

Program Engineering

Specialty	Program Requirements
Course Number	
Course Title	Engineering Workshops
Credit Hours	(1)
Theoretical Hours	(0)
Practical Hours	(3)

Brief Course Description:

- ❖ Development of basic skills in Mechanics, Welding, Lathing, and Central Heating works, including Hand Filing, Turning, Welding, Metal Cutting and Forming.

Course Objectives:

This course aims at:

1. Technical basic skills by using engineering and practical methods.
2. Manual utilization for working by tools, machines in workshops as mechanics, welding, lathing, and central heating.
3. Utilization tools and instruments both electrical and mechanical.
4. Determination of production works cost.
5. Applied safety tools in workshops.

Detailed Course Description:

1. General Mechanics Workshop:

Unit Number	Unit Name	Unit Content	Time Needed
1.	Mechanical instrument	<ul style="list-style-type: none"> ▪ Safety in mechanics workshop ▪ Tools and mechanical instruments (Ruler, Caliper, angle, protractor, etc.) with their utilizations, classifications, and applications ▪ Practical applications on using mechanical measurement tools 	(2 hours)
2.	Sheet works and drafting tools	<ul style="list-style-type: none"> ▪ Basic marking tools (trammel, markers, dot marker, gauge marker.) ▪ Drawing on simple flat work pieces ▪ Drawing on cylindrical work pieces ▪ Repairing work pieces and removing chip and dust. ▪ Practical applications on sheets using drawing tools 	(2 hours)
3.	Metal cutting	<ul style="list-style-type: none"> ▪ Cutting by using manual and fixed automatic cutters. ▪ Cutting by using manual and electrical metal saws. ▪ Cutting by using files. ▪ Practical applications like rounded cutting, angular cutting, pipe and flat iron shearing, making hollow shapes. 	(4 hours)
4.	Filing	<ul style="list-style-type: none"> ▪ File types, categories, and applications. ▪ File handling and fixing work pieces on vice. 	(2 hours)

		<ul style="list-style-type: none">▪ Practical applications like filing square and flat iron shapes with different sizes.	
5.	Metal joining	<ul style="list-style-type: none">▪ Manual and mechanical drilling tools; their types and proper speeds.▪ Methods of metal joining - joining by screws, joining by rivets, joining by welding.▪ Practical applications including drilling of different sheets and flat pieces, and choosing the best rivet for drilling and joining metals.	(2 hours)

2. Welding and forging workshop

Brief Course Description:

Welding and forging: This workshop aims to teach the students a lot of practical skills and theoretical information about arc welding, gas welding, Oxy-Acetylene welding, manual casting, sheet works, screw and rivet joining, with taking into consideration all safety rules.

Detailed Course Description:

Unit Number	Unit Name	Unit Content	Time Needed
1.	Welding	<ul style="list-style-type: none"> ▪ Methods of metal welding (Electrical arc, Oxy-Acetylene, Gas welding, Spot welding.) ▪ Applications on arc welding (using arc welding instruments, choosing the proper arc, choosing the welding wire, polarity, welding positions, preparing work pieces for welding.) ▪ Applications on spot welding. ▪ Application on Oxy-Acetylene welding ▪ Different applications on welding with different positions (straight lines, T welding, right angle welding, horizontal and vertical welding, pipes and sheets welding.) 	(12 hours)

3. Turning Workshop :

Brief Course Description:

Turning workshop: Teaching and training students practically about working with tools, machines That are used in the turning operations, while focusing on general safety rules and reducing loses by: precise measurements, marking, drilling and turning, milling and shaping, flat surfaces grinding.

Detailed Course Description:

Unit Number	Unit Name	Unit Content	Time Needed
1.	Turning machines	<ul style="list-style-type: none"> ▪ Types, main parts, motion transmission methods, cutting path, feed, and concentrating on the ratio of the feed speed and the cutting depth ▪ Methods of fixing work pieces on lathe machines ▪ Types of tools and their working temperatures with mentioning their rake angle, clearance angle, and cutting angle ▪ Basic maintenance principles about working on lathe machines ▪ Practical applications including all operations to understand each type of tool machines 	(3 hours)
2.	Turning machines	<ul style="list-style-type: none"> ▪ Types and parts ▪ Motion of the turning tool, choosing the proper speeds, methods of tool fastening on different milling machines and different vice ▪ Describing the main angles on milling tools and all used metals for manufacturing these tools General guides during 	(3 hours)

		working on milling machines and concentrating on safety and maintenance methods	
3.	Shaping machines	<ul style="list-style-type: none"> ▪ Types and main parts ▪ Tool motion and methods of fixing tools, feed rate, required cutting depth and the existed feet range in these machines ▪ The best methods for fixing work pieces on shaping machines 	(3 hours)

