam	50%	--/--/----
Homework and Projects			
Discussions and lecture Presentations			

Teaching Methodology:

- Power point
- Lecture

Text Books & References:

١. كراسة الاتصالات / اعداد : كلية الامير فيصل الفنية

2. Communication electronics, systems, circuits and devices. Forrest Baker
3. Digital communication – Feher
4. Radio and electronics for technicians Engineers- Jacobs

برنامج الدرجة الجامعية المتوسطة	
التخصص	**هندسة الإتصالات الجوية**
رقم المادة الدراسية	**٠٢٠٤٠٢١٢٢**
اسم المادة الدراسية	**مختبر مبادئ اتصالات**
عدد الساعات المعتمدة	**(١)**
عدد الساعات النظرية	**(٠)**
عدد الساعات العملية	**(٣)**

Brief Course Description:

Data transfer, Arithmetic Operations, Looping, Subroutines, General programs, Applications.

Course Objectives:

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

To illustrate classroom topics using a "hands-on" approach to the design, construction, and testing of a microprocessor-based computer and its associated sections - CPU, memory, I/O, interrupts, and programming

Lab Number	Lab Name	Lab Content	Time
1	**Amplifiers and attenuators**		2 weeks
2	**Tuned circuits**		2 weeks
3	**filters**		2 weeks
4	**AM modulation**		2 weeks
5	Super heterodyne radio		2 weeks
6	**Frequency modulation an FM detection**		2 weeks
7	**sampling**		2 weeks
8	**Pulse code modulation**		2 weeks
9	**Delta modulation**		Week

Evaluation Strategies:

Exams		Percentage	Date
Exams	Midterm Exam	20%	--/--/----
	Reports and participation	30%	--/--/----
	Final Exam	50%	--/--/----
Homework and Projects			
Discussions and lecture Presentations			

Teaching Methodology:

- Laboratory

Text Books & References:

١. كراسة مختبر الاتصالات / اعداد : كلية الامير فيصل الفنية

2. Communication electronics, systems, circuits and devices. Forrest Baker
3. Digital communication – Feher
4. Radio and electronics for technicians Engineers- Jacobs

برنامج الدرجة الجامعية المتوسطة	
التخصص	**هندسة الإتصالات الجوية**
رقم المادة الدراسية	**٠٢٠٤٠٤١١١**
اسم المادة الدراسية	**تراسل بيانات رقمية**
عدد الساعات المعتمدة	***(2)***
عدد الساعات النظرية	***(2)***
عدد الساعات العملية	***(0)***

Brief Course Description:

Basic communication systems, Introduction to information theory, Digital radio, FSK,PSK, QAM, Digital transmission, Pulse Code Modulation, Error detection and correction, Digital encoding, Multiplexing, OSI protocol architecture, TCP/IP Suite, Local Area Networks, Wide Area Networks.

Course Objectives:

After studying this course the student should
1. Describe basic communication systems and information theory concept.
2. Distinguish between analogue and digital communications.
3. Understand digital radio systems and digital modulation techniques.
4. Understand Digital transmission concept and Pulse Code Modulation.
5. Explain the concepts of error detection and correction and digital encoding.
6. Understand OSI and TCP/IP Protocol stacks and IP addressing.
7. Distinguish between Local Area and Wide Area, networks and services

Unit NO.	Unit Name	unit Content	time
1	**Basic Communication Systems**	• Types of communications: point-to point, • point-to-multipoint, simplex ,half-duplex, full-duplex, broadcasting • Transmission Impairments: attenuation distortion, delay distortion, noise • Analogue vs. Digital Communications	2 weeks
2	**Digital Communications**	• Frequency Shift Keying (FSK): FSK • transmitter and FSK receiver • Phase Shift Keying (PSK): Binary • PSK, BPSK transmitter and receiver, • Quaternary PSK, QPSK transmitter • and receiver, Offset QPSK, Eight- • PSK, 8PSK transmitter and receiver • Quadrature Amplitude Modulation • (QAM): (Eight/Sixteen) QAM	2 weeks
3	**Digital Transmission**	• Pulse modulation: Pulse Width Modulation, Pulse Position Modulation, • Pulse Amplitude Modulation Pulse Code Modulation (PCM):Simplified PCM block, Sample-and- Hold circuit, PCM codes, Delta Modulation transmitter and receiver	3 weeks
4	**Digital Encoding and Multiplexing**	• Error Detection: Parity and Cyclic Redundancy Check • Digital Encoding (NRZ, NRZI, Manchester) • Multiplexing (FDM, ADM, WDM) • Multiple Access: Time Division • Multiple Access, Frequency Division Multiple Access	3 weeks

5		• ISO/OSI protocol architecture: Overview, OSI reference model • TCP/IP protocol suite: Operation of (TCP, UDP, and IP) • IP addressing and subletting Pulse width modulation (PWM)	2 week
6	**Transmission Media, LAN and WAN**	• Transmission media: Coaxial, Twisted pair, Fiber and Wireless communication • Local Area Networks (LAN): Topologies, Media Access Control (MAC), LAN standards • Wide Area Networks (WAN): WAN standards, WAN services	2 weeks

Evaluation Strategies:

Exams		Percentage	Date
Exams	Midterm Exam	40%	--/--/----
	Reports and participation	10%	--/--/----
	Final Exam	50%	--/--/----
Homework and Projects			
Discussions and lecture Presentations			

Teaching Methodology:

- Power point
- Lecture

Text Books & References:

1. "Advanced Electronic Communications Systems, Sixth Edition", Wayne Tomasi, Prentice Hall,2003.
2. "Principles of Digital Communication Systems and Computer Networks", K.V. Prasad, Charles River Media, 2003.

