Associate Degree Program

Specialization	**Common**
Course Number	**020400111**
Course Title	**Electronics**
Credit Hours	**3**
Theoretical Hours	**3**
Practical Hours	**0**

وصف المادة الدراسية:

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.

أهداف المادة الدراسية:

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 devices

الوصف العام:

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

		▪ The DC operation point)load line) ▪ 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 of operation 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)	**2 week**

9.	**Thyristor and Other Devices**	▪ Structure ,principle of operation ▪ Characteristics curves and applications of the following devices: (Four – layer device, SCR (Silicon – controlled rectifier), siac, triac, Uninjunction transistor (UJT), and phototransistor	**2 week**
10.	**Introduction to Electronic Measurements**	▪ Applications of oscilloscope in electronic measurements	**1 week**

❖ Lectures

الكتب و المراجع :

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.

Associate Degree Program

Specialization	**Common**
Course Number	**020400112**
Course Title	**Electronic Circuits and Devices Lab.**
Credit Hours	**1**
Theoretical Hours	**0**
Practical Hours	**3**

وصف المادة الدراسية:

- 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).

أهداف المادة الدراسية:

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

الوصف العام:

رقم الوحدة	اسم الوحدة	محتويات الوحدة	الزمن
1.	**The diode**	▪ Forward and reverse biasing. ▪ Characteristic curve. ▪ Data sheet.	**2 weeks**
2.	**The zener Diode.**	▪ Breakdown voltage. ▪ Regulation. ▪ Characteristic curve. ▪ Data sheet	**2 weeks**
3.	**Rectification Circuits with Filter and Regulator**	▪ Half- wave and full- wave. ▪ Ripple factor. ▪ Line and load regulation	**1 week**
4.	**A BJT testing by using AVO meter , and how to determine the specifications of transistor through data sheets**		**1 week**
5.	**A BJT with Voltage – Divider Bias**		**1 week**
6.	**A BJT as a switch**		**1 week**
7.	**Common Emitter Amplifier Circuit**		**1 week**
8.	**Common collector Amplifier circuit**		**1 week**
9.	**Common Base Amplifier Circuits**		**1 week**
10.	**Common source Amplifier Circuits**		**1 week**
11.	**Operational Amplifier as Inverting and Noninverting Amplifier**		**1 week**
12.	**Operational Amplifier as Differentiator and Integrator**		**1 week**
13.	**RC phase-shift Oscillator**		**1 week**

14.	**SCR as a switch**		**1 week**

طرق التقييم المستخدمة :

الامتحانات	نسبة الامتحان من العلامة الكلية	التاريخ
التقارير	30%	
الامتحان المتوسط	20%	
الامتحانات النهائية	50%	

الكتب و المراجع :

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.