4. Central heating Workshop : (12 hours)

Brief Course Description:

Heating workshop: This workshop aims to teach the student how to build a central heating set in a building for both hot and cold water networks, and to teach him how to get the proper measurements and sizes during execution.

Detailed Course Description:

Unit Number	Unit Name	Unit Content	Time Needed
1.	The utilized tubes in heat connections	<ul style="list-style-type: none"> ▪ Cutting, matching, and tothing black and galvanized metal tubes ▪ Determining cutting, joining, and welding defects for all types of tubes ▪ Practical applications to upgrade skills 	(3 hours)
2.	Hot Water heating system	<ul style="list-style-type: none"> ▪ Introducing parts and contents of hot water heating circle for closed and opened systems ▪ Boiler: types, parts, technical specifications, joining and disjoining, maintenance, and comparison between its different types ▪ Burner: types, mechanical and electrical parts, discussing each part function, illustrating specifications for the different 	(3 hours)

		<p>types</p> <ul style="list-style-type: none"> ▪ Joining and disjoining the parts mechanically and electrically, maintenance and repair, determining damages and defects, starting up and calibration ▪ Pumps: Classifications, specifications, parts, methods of insulating and connecting, determining defects and fixing them ▪ Radiators: Types, specifications, parts, technical comparison between their parts, connecting and insulating, introducing its connecting systems and the characteristic of each system. ▪ Cylinder: function, types, methods of insulating and connecting ▪ Chimney: types, specifications, function, maintenance methods. ▪ Expansion tank: function, joining methods ▪ Diesel tank: function, specifications, joining methods. ▪ Connection apparatus: shapes, types 	
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Evaluation Strategies:

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

Program Engineering

Specialty	Program Requirements
Course Number	
Course Title	Auto Cad
Credit Hours	(2)
Theoretical Hours	(0)
Practical Hours	(6)

Brief Course Description:

- ❖ Introduction to AutoCAD, application of AutoCAD, commands, geometric entities. Geometric construction. Dimensioning, free -hand sketching, object representation, orthographic drawing and projections.

Course Objectives:

This course aims at:

1. The course introduces students to engineering drawing, which is the essential language for engineers to express ideas in the design process.
2. The course is designed to enable the students to acquire skills and knowledge in drawing principles, drawing presentation, and projections.

Detailed Course Description:

Unit Number	Unit Name	Unit Content	Time Needed
1.	What is CAD?		
2.	Developing new skills	<ul style="list-style-type: none"> ▪ Motor skills ▪ Mental skills 	
3.	Computer drafting equipment	<ul style="list-style-type: none"> ▪ Monitors. ▪ The computer ▪ Input devices ▪ Keyboard (illustrate most common used keys; Enter, Escape, Cursor keys, Home, Backspace, Control, Function keys, Calculator keypad) ▪ Mouse (mouse movement, select buttons, Enter buttons, clicking, and double clicking) ▪ Digitizer ▪ Output devices ▪ Pen plotters ▪ Impact printers (dot-matrix) ▪ Non-Impact printers (laser, colored) ▪ Storage devices ▪ Hard disks ▪ Floppy disks (diskettes) ▪ Tapes ▪ CD-ROMs ▪ Software ▪ AutoCAD R14 package 	
4.	CAD materials	<ul style="list-style-type: none"> ▪ Drawing media ▪ Drawing pens 	
5.	Getting started with AutoCAD	<ul style="list-style-type: none"> ▪ Overview of Windows 95 software basics ▪ AutoCAD coordinate systems ▪ Absolute ▪ Relative 	

		<ul style="list-style-type: none"> ▪ Polar ▪ How to start AutoCAD ▪ Starting a new drawing 	
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○ Getting Started with Auto CAD R14