برنامج الدرجة الجامعية المتوسطة	
التخصص	**هندسة الإتصالات الجوية**
رقم المادة الدراسية	**٠٢٠٤٠٤١١٢**
اسم المادة الدراسية	**مختبر تراسل بيانات رقمية**
عدد الساعات المعتمدة	**(١)**
عدد الساعات النظرية	**(٠)**
عدد الساعات العملية	**(٣)**

Brief Course Description:

Introduction to Digital Communications, Pulse Code Modulation, Delta Modulation, Digital encoding and decoding, Time Division Multiplexing, Phase Shift keying, Frequency Shift Keying, Networking Media, Constructing Basic LAN, LAN Meters, Constructing Basic WAN.

Course Objectives:

Upon the completion of the course, the student will be able to :
1. Able to use Digital Communication Modulation Kit.
2. Constrict FSK/ PSK generator and detection circuit.
3. Be familiar with PCM, delta modulation.
4. Able to construct LAN cables (crossover, rollover, and straight).
5. Construct basic LAN network.
6. Troubleshoot basic LAN problems.
7. Be familiarized with basic router configuration

Lab Number	Lab Name	Lab Content	Time
1	**Introduction to Digital Communication, Modulation Kit**		weeks
2	**Frequency Shift Keying generation and detection**		weeks
3	**Phase Shift Keying generation and detection**		weeks
4	**Pulse Code Modulation**		weeks
5	**5. Delta Modulation**		weeks
6	**Digital Encoding and Decoding**		weeks
7	**Time Division Multiplexing**		weeks
8	**8. Networking Media**	• Straight, Crossover, and Rollover UTP cable • Coaxial and Fiber cables	weeks
9	**Basic LAN setup 1**	• TCP/IP protocol, NETBUI • protocol, LAN devices	eek
١٠	**Basic LAN setup 2**	• Client/Server and Peer-Peer Networks, File Sharing and Security	Week
١١	**Basic WAN setup 1**	Introduction to routers, Basic • routing topology	Week
١٢	**Basic WAN setup 2**	• Basic router configurations	Week

Evaluation Strategies:

Exams		Percentage	Date
Exams	Midterm Exam	20%	--/--/----
	Reports and participation	30%	--/--/----
	Final Exam	50%	--/--/----
Homework and Projects			
Discussions and lecture Presentations			

Teaching Methodology:

- Laboratory

Text Books & References:

References:

1. Lab manual

برنامج الدرجة الجامعية المتوسطة	
التخصص	**هندسة الإتصالات الجوية**
رقم المادة الدراسية	**٠٢٠٤٠٤١٣١**
اسم المادة الدراسية	**مشغل اتصالات جوية ١**
عدد الساعات المعتمدة	**(٢)**
عدد الساعات النظرية	**(٠)**
عدد الساعات العملية	**(٦)**

Brief Course Description:

Experiments in different Digital and analogue instruments such as, multi meters, bridges, watt meters, oscilloscopes, signal generators , frequency counter, phase meter, transistor and IC tester,AM/FM Signal Generator,RFvoltmeter,RF power meter,Spectrum analyzer.

Course Objectives:

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

1. Be familiarized with sub-assemblies and their functions, operations, calibration, precautions and applications
2. Extend their knowledge and skills in an aeronautical communication measurement equipment course
3. Develop their ability to solve practical problems
4. Perform experiments on different equipment sch as multimetres, generators, powermetrs.

Lab Number	Lab Name	Lab Content	Time
1	**Introduction to instruments in the LAB and care of instruments**		2 weeks
2	**Analog and Digital Multi meters**		2 weeks
3	**The Universal Bridge**		2 weeks
4	**The Transistor and ICs Tester**		2 weeks
5	**The Oscilloscope (one channel)**		2 weeks
6	**The Digital storage Oscilloscope**		2 weeks
7	**A.F signal Generator & Pulse Generator**		2 weeks
8	**Function Generator (sine/square/saw tooth)**		2 weeks
9	**Two-Tone A.F signal Generator & phase Meter**		Week
١٠	**Frequency Counter and AM/FM Signal generator**		Week
١١	**Electronic wattmeter . A.F (O/P power meter) and RF power meter.**		Week

١٢	**Spectrum analyzer**		Week

Evaluation Strategies:

Exams		Percentage	Date
Exams	Midterm Exam	20%	--/--/----
	Reports and participation	30%	--/--/----
	Final Exam	50%	--/--/----
Homework and Projects			
Discussions and lecture Presentations			

Teaching Methodology:

- Laboratory

Text Books & References:

1. Electronic Circuits and Applications
2. Electronic Equipment reliability
3. Electronic Devices and Circuits, David Bell
4. Electronics TEC level DC Green
5. Moto application and maintenance/hand book
6. Manuals of test equipment and measuring equipment used in the lab

برنامج الدرجة الجامعية المتوسطة	
التخصص	**هندسة الإتصالات الجوية**
رقم المادة الدراسية	**٠٢٠٤٠٤٢١١**
اسم المادة الدراسية	**تراسل أمواج الراديو**
عدد الساعات المعتمدة	***(2)***
عدد الساعات النظرية	***(2)***
عدد الساعات العملية	***(٠)***

Brief Course Description:

Types and characteristics of transmission lines , transmission line theory and application, resonant and non- resonant transmission lines , optical fiber theory and application, antenna theory, antenna terminology, antenna types, antenna pairs, electromagnetic waves, wave phenomenon, wave propagation, mobile and satellite propagation

Course Objectives:

Upon the completion of the course, the student will be able to :
1. Be introduced to the basic principles, characteristics and analysis of RF transmission lines
2. Explain the operation of impedance matching and impedance transformation devices
3. Describe the operation of power dividers, and transmission line Bridges
4. Be introduced to the basic concepts of fiber optics
5. Be introduced to the characteristics and radiation patterns of antennas
6. Be introduced to the propagation characteristics of radio waves
7. Acquire an understanding of some of the specific antennae types used in aeronautical radio equipment

Lab Number	Lab Name	Lab Content	Time
1	**Transmission Line Theory**	• Non-mathematical description of Transmission line behavior • The general equations • Standing wave pattern • Impedance and admittance • Losses • Transmission Line components(stub, directional coupler, slotted line)	
2	**Transmission Line Applications**	• Quarter wave transformers • Stub impedance matching • Balance to unbalance transformations • Transmission Line Bridges	
3	**Optical Fiber Theory and Application**	• Introduction to light Fiber construction and characteristics • Step index single mode fiber • Fiber optic attenuation and dispersion • Couplers, connectors, splices , and switches	
4	**Antenna Theory**	• Electromagnetic radiation • Hertzian dipole • Current and voltage distribution , and radiation pattern . • Resonant and non resonant • antenna . Effects of antenna height • Antenna coupling	
5	**Antenna Terminology**	• Antenna gain and effective radiated power • Radiation measurement and field intensity • Antenna Resistance • Bandwidth, beam width, and polarization	

		• Antenna Length	
6	**Antenna Types**	• General description and characteristics of the following antenna types • Half wave(YAGI), vertical (Quarter Wavelength) , "L", ferrite, "V", Rhombic, Slot, Long wire, Log periodic, parabolic reflector and Loop antenna	
7	**Antenna Pairs**	• Basic concepts and definitions • Basic Antenna pairs with equal antenna currents • Basic Antenna pairs with unequal antenna currents • Specific Antenna pairs	
8	**Electromagnetic Waves**	• The electromagnetic spectrum • Radiation of electromagnetic waves • Waves in free space • Effects of the environment • Reflection, Refraction • Diffraction , and • Interference . • Linear and nonlinear polarization • Attenuation and absorption • Electromagnetic waves calculations	
9	**Propagation of Waves**	• Ground waves • Standard atmosphere • Sky wave • Space wave • Troposphere scatter propagation	

١٠	**Mobile and Satellite Propagation**	• General description of cellular system • VHF propagation , fast and flat fading component • UHF and EHF propagation • Adjacent channel, co channel, and nodal point interference. • Satellite propagation	

Evaluation Strategies:

Exams		Percentage	Date
Exams	Midterm Exam	40%	--/--/----
	Reports and participation	10%	--/--/----
	Final Exam	50%	--/--/----
Homework and Projects			
Discussions and lecture Presentations			

Teaching Methodology:

- Lecture

Text Books & References:

References:

1. Electronic communication system , KENNEDY , 1996.
2. Modern electronic communication ,GARY, 2001.
3. Introduction to Radio propagation , JOHN, 1996

برنامج الدرجة الجامعية المتوسطة	
التخصص	**هندسة الإتصالات الجوية**
رقم المادة الدراسية	**٠٢٠٤٠٤٢١٢**
اسم المادة الدراسية	**مختبر تراسل أمواج الراديو**
عدد الساعات المعتمدة	***(1)***
عدد الساعات النظرية	***(٠)***
عدد الساعات العملية	***(3)***

Brief Course Description:

Introduction to the transmission lines kit, primary and secondary T. L factors measurement , Behavior of T.L under various load .Polar-diagram of radiation pattern for different antennas types. Short-circuit and open circuit terminal condition.

Course Objectives:

Upon the completion of the course, the student will be able to :
1. Analyze the behavior of transmission line.
2. Distinguish the types of T .L
3. Use the T .L measuring instruments.
4. Distinguish the types of antennas.
5. Use the computer to draw the radiation patterns of antennas.
6. Calculate the approximate gain, measure beam width of different antennas

Lab Number	Lab Name	Lab Content	Time
1	**Introduction to the transmission lines circuit board and cables**		Week
2	**Velocity of propagation**		Week
3	**Behavior of transmission line under various Load**	-short circuit /open circuit condition	Week
4	**Attenuation and distortion**		2 weeks
5	**Reflection coefficient at the load and generator**		2 weeks
6	**standing waves and standing wave ratio**		2 weeks
7	**polar diagram plotting for rombic antenna**		2 weeks
8	**plotting diagram for yogi and horn antennas**		2 weeks
9	**wave pattern for yogi(vertical polarization & horizontal polarization)**		Week
١٠	**wave pattern for rombic (vertical and horizontal polarization)**		Week

Evaluation Strategies:

Exams		Percentage	Date
Exams	Midterm Exam	20%	--/--/----
	Reports and participation	30%	--/--/----
	Final Exam	50%	--/--/----
Homework and Projects			
Discussions and lecture Presentations			