Unit Number	Unit Name	Unit Content	Time Needed
1.	Understanding the Auto CAD interface	<ul style="list-style-type: none"> ▪ The Auto CAD main window ▪ Toolbars ▪ Display toolbar ▪ Close a toolbar ▪ Menus ▪ Cursor Menu ▪ The Command Window ▪ The Text Window 	
2.	Accessing Commands	<ul style="list-style-type: none"> ▪ Using a Toolbar ▪ Using a Menu ▪ Using the Command line 	
3.	Correcting mistakes	<ul style="list-style-type: none"> ▪ Undo the most recent action ▪ Undo a specific number of actions 	
4.	Refreshing the screen display	<ul style="list-style-type: none"> ▪ Redraw the screen 	
5.	Saving drawings and opening existing drawings		
6.	Exiting AutoCAD		

○ Creating Objects in Auto CAD 14

Unit Number	Unit Name	Unit Content	Time Needed
1.	Drawing lines	<ul style="list-style-type: none"> ▪ Drawing line objects ▪ Drawing Ray and construction line ▪ Drawing Polylines ▪ Drawing Multilines ▪ Drawing Polygons 	
2.	Drawing Curved objects	<ul style="list-style-type: none"> ▪ Drawing circles 	

		<ul style="list-style-type: none"> ▪ Drawing arcs ▪ Drawing ellipses ▪ Drawing donuts 	
3.	Drawing point objects	<ul style="list-style-type: none"> ▪ Setting point style and size 	
4.	Hatching areas	<ul style="list-style-type: none"> ▪ Defining Hatch boundaries ▪ Using Hatch styles ▪ Using Hatch patterns 	

○ Working with Precision

Unit Number	Unit Name	Unit Content	Time Needed
1.	Showing and using Grid		
2.	Using Ortho Mode		
3.	Snapping to geometric points on objects		
4.	Calculating distance and angle		

○ Controlling the Drawing Display

Unit Number	Unit Name	Unit Content	Time Needed
1.	Using Zoom and pan		
2.	Using Pan (Real time, point left , right , up , down)		
3.	Using Aerial view		

○ Editing Methods

Unit Number	Unit Name	Unit Content	Time Needed
1.	Editing objects using the Object Properties Toolbar		
2.	Coping objects	<ul style="list-style-type: none"> ▪ Copying Within a drawing ▪ Multiple copying using grips ▪ Copying with the Clipboard ▪ Offsetting objects ▪ Mirroring objects ▪ Arraying objects ▪ Creating and inserting 	

		blocks	
3.	Moving objects	<ul style="list-style-type: none"> ▪ Moving without changing ▪ Rotating objects ▪ Aligning objects 	
4.	Erasing objects		
5.	Resizing objects	<ul style="list-style-type: none"> ▪ Stretching objects ▪ Scaling objects ▪ Extending objects ▪ Changing the length of objects (lengthen) ▪ Trimming objects 	
6.	Inserting breaks in objects		
7.	Exploding objects		
8.	Editing polylines		
9.	Chamfering objects	<ul style="list-style-type: none"> ▪ Chamfering by specifying distances 	
10.	Filleting objects	<ul style="list-style-type: none"> ▪ Setting the Fillet radius ▪ Filleting circles and arcs 	

○ Using Layers, Colors, and Line types

Unit Number	Unit Name	Unit Content	Time Needed
1.	Working with Layers		
2.	Working with Colors		
3.	Working with Line types		
4.	Assigning Layers, Colors, and Line types to objects		

○ Adding Text to drawings

Unit Number	Unit Name	Unit Content	Time Needed
1.	Working With Text Styles		
2.	Using single line Text		
3.	Using multiline Text		
4.	Checking spelling		

○ Dimensioning

Unit Number	Unit Name	Unit Content	Time Needed

1.	Dimensioning concepts		
2.	Creating Dimensions		
3.	A Adding Dimensions		
4.	Editing Dimensions		

Plotting (printing)

1. Preparing a layout
2. Plotting drawings

Evaluation Strategies:

Exams		Percentage	Date
Exams	Drawing	5%	--/--/----
	First Exam	10%	--/--/----
	second	10%	--/--/----
	Final Exam	25%	--/--/----

Evaluation Strategies:

Exams		egatnecreP	etaD
smaxE	Laboratory Drawing	5%	----/--/--
	First	10%	----/--/--
	Second	10%	----/--/--
	Final Exam	25%	--/--/----