Teaching Methodology:

Laboratory

Text Books & References:
References:

1. Manuals of test equipment and measuring equipment used in lab.
2. Manuals of T L circuit board.

برنامج الدرجة الجامعية المتوسطة	
التخصص	هندسة الإتصالات الجوية
رقم المادة الدراسية	٠٢٠٤٠٤٢٥١
اسم المادة الدراسية	راديو جوي
عدد الساعات المعتمدة	(٢)
عدد الساعات النظرية	(٢)
عدد الساعات العملية	(٠)

Brief Course Description:

General classification of radio transmission .ICAO standard specification ,Aeronautical radio transmitter and receiver, micro wave system ,voice com. system , fiber optic system

Course Objectives:

1. The student shall be introduced to :
   - VHF and UHF communication in civil aviation in Jordan.
   - ICOA standards and specifications.
2. Describe the operation of :
   - Aeronautical radio transmitter and receiver.
   - Ground -air- ground communications.
   - Ground to ground communications.
   - Digital millimeter wave radio system.
   - Voice communication system (VSC)
   - Fiber optical system.

Lab Number	Lab Name	Lab Content	Time
1	**Introduction to Aeronautical Radio**	• General classification of radio transmissions and utilization of frequency bands • VHF and UHF transmission in civil Aviation(state) • Organization of VHF comm. In civil aviation (state) • General block diagram of ground –air – ground voice communication system (describe) • Ground frequency ,tower and area frequencies, and emergency frequency.(define) • Ground-ground UHF system characteristics (state)	
2	**Aeronautical Radio Transmitter**	• General description of VHF transmitter • VHF transmitter performance specifications (explain) • VHF –TX . block diagram ,function of each block • Explain in detail the operation of VHF – TX,with the aid of circuit –diagram • Explain how the main parameters of VHFTX are checked	
3	**Aeronautical Radio Receivers**	• Block diagram of VHF receivers (describe) • Performance specifications of VHFRX(explain) • Describe the operation of VHF-RX , with the aid of circuit diagram • Describe tuning techniques for RF and IF stages	

		• Describe adjusting techniques for squelch and S/N ratio	
4	**Optical Communication Systems**	• Introduction • Transmitter • Receiver • Wavelength Division Multiplexing • Optical Time Division Multiplexing • Local Area Network	
5	**Digital Microwave System**	• Microwave fundamentals (define) frequency band ,LOS ,micro wave channel ,basic MW system> • comparison of FDM and TDM equipment , long ,and short haul • Basic two way digital MW system (block ,describe) • Digital radio path (block ,describe) • Fade margin (define ,solve problem) • Multi-path fading (explain) • Diversity and protection switch techniques ,space ,and freq diversity, protection, switching and hot stand by ,switching and combining techniques • Radio telemetry system • VHF extended range using microwave link	
6	**Digital Millimeter Wave Radio System**	• Introduction. • Product structure (explain) • Specifications of system (state) • Theory of operation (explain) Out door, and Indoor unit ,signal flow –transmit and receiver direction • Channel plans (describe) • Service channels (describe)	

		• PCM multiplexing system	
7	**VOICE COMMUNICATION SYSTEM**	• Network organization • Centralized switching • Switching system • Description of (QUMRAN) system • VCS external interfaces. • VCS functional architecture • OWP components and connections • Emergency radio VSC	

Evaluation Strategies:

Exams		Percentage	Date
Exams	Midterm Exam	40%	--/--/----
	Reports and participation	10%	--/--/----
	Final Exam	50%	--/--/----
Homework and Projects			
Discussions and lecture Presentations			

Teaching Methodology:
Lecture

Text Books & References:
References:

1. Digital communication,KAMILO FEHER, 1997.
2. P-COM manual, 1997.
3. Modern electronic communication , GARY, 2001.
4. QUMRAN manual,2003.
5. Fibre optic communication , DC AGARWAL, 1998.

برنامج الدرجة الجامعية المتوسطة	
التخصص	هندسة الإتصالات الجوية
رقم المادة الدراسية	٠٢٠٤٠٤٢٥٢
اسم المادة الدراسية	مختبر راديو جوي
عدد الساعات المعتمدة	(١)
عدد الساعات النظرية	(٠)
عدد الساعات العملية	(٣)

Brief Course Description:

RF electronic voltmeter, RF signal generators, RF wattmeter , Identification and analysis and trouble shooting of AM/FM transmitter and receiver circuits, VHF aeronautical transmitter and receiver (testing and tuning and fault finding) , VHF transceiver (performance and fault finding) .

Course Objectives:

Upon the completion of the course, the student will be able to.
1.Be familiarized with RF measuring and test instrument.
2.Analysis the AM/FM transmitter and receiver circuits.
3.Identify and test the VHF aeronautical transmitter and receiver.
4.Trouble shooting AM/FM , TX and RX.
5.Trouble shooting VHF , TX and RX.