Teaching Methodology:

- ❖ Laboratory Drawing

Text Books & References:

1. (Technical Drawing By: Giescke and others Engineering Design graphics by : James H Earle

Program Engineering

Specialty	Program Requirements
Course Number	
Course Title	Industrial safety
Credit Hours	(2)
Theoretical Hours	(2)
Practical Hours	(0)

Brief Course Description:

- ❖ Role of technicians in economic development job organization and hierarchy. Management of environment in industrial plants First Aid Accident Prevention. Protective devices and equipment industrial Safety Standards .Nature of fire hazards sand fire regulations. Physiological effects of electrical shock on human body .first and treatment for the effects of elects shock Rules of spare and chemicals storage and handing Issues related to national law of labor. social security benefits and regulations

Course Objectives:

This course aims at:

1. Knowledge of the role of the technicians in economics development and labor.
2. Knowledge of methods for management of work in industrial firms
3. Knowledge of causes of industrial incidents and methods of protection.
4. First aid in the case of standards of incidents.
5. Knowledge of standards of industrial safety in industrial plants.
6. Methods of materials storage and handling.
7. Knowledge of worker rights as insured in the Jordanian legislations.

Detailed Course Description:

Unit Number	Unit Name	Unit Content	Time Needed
1.	The important of technicians in labor structure	<ul style="list-style-type: none"> ▪ Levels and classification of occupation ▪ Role of technicians in the economic development 	
2.	Organization of production projects & industrial firms	<ul style="list-style-type: none"> ▪ Classifications of production projects ▪ Production requirement and quality control management. ▪ Choosing location for productive project and industrial firms ▪ Organizing structures for industrial firms ▪ The role of industrial supervisor and industrial safety officer in the industrial firms 	
3.	Requirement of safety & occupational	<ul style="list-style-type: none"> ▪ Working environment (building, illumination, noise, ventilation of industrial firms) ▪ Requirements and standards of industrial safety ▪ Legislation of industrial safety 	
4.	Risks and industrial incidents.	<ul style="list-style-type: none"> ▪ Classification of risks and industrial incidents ▪ Causes of industrial hazards and methods of protection (physical hazards, chemical hazards, biological hazards and engineering hazards) ▪ Pollution caused by industry and its hazardous effects and methods of risks limitation ▪ Occupational diseases and methods of protection ▪ Up leveling of industrial safety on both of industrial level and national level 	

		<ul style="list-style-type: none"> ▪ The role of occupational education, guideness & training in up leveling the industrial safety ▪ The effect of industrial incidents on the national economy 	
5.	Handling and storage of materials	<ul style="list-style-type: none"> ▪ Lifting and moving of materials by manual and mechanical methods and incidents caused by it ▪ Methods of limitation of incidents caused by materials handling ▪ Handling and storage of chemical materials 	
6.	Fires and protection of its hazards	<ul style="list-style-type: none"> ▪ Classification of fires in the industrial firms and risks caused by it ▪ Causes of fires in industrial firms ▪ Methods of fire fighting in the industrials firms 	
7.	Risks of dealing with electricity	<ul style="list-style-type: none"> ▪ Classification and causes of incidents caused by dealing with electricity ▪ Methods of protections of incidents caused by electricity in the industrial firms ▪ First aid for electrical shock. 	
8.	Labor legislations	<ul style="list-style-type: none"> ▪ Behavior of worker and his duties ▪ Rights of worker as insured by Jordanian legislations (labor law, social security law) ▪ The relation between workers and work owners ▪ The labor associations ▪ Treatment of labor disputes ▪ Statistics of industrial incidents 	

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, Video Tapes, Slide Show, Presentations, Group work)

Text Books & References:

- 1. السلامة المهنية ، م.مازن خرابشه وم.عبد الرحمن العامري، دار صفاء للنشر والتوزيع-عمان الأردن، الطبعة الاولى 2000

Program Engineering

Specialty	Program Requirements
Course Number	
Course Title	Communication Skills and Technical Reporting
Credit Hours	(2)
Theoretical Hours	(2)
Practical Hours	(0)

Brief Course Description:

- ❖ The main goal of this course is to equip the students with the necessary communication skills and improve their abilities in technical writing to meet market needs.