Lab Number	Lab Name	Lab Content	Time
1	**RF electronic voltmeter, and RF signal generators and RF**		
2	**Identification and analysis of AM transmitter circuits**	1.Trouble-shooting AM ,TX circuit.	
3	**Identification and analysis of FM transmitter circuits**	1.Trouble-shooting FM,TX circuit.	
4	**Identification and analysis of AM/FM ,receiver circuits**	**1. Trouble-shooting AM/FM, RX circuits**	
5	**Trouble shooting of AM/FM radio receiver**	**Trouble-shooting AM/FM, RX circuits**	
6	**Identification of VHF aeronautical transmitter**		
7	**Testing and tuning of VHF aeronautical transmitter**		
8	**Fault finding of VHF aeronautical transmitter**		
9	**Identification of VHF aeronautical Receiver**		
10	**Testing and tuning of VHF aeronautical Receiver**		
11	**Identification of VHF transceiver**		
12	**Trouble shooting of VHF transceiver**		

Evaluation Strategies:

Exams		Percentage	Date
Exams	Midterm Exam	20%	--/--/----
	Reports and participation	30%	--/--/----
	Final Exam	50%	--/--/----
Homework and Projects			
Discussions and lecture Presentations			

Teaching Methodology:

Laboratory

Text Books & References:

References:

1. Comprehensive laboratory course materials.
2. VHF aeronautical transmitter and receiver manuals

برنامج الدرجة الجامعية المتوسطة	
التخصص	**هندسة الإتصالات الجوية**
رقم المادة الدراسية	**٠٢٠٤٠٤٢٦١**
اسم المادة الدراسية	**رادار المراقبة الجوية**
عدد الساعات المعتمدة	**(٣)**
عدد الساعات النظرية	**(٣)**
عدد الساعات العملية	**(٠)**

Brief Course Description:

Common concepts to primary and secondary radar, radar wave guide (W/G) theory, radar wave guide components, radar microwave sources, primary surveillance radar, radar transmitters and receiver, radar signal processing and plot extraction , conventional & Mono pulse secondary surveillance radar , radar displays and antennas.

Course Objectives:

Upon the completion of the course, the student will be able to :
1. Describe the common concepts of primary and secondary radar .
2. Explain the wave guide theory .
3. Describe the radar wave guide components.
4. Recognize the different stages of primary and secondary radar .
5. Analysis the circuits of primary and secondary radar .
6. Distinguish between the codes and modes of the radar.

Lab Number	Lab Name	Lab Content	Time
1	**Concepts Common To Primary and Secondary RADAR**	• Basic principles of Radar Theory • RF signal Parameters • Synchronization • Coherence • Radio Wave characteristics • Wave polarization (linear and circular) • Spectrum and bandwidth • Signal delectability • Noise	
2	**Radar Wave guide (W/G) theory**	• Advantages and disadvantages of W/G • Shapes of W/G • W/G transmission (• rectangular modes, and circular modes) • Phase and group velocities • W/G equation • W/G attenuation • W/G coupling • W/G termination • W/G impedance matching	
3	**Radar Wave guide (W/G) devices**	• Cavity resonator fundamentals • Directional coupler • W/G junctions • Isolators and Circulators • Joints (choke joint , rotary joint) • Duplexer • Switches • Bends , Twists , Corners , Stubs	
4	**RADAR Microwave Sources**	• Magnetron (theory and application) • Klystron (theory and application)	

		• Traveling wave tube(TWT) (theory and application)	
5	**Primary Surveillance RADAR (PSR)**	• PSR concepts • Radar equation , Radar echo, • Radar reference coordinates , Ranges • Pulse repetition frequency(PRF), • Power calculation (peak & average), Antenna height and speed • Bearing (Azimuth), Altitude, Target resolutions, Radar accuracy and pulse shaping ,Scanning Radar transmission methods, search radar, tracking • Radar	
6	**Radar Transmitters and Receivers**	• Transmitter block diagram • Modulators . • Power amplifier transmitter • Diversity operation (frequency , space, and polarization diversity) • Radar receiver components • Radar special receivers: - moving target indicator - system (MTI) - logarithmic receiver - mono pulse receiver	
7	**Radar signal processing & plot extraction**	• First steps in removing clutter • Threshold techniques • Logarithmic amplification and STC • Phase sensitive detector (PSD) characteristics • Cancellation techniques • Plot extraction techniques :	

		✓ plot start azimuth ✓ plot finish azimuth ✓ plot range (resolution cell position) ✓ - plot presence	
٨	**Radar displays and antennas**	• The A-scope • Range height display (RHD) • Plane Position indicator(PPI) • PPI block diagram • Sweep rotation • CRT screen persistence • plot extracted displays • Parabolic reflectors antenna • Cylindrical parabolic antenna • Broad side array • Horn radiators	
٩	**Electronic Counter-Countermeasures (ECM &ECCM)**	• Introduction • ECM methods • Jamming • ECCM • ECCM implementations • ECCM techniques	
١٠	**Conventional secondary surveillance RADAR**	• Introduction to CSSR • comparison between PSR and SSR • modes of interrogation and usage • Transponder code reply and usage • Codes reply (real time decoding, automatic decoding and data extraction) • Mode interlace • Interrogator functions • Aircraft transponder functions • SSR system performance	

		• Probability of detection • Aircraft Transponder dead time • Antenna patterns	
١١	**Mono pulse Secondary Surveillance RADAR (MSSR)**	• Basic principles of MSSR • Horizontal characteristics of the antenna • Vertical characteristics of the antenna • Antenna back lobes • Improving the azimuth by mono pulse techniques • Phase comparison mono pulse • Amplitude comparison mono pulse • Mono pulse technique (amplitude/ amplitude mono pulse) • Traffic advisory and collision • avoidance system	

Evaluation Strategies:

Exams		Percentage	Date
Exams	Midterm Exam	40%	--/--/----
	Reports and participation	10%	--/--/----
	Final Exam	50%	--/--/----
Homework and Projects			
Discussions and lecture Presentations			

Teaching Methodology:
Lecture

Text Books & References:
References:
1. Radar system design and analysis ; S.A HOVANESSIAN.
2. Introduction to radar system ; M.I. SKOLNIK , 2000.