Course Objectives:

This course aims at:

1. Know how to deal with individuals and groups on various levels.
2. Listen and respond effectively.
3. Deal with meetings.
4. Write technical reports, letters and resumes.
5. Present him/her self or relevant matters using the available media.
6. Use graphics to illustrate mail ideas.

Detailed Course Description:

Unit Number	Unit Name	Unit Content	Time Needed
1.	introduction to Communication Skills		
2.	Dealing with individual	<ul style="list-style-type: none"> ▪ The Rules of Dealing with the others ▪ Dealing with the Manager ▪ Dealing with the College ▪ Dealing with the Inferiors ▪ Dealing with the Customers ▪ Dealing with the Patients ▪ Different Personality Patterns ▪ How to Deal with Personality Patterns 	
3.	Work Environment Communication	<ul style="list-style-type: none"> ▪ Work Environment Concept ▪ Work Environment Communication Patterns ▪ Corporations Communication Network ▪ Dealing with Stress & Pressure ▪ Relaxing Exercise 	
4.	Effective Telephoning	<ul style="list-style-type: none"> ▪ Preparing for a Telephone Call ▪ Evaluate your Telephone Voice ▪ Key Vocabulary about Telephoning ▪ Receiving Calls & Taking Messages ▪ Structuring a Message ▪ Asking for Repetition, Clarification & Responses ▪ Active Listening & Reflective Questions ▪ Handling Complaints ▪ Recognizing Closing Signals & Effective Closing 	
5.	Effective Meeting	<ul style="list-style-type: none"> ▪ Introduction ▪ Effective Meeting ▪ Ten Characteristics of 	

		<p>Effective Meeting</p> <ul style="list-style-type: none"> ▪ An Informative Meeting ▪ A problem Solving Meeting ▪ A Brainstorming Meeting ▪ A Specific Conflict Meeting ▪ A Training Meeting ▪ Key Features of an Effective Meeting ▪ Controlling the Direction of a meeting ▪ Interrupts & Conflicts & Finishing a point ▪ Questioning & Clarifying ▪ Obtaining Consensus & Making Difficult ▪ Decisions ▪ Techniques to Facilitating Consensus 	
6.	Effective Presentation	<ul style="list-style-type: none"> ▪ Determining the Purpose of the Presentation. ▪ Determining the Topics of the Presentation. ▪ Preparation of the Presentation Topics. ▪ Supporting Presentation Points ▪ Using Visual Aids. ▪ Conduction Your Presentation ▪ Making A Good Introduction. ▪ Making Well Designed And Well Presented Visual Aid (How to make power point presentation) ▪ The Importance of Body Language. ▪ Making An Effective Ending To A Presentation ▪ Handling Questions Effectively 	
7.	Introduction to Technical Writing	<ul style="list-style-type: none"> ▪ Background ▪ Types of Writing ▪ Technical Writing for Engineering 	

8.	Guidelines in Usage & Style for Technical Writing	<ul style="list-style-type: none"> ▪ Paragraph & Section Development ▪ Controlling Sentence Length ▪ Coherence & Wordiness ▪ Technical Vocabulary 	
9.	Technical Correspondence	<ul style="list-style-type: none"> ▪ Letters ▪ Resumes 	
10.	Reports	<ul style="list-style-type: none"> ▪ Report Format Structure & Communication ▪ Types of Reports ▪ Procedures of Reports Writing ▪ Graphics & Illustrations 	
11.	Technical Articles	<ul style="list-style-type: none"> ▪ General Outlines Types 	

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, Video Tapes, Slide Show, Presentations, Group work)

Text Books & References:

1. (Text I): Communication Skills, Masoud Omar Nasro, AmmanDar Safa', 2001.
2. (Text III): Technical Writing, Charles R. Stratton, 1998.
3. (Text IV): Scientific for Engineering, Al-Jayyousi & Kattan, 2000.
4. (Text V): A short Guide to Writing about Scientific, David Porush, 1997.
5. (Text II): مهارات الاتصال الفعال- إعداد فاطمة عطية، قسم التعليم التقني والمهني والتدريب- الأنوروا، الرئاسة العامة، عمان، 2006

Program Engineering

Specialty	Program Requirements
Course Number	
Course Title	Materials Science
Credit Hours	(2)
Theoretical Hours	(2)
Practical Hours	(0)

Brief Course Description:

- ❖ Classification of material and properties, Atomic structure, assemblies of atoms, solidification, bonding. Structure of solids, alloy system, crystal imperfections, mechanical properties. Ceramics and glasses. Polymers, composites. Electrical properties materials. Photo – electrical and thermo- electrical effects in metals. Band theory of solids, properties of insulators. Magnetic Materials.