3. Radar handbook ; M.I.SKOLNIK , 1999 .

برنامج الدرجة الجامعية المتوسطة	
التخصص	**هندسة الإتصالات الجوية**
رقم المادة الدراسية	**٠٢٠٤٠٤٢٦٢**
اسم المادة الدراسية	**مختبر رادار المراقبة الجوية**
عدد الساعات المعتمدة	**(١)**
عدد الساعات النظرية	**(٠)**
عدد الساعات العملية	**(٣)**

Brief Course Description:

Common concepts to primary and secondary radar, radar wave guide (W/G) theory, radar wave guide components, radar microwave sources, primary surveillance radar, radar transmitters and receiver, radar signal processing .

Course Objectives:

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

2. Implement the wave guide theory .
3. Describe the characteristic of radar wave guide components.
4. Recognize the different stages of primary and secondary radar .
5. Analysis the circuits of primary and secondary radar .

Lab Number	Lab Name	Lab Content	Time
1	To study wave guide components.		
2	To study the characteristics of Gunn oscillator Gun diode as modulated source		
3	Study of wave guide horn and its radiation pattern and determination of the beam width.		
4	To study isolation and coupling coefficient of a magic Tee.		
5	To measure coupling coefficient, Insertion loss & Directivity of a Directional coupler.		
6	To measure attenuation and insertion loss of a fixed and variable attenuator.		
7	To measure isolation and insertion loss of a three port Circulators/Isolator		
8	To measure the standing wave ratio and reflection coefficient in a Microwave Transmission line		
9	To measure the frequency of a microwave source and demonstrate relationship among guide dimensions, free space wavelength and guide		
10	To measure the wavelength impedance of unknown load.		

Evaluation Strategies:

Exams		Percentage	Date
Exams	Midterm Exam	20%	--/--/----
	Reports and participation	30%	--/--/----
	Final Exam	50%	--/--/----
Homework and Projects			
Discussions and lecture Presentations			

Teaching Methodology:

Laboratory

Text Books & References:

References:

1. lab manual

برنامج الدرجة الجامعية المتوسطة	
التخصص	**هندسة الإتصالات الجوية**
رقم المادة الدراسية	**٠٢٠٤٠٤٢٧١**
اسم المادة الدراسية	**مساعدات الملاحة الجوية**
عدد الساعات المعتمدة	***(2)***
عدد الساعات النظرية	***(2)***
عدد الساعات العملية	***(٠)***

Brief Course Description:

Instrument Landing System (ILS). Space Modulation and ILS Waveforms. Difference in depth of Modulation (DDM).Glide Slope Antenna-Array. Glide Slope DDM & path width. Localizer Radiation Patterns. Localizer DDM& course width . Marker. VOR principles , VOR Antenna & Radiation Pattern ,RF Phasing , VOR Block diagram , Doppler VOR, DME Principles ,DME Terminology and Parameters ,DME Block Diagram, DGPS , PAPI precision approach path indicator .

Course Objectives:

Upon the completion of the course, the student will be able to :
1. Explain the Instrument Landing System (ILS) concepts
2. Describe Very high frequency Omni Range (VOR) equipment concepts
3. Explain Distance Measuring Equipment (DME) concepts
4. Define DGPS ,and PAPI system

Lab Number	Lab Name	Lab Content	Time
1	**Concepts of Navigational aids**	• Introduction to the navigational aids systems • Non Directional Beacon (NDB) principles • Description of ILS equipment ,Frequencies ,Function , site location , categories , and guidance information • PAPI system	
2	**Navigational Aids Modulation**	• Transmitter and space modulation • RF phase relationship , and its effect on the • space modulation parameters • ILS major radiated signals and ILS waveforms	
3	**DDM & DSM**	• Difference Depth of Modulation (DDM) • Sum Depth of Modulation (SDM) • ILS receiver characteristic • ILS (LOC.&GP) radiation characteristic	
4	**NRGS, and Navigational Aids Antenna**	• Specific antenna pairs radiation (SIP,SOP,and the image antenna) • Null reference Glide slope (NRGS) concepts • NRGS antenna array • antenna positioning and height ratios • Carrier(CSB) and side band only (SBO) radiated signals • Formation of the GS • GS DDM and path width	
5	**Capture Effect Glide Slope (CEGS)**	• Uneven Terrain and GS structure • Capture effect principle • M antenna array and composite CEGS radiated • signal (course & Clearance) • Antenna heights and ratios • CEGS DDM structure	