Course Objectives:

This course aims at:

1. To distinguish between the crystalline materials and amorphous one.
2. Create the mechanical testing to materials.
3. Analyze the mechanical and chemical effect on the materials.

Detailed Course Description:

Unit Number	Unit Name	Unit Content	Time Needed
1.	Classification materials	<ul style="list-style-type: none"> ▪ Metals (Iron, steel, Aluminum, Copper , Bronze) ▪ Ceramics (Abrasives, Clay products, Rocks and Building Stones) ▪ Polymers (condensation Polymerization, Depolymerization of Degradation) ▪ Composite materials (Wood, Cement, Glasses) 	
2.	Crystal Structure	<ul style="list-style-type: none"> ▪ Introduction in Atomic Structure ▪ Crystals, Packing Factor, Crystallographic Planers, Space Lattices, and atomic Density in Atomic plans ▪ Crystals imperfection (Defects in Crystals) 	
3.	Alloy system	<ul style="list-style-type: none"> ▪ Usage and properties ▪ Alloys Deformation, solid Solutions. ▪ Cooling curves and phase diagram and lever rule ▪ Classification of phase diagrams for alloys 	
4.	Cast Iron and Steel	<ul style="list-style-type: none"> ▪ Properties of Cast iron and Carbon Steel and there usage ▪ Influence of various constituents on steel. ▪ Phase diagrams of Carbon Steel 	
5.	Electrical Properties of Materials	<ul style="list-style-type: none"> ▪ Electrical conductivity ▪ Conduction and carries. ▪ Conductivity in metal, semi conductors and insulators ▪ Applications 	

6.	Magnetic properties of materials	<ul style="list-style-type: none"> ▪ General ▪ The magnetic circuit and important magnetic properties. ▪ Magnetic permeability ▪ Magnetic domains ▪ Magnetic saturation. ▪ Effect of temperature on magnetization 	
7.	Mechanical and Thermal Properties of solid materials	<ul style="list-style-type: none"> ▪ Mechanical Properties (Stress, Strain, Tension, Resistance, Hardness, Modules of Elasticity) ▪ Thermal properties (thermal extension, thermal conductivity) 	

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, Video Tapes, Slide Show, Presentations, Group work)

Text Books & References:

1. The principles of engineering materials by Calluotw.
2. Introduction to material Science by B.R. Schlencker.

Program Engineering

Specialty	Program Requirements
Course Number	
Course Title	Materials Science lab
Credit Hours	(1)
Theoretical Hours	(0)
Practical Hours	(3)

Brief Course Description:

- ❖ Structural analysis of materials, photo – electrical and thermo- electrical effects analysis. Chemical – mechanical and electrical properties of materials.

Course Objectives:

This course aims at:

1. Analyze the microstructure under optical microscope for different types of material.
2. Be able to create the macroscopic inspection to the samples.
3. Be able to prepare the samples for microscopic examination.

Detailed Course Description:

Unit Number	Unit Name	Unit Content	Time Needed
1.	Hardness and Hardness Testing	<ul style="list-style-type: none"> ▪ Scratch test ▪ Indentation Tests ▪ The Brinell hardness test. ▪ The Vickers Hardness test ▪ The Rock well Hardness test ▪ Microscopic preparation & Examination of metallic 	
2.	Ductility Test	<ul style="list-style-type: none"> ▪ The Bend test ▪ The Cupping test 	
3.	Impact Test		
4.	Creep Test	<ul style="list-style-type: none"> ▪ Behavior of specimen during creep test ▪ Factors influencing creep ▪ Presentation of creep data 	

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:

Program Engineering

Specialty	Program Requirements
Course Number	
Course Title	Mathematics
Credit Hours	(3)
Theoretical Hours	(3)
Practical Hours	(0)

Brief Course Description:

This course covers the following items:

- ❖ Coordinates ,Graphs , lines (real numbers, applications ,coordinate planes, Distance and Circles), functions and limits (Operations and Graphs on functions, limits and Continuity of Trigonometric functions),Differentiation(Techniques of Differentiation, The Chain Rule, Implicit Differentiation), Application of Differentiation (Related rates , Concavity, graphs of polynomials, Applications : Rolls Theorem and Mean – Value Theorem), Integration (Integration by substitution, Definite Integral, the Second fundamental Theorem of Calculus)،Applications of the Definite Integral (Area Between two Curves ,Volumes, Applications : area of surface of revolution).

Course Objectives:

This course aims at:

1. Understand basic facts and terminology to numbers, coordinate planes ,graphs, and lines.
2. Describe functions, investigate some of their properties, and use the arithmetic operations on functions.
3. Define and calculate limits of functions and use the limits to test the functions for continuity.
4. Derive different types of functions and derive formulas that express the derivative for some functions.
5. Use derivatives to find the rate at which some quantity is changing, to make reliable graphs of polynomials and rational functions and to solve some applied optimization problems.
6. Evaluate definite and indefinite integrals.
7. Calculate the area between curves; find arc length of plane curves.
8. find volumes of three-dimensional solid

Detailed Course Description:

Unit Number	Unit Name	Unit Content	Time Needed
1.	coordinates ,Graphs, lines	<ul style="list-style-type: none"> Real number, interval and inequalities, absolute value, coordinate planes and Graphs, lines, distance and circles 	
2.	Functions and limits	<ul style="list-style-type: none"> functions, operations on functions, Graphs of functions ,limits, limits (computational techniques) continuity limits and continuity of trigonometric functions 	
3.	Differentiation	<ul style="list-style-type: none"> Tangent lines and rates of change, the derivative techniques of differentiation, derivative of trigonometric functions, the chain rule, implicit differentiation differentials 	
4.	Application of Differentiation	<ul style="list-style-type: none"> Related Rates, Intervals of increase And Decrease and Concavity, Relative extrema, Graphs of polynomials and Rational functions, other Graphing problems, maximum and Minimum values of function, Applied Maximum and Minimum problems, Rolles Theorom and Mean- value Theorem 	
5.	Integration	<ul style="list-style-type: none"> Antiderivatives and the indefinite Integral, Integration by substitution, Areas as limits , the definite Integral, The first fundamental Theorem 	

		of calculus, Evaluating definite Integrals by fundamental substitution, The Second Theorem of calculus	
6.	Application of the Definite Integral	<ul style="list-style-type: none"> ▪ Area between two curves, volumes by slicing , discs and washers, volumes by cylindrical shells, length of a plan curve, Area of a surface of a surface of revolution 	

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:

- ❖ Lecture

Text Books & References:

Textbook:

1. Electrical Machinery .A.E.Fitzgslery. Charles Kingsley .jr.
2. Generalized Theory of Electric Machines. Dr .P.s. Bimbhra.

References:

1. Thomas L. Flyd Principles of electric Circuit. Charles E. Merrill publishing Company Bell and Homel Company Columbus 1981.
2. Timoth N.Trick, Introduction to circuit Analysis USA, New York 1977.

3. الدارات الكهربائية. م. محمد الطالب بني ياسين. م. محمد منصور المعاني

4. المكنان الكهربائية د. نبيل محمود عبدالقادر. د. فاروق عموري

Program Engineering

Specialty	Program Requirements
Course Number	
Course Title	Physics
Credit Hours	(3)
Theoretical Hours	(3)
Practical Hours	(0)

Brief Course Description:

- ❖ Vectors analysis, Measurement and units and error estimation, Motion in one and Two or three dimensions, laws of motion, circular motion and application, work power and energies, linear momentum and collisions, rational motion of rigid bodies, Rolling and angular momentum, kinds of oscillation.

Course Objectives:

This course aims at:

1. know methods of measurements, units
2. know the primitive unites and their derivatives
3. know the motion in one and different directions
4. Calculate the distance velocity, acceleration
5. know the laws of motion, Newton laws
6. know the circular motion
7. know the kinetic, potential and the mechanical energy
8. know the power ,work, linear momentum
9. Differentiate between tough and smooth surfaces.
10. know Rolling motion and angular momentum
11. know oscillation and Oscillatory Motion.