		• proximity phase error and antenna offset • Typical CEGS transmitter block diagram Radar	
6	**Localizer**	• ILS localizer radiated signals,patterns, and RF • phase relationship • LOC.DDM and path width • Front and back course • LOC. Antenna system • Uneven terrain and LOC. Structure • Capture Effect Loclizer (CELOC) • Typical CELOC. Transmitter block diagram	
7	**ILS markers**	• Types ,guidance information ,and site locations • Radiation , frequencies ,and modulation • Typical marker block diagram	
٨	**VOR**	• Introduction to VOR (frequency range, • guidance information ,and general concepts) • General theory of VOR operation • VOR antenna system • Carrier radiation pattern (Reference signal) • Composite side band radiation patter (variable signal) • Rotating figure of eight and limacine concept • VOR functional block diagram • Audio phasing • R.F. phasing • Field detector positioning	

٩	**Doppler VOR**	• Deference between DVOR and CVOR • Principles of DVOR • DVOR system over view • Phase angle in various direction • Frequency spectrum of a DVOR • Generation of direction • Switch of sideband antennas in the DVO	
١٠	**DME principles**	• Purpose of DME • General theory of DME • DME specifications (frequency and distance range) • DME Terminology : High and low level interrogation , Reply pulses, search mode and track mode, major and minor faults, and elapse time and Squatter pulses (ARRC1&ARRC2) • DME parameters : pulse spacing , system delay , pulse count , identification , reply efficiency , and power output • General DME block diagrams : Transponder ,monitor, and DME antenna system	
١١	**DME principles**	• Fundamentals of satellite Navigation • Introduction to GPS • GPS satellite Constellation • GPS-segments • GSP-Ground Reference station • GSP-Ground Monitor station • Code Based Techniques • Carrier Based Techniques	
12	**Differential Global Positioning System (DGPS)**	• Fundamentals of satellite Navigation • Introduction to GPS • GPS satellite Constellation • GPS-segments	

		• GSP-Ground Reference station • GSP-Ground Monitor station • Code Based Techniques • Carrier Based Techniques	

Evaluation Strategies:

Exams		Percentage	Date
Exams	Midterm Exam	40%	--/--/----
	Reports and participation	10%	--/--/----
	Final Exam	50%	--/--/----
Homework and Projects			
Discussions and lecture Presentations			

Teaching Methodology:
Lecture

Text Books & References:

References:
1. FAA Academy training manual; (Instrument Landing System) , 1998.
2. Aeronautical telecommunication ICAO Annex 10 , 2000.
3. Understanding GPS; D. KAPLAN, 1996.

برنامج الدرجة الجامعية المتوسطة	
التخصص	**هندسة الإتصالات الجوية**
رقم المادة الدراسية	**٠٢٠٤٠٤١٢١**
اسم المادة الدراسية	**نظم النقل في الإتصالات**
عدد الساعات المعتمدة	***(2)***
عدد الساعات النظرية	***(2)***
عدد الساعات العملية	***(٠)***

Brief Course Description:

Introduction. Transmission Media: Type of transmission Lines. Wave propagation on a Metallic transmission Line. Transmission line losses. Standing waves. Optical Fiber Transmission media: Optical fiber types. Losses in optical fiber cable. Electromagnetic wave propagation. Waveguides & Microwave Radio system.Satelitte communications. The public telephone network

Course Objectives:

At Completing this course the student should have :

- Very good knowledge on the different types of transmission media
- The ability to construct the required transmission system for a given environments
- Sufficient information about the satellite and cellular systems

Lab Number	Lab Name	Lab Content	Time
1	**Introduction to Communication Systems**	• Basic communication systems • Transmitters • Receivers	
2	**transmission media**	• Guided media • Unguided media	
3	**Propagation of RF waves**	• Ground wave • Sky wave • Space wave	
4	**The Basics of Antennas**	• Electromagnetic radiation • Hertzian dipole • Current and voltage distribution , and radiation pattern . • Resonant and non resonant • antenna . Effects of antenna height • Antenna coupling	
5	**Microwave Communication Systems**	• Basic principle of microwave system • Channel perturbations in microwave system • Characteristics of microwave systems	
6	**Spread spectrum communication systems**	• Direct sequence spread spectrum • Performance in continuous wave interface environments • Performance in multiple user environments • Frequency hop spread spectrum • Code synchronization	

7	**Satellite Communication Systems**	• Antenna coverage • Earth stations and transmission methods • Link analysis: bent pipe relay • Bent analysis: OBP digital transponder	
٨	**Cellular radio communication system**	• Basic principle of cellular radio • Channel perturbations in cellular radio • Characteristics of IG ,2G and 3G systems • Characteristics of WCMDA and CDMA2000	
٩	**Telephony and Telephone Networks**	•	

Evaluation Strategies:

Exams		Percentage	Date
Exams	Midterm Exam	40%	--/--/----
	Reports and participation	10%	--/--/----
	Final Exam	50%	--/--/----
Homework and Projects			
Discussions and lecture Presentations			

Teaching Methodology:

- Lecture
- homework's

Text Books & References:

References:

- J.Flood &P.Cochrane ," Transmission Systems ", IEE Telecom series, 1991
- .Winch," Telecommunication Transmission Systems ",MacGraw –Hill, 1993
- J.Dunlop&D.Smith,"Telecommunication Engineering", Chapman and Hall, third edition, 1994
- Huurdeman,Anton A. Boston "Guide to telecommunications transmission systems Artech House, 1997
- Khader,Michael Barnes, William, Telecommunications systems and technology Upper Saddle River, New Jersey: Prentice Hall, 2000
- W.Tomasi," Advanced Electronics Communications System ", Prentice Hall , Sixth edition,2004.

برنامج الدرجة الجامعية المتوسطة	
التخصص	**هندسة الإتصالات الجوية**
رقم المادة الدراسية	**020404122**
اسم المادة الدراسية	**مختبر نظم النقل في الإتصالات**
عدد الساعات المعتمدة	**(١)**
عدد الساعات النظرية	**(٠)**
عدد الساعات العملية	**(٣)**

Brief Course Description:

Introduction to communication systems the transmission lines kit, measurement, Behavior of T.L under various load .Polar-diagram of radiation pattern for different antennas types. Short-circuit and open circuit terminal condition. Implement some of communication systems using MATLAB

Course Objectives:

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

1. Student should come with thorough preparation for the experiment to be conducted.
2. Student should take prior permission from the concerned faculty before availing the leave.
3. Student should come with proper dress code and to be present on time in the laboratory.
4. Student will not be permitted to attend the laboratory unless they bring the practical record fully completed in all respects pertaining to the experiment conducted in the previous class.
5. Student will not be permitted to attend the laboratory unless they bring the observation book fully completed in all respects pertaining to the experiment to be conducted in present class.
6. Experiment should be started conducting only after the staff-in-charge has checked the circuit diagram.

Lab Number	Lab Name	Lab Content	Time
1	T.L characteristic		
2	SWR (open and short circuit)		
3	Antenna types		
4	Antenna radiation patterns		
5	Propagation of RF waves		
6	Microwave Communication Systems		
7	Spread spectrum communication systems		
8	Satellite communication systems		
9	Telephone network construction		

Evaluation Strategies:

Exams		Percentage	Date
Exams	Midterm Exam	20%	--/--/----
	Reports and participation	30%	--/--/----
	Final Exam	50%	--/--/----
Homework and Projects			
Discussions and lecture Presentations			

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

Teaching Methodology:

Laboratory

Text Books & References:
References:

1. Lab manual.

برنامج الدرجة الجامعية المتوسطة	
التخصص	هندسة الإتصالات الجوية
رقم المادة الدراسية	٠٢٠٤٠٤٢٣١
اسم المادة الدراسية	مشغل اتصالات جوية ٢
عدد الساعات المعتمدة	(٣)
عدد الساعات النظرية	(٠)
عدد الساعات العملية	(٦)

Brief Course Description:

1. To study MATLAB and communication tool box

Course Objectives:

This laboratory will commence with 'Orientations' to familiarize students with surroundings or circumstances includes following:

A. Familiarization with MATLAB and its communication toolbox
B. Familiarization amplitude modulation, frequency modulation and super heterodyne AM receiver.

Lab Number	Lab Name	Lab Content	Time
1	To study MATLAB and communication tool box		Week
2	To generate AM wave without using mat lab inbuilt function		Week
3	To generate AM wave and plot it's frequency spectrum using matlab		Week
4	To generate AM wave for different value of modulation index(m<1, m=1 &m>1) using matlab		2 weeks
5	To generate FM wave and plot it's frequency spectrum using matlab		2 weeks
6	To generate Amplitude Modulation (AM) wave and determine it's Modulation Index 'ma'		2 weeks
7	To demodulate **a**mplitude modulated wave		2 weeks
8	To generate frequency modulation wave		2 weeks
9	To demodulate frequency modulated wave		Week
١٠	10 To study super heterodyne AM receiver		Week

Evaluation Strategies:

Exams		Percentage	Date
Exams	Midterm Exam	20%	--/--/----
	Reports and participation	30%	--/--/----
	Final Exam	50%	--/--/----
Homework and Projects			
Discussions and lecture Presentations			

Teaching Methodology:

Laboratory

Text Books & References:
References:

1. lab manual

برنامج الدرجة الجامعية المتوسطة	
التخصص	**هندسة الإتصالات الجوية**
رقم المادة الدراسية	**٠٢٠٤٠٤٢٤١**
اسم المادة الدراسية	**تزويد قدرة في المطارات**
عدد الساعات المعتمدة	**(٢)**
عدد الساعات النظرية	**(٢)**
عدد الساعات العملية	**(٠)**

Brief Course Description:

This subject introduced types of power supplies that used in airport AC&DC , UPS how charging and its modes in work, and airport ground lighting system

Course Objectives:

At Completing this course the student should have :

- AC main Power supply
- DC main power supply
- AC secondary power supply
- DC secondary power supply
- UPS
- Lighting system in Airport

Lab Number	Lab Name	Lab Content	Time
1	**Introduction primary power supply**	• Main power supply circuits block diagram • Characteristic of main circuit • Types of main power supply	
2	**Secondary power supply**	• Secondary power supply circuits • UPS • DESIL engine	
3	**Airport lighting system**	• introduction to Airfield Lighting • Taxiway Guidance Signs • Electrical Supply for Airfield Lighting Systems • Airfield Ground Lighting Control and Monitoring System (AGLCMS) • Runway, Taxiway & AFLCC Inspection & Maintenance • Airfield Lighting Projects	

Evaluation Strategies:

Exams		Percentage	Date
Exams	Midterm Exam	40%	--/--/----
	Reports and participation	10%	--/--/----
	Final Exam	50%	--/--/----
Homework and Projects			
Discussions and lecture Presentations			

Teaching Methodology:

- Lecture
- homework's

Text Books & References:

References:

- كراسة تغذية أنظمة الإتصالات \كلية الملكة نور الفنية
- Airport Lighting products, Windsor, CT