Detailed Course Description:

Unit Number	Unit Name	Unit Content	Time Needed
1.	Vectors	<ul style="list-style-type: none"> ▪ Coordinate systems ▪ Vector and Scalar Quantities ▪ Some properties of vectors ▪ Components of a vectors and Unit Vectors 	
2.	Physics and Measurements	<ul style="list-style-type: none"> ▪ Standards of length, Mass, and Time ▪ The building Blocks of Matter ▪ Density ▪ Dimensional Analysis ▪ Conversion of Units ▪ Estimates and order – of Magnitude- calculations ▪ Significant figures 	
3.	Motion in one Dimension	<ul style="list-style-type: none"> ▪ Displacements, Velocity, and speed ▪ Instantaneous velocity and speed ▪ Acceleration ▪ Motion Diagrams ▪ one – Dimensional motion with Constant Acceleration ▪ Freely falling Objects 	
4.	Motion in Two Dimension	<ul style="list-style-type: none"> ▪ The Displacements, velocity, and Acceleration Vectors ▪ Two-Dimensional Motion with constant Acceleration ▪ Projectile motion ▪ Uniform Circular motion ▪ Tangential and radial Acceleration ▪ Relative velocity and relative Acceleration 	
5.	The law of Motion	<ul style="list-style-type: none"> ▪ The concept of force ▪ Newton's first Law and 	



		<p>Inertial frames -Mass</p> <ul style="list-style-type: none"> ▪ Newton's second Law ▪ The force of Gravity and weight ▪ Newton's second law ▪ The force of Gravity and weight ▪ Newton's Third law ▪ some Applications of Newton's law ▪ forces of friction ▪ Newton laws of Universal Gravitations ▪ Measuring the Gravitational constant ▪ Free fall Acceleration and the Gravitational ▪ Conservation of Angular Momentum 	
6.	Static equilibrium and Elasticity	<ul style="list-style-type: none"> ▪ The Conditions for Equilibrium ▪ More on the center of Gravity ▪ Examples of rigid objects static Equilibriums ▪ Elastic properties of solids 	
7.	Oscillatory Motion	<ul style="list-style-type: none"> ▪ simple harmonic Motion ▪ The Block – spring system Revisited ▪ Energy of the simple Harmonic Oscillator ▪ The pendulum ▪ Comparing simple Harmonic Motion with uniform circular Motion ▪ Damped Oscillations ▪ forced Oscillations 	

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:

- ❖ Lecture

Text Books & References:

References

1. Physics for scientists and Engineers 7th edition 2004 Raymond A. Serway ISBN 0-03-022657-0 Robert J. Beichner Johan w. Jewett Jr. Contributor Anthers
2. Fundamental of physics David Halliday Robert Resnick Jeart walker th edition Johan wiley and Sons .Inc ISBN 0-471-32235-6
3. University physics (2002) last Edition Francis w. sears Mark w .zemansky Hugh d. young Addison – Wesley publishing company

Program Engineering

Specialty	Program Requirements
Course Number	
Course Title	Physics lab
Credit Hours	(1)
Theoretical Hours	(0)
Practical Hours	(3)

Brief Course Description:

- ❖ In this course, the student performs thirteen experiments in mechanics, in Parallels with the physics course 101 .

Course Objectives:

This course aims at:

Detailed Course Description:

Unit Number	Unit Name	Unit Content	Time Needed
1.	Significant Figures & Errors		
2.	Measurements And Uncertainties		
3.	Rectilinear Motion Kinematics of		
4.	Vectors (equilibrium of Forces)		
5.	Conservation of Energy		
6.	Force and Motion		
7.	Friction		
8.	Simple Harmonic Motion-1(Simple Pendulum)		
9.	Simple harmonic motion-11(Hooks law for a Helical Spring)		
10.	Physical Pendulum		
11.	Rotational Motion		
12.	Speed of Transverse Mechanical Waves		
13.	Centripetal Force		
14.	Specific Heat		
15.	Electrical Equivalent of Heat		

Evaluation Strategies:

Exams	Percentage	Date
Lab. Reports	40%	--/--/----
Quiz	10%	--/--/----
Mid-term Exam (Practical)	10%	--/--/----
Final Exam	40%	

Teaching Methodology:

- ❖ Lecture

Text Books & References:

References:

1. General physics manual (111, prepared by AL – Balqa Applied University, 1999
2. Exercises and experiments in physics, John E. Williams.
3. Laboratory Experiments, University of Jordan.
4. Experiments in Mechanics, Yarmouk University