

Program Engineering

Specialization	Advanced Welding Technology
Course Number	20214111
Course Title	Welding Drafting
Credit Hours	2
Theoretical Hours	0
Practical Hours	6



Brief Course Description:

Graphic language and software packages for welding, drafting standards, projections, drafting instruments and tools, geometric constructions, tolerance, intersections and developments, representation of basic types of welded joints, welding symbols, supplementary symbols, dimensioning welding joints.

Course Objectives:

تهدف هذه المادة إلى:

At the end of this course student will be able to:

1. be aware of the need for engineering drawings in terms of communication & organization
2. Identify and illustrate shapes of simple components when viewed from different directions
3. Identify the two forms of Orthographic projection (first & third angle) in principal and auxiliary planes
4. construct true sizes and shapes of three dimensional objects
5. Standard of dimensioning functional and non- functional surfaces
6. select and state limits and fits
7. figure symbols of welded joints



Detailed Course Description:

Serial no.	Topic	Content	Timing
1.	Communication & Organization	Types of drawings, drawing office, print room,	
2.	Projection	Geometric figures and construction Points, lines and plans in space, proj. oblique surfaces & curved edges, intersections projection, First angle Projection, third angle Projection, Isometric Projection	
3.	Details drafting	True sizes drafting ,Principal & auxiliary Projection and revolutions, sections views, dimensioning , cutting plans, hatching	
4.	Tolerance & feature control	Definition and application, Standard fits between mating parts, fits systems, feature control symbol placement, tolerance of location, tolerance of form & runout, control of surface quality	
5.	Drafting Welded joints	Definition and application, fusion welding, welding symbol, information in symbol, standard location of weld symbol element on drawings	



Evaluation Strategies:

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

Teaching Methodology:

- ❖ Lectures
- ❖ Drawing lab. Application
- ❖ Computer lab Application AutoCAD

Text Books & References:

Textbook:

1. **Technical Drafting, William Spence, Dean , Michael B. Atkins, Chas. A. Bennett Co.**
2. **Engineering Drawing, P. Collier & R. Wilson, Hutchinson of London**

References:

1. .



Engineering Program

Specialization	Common
Course Number	20212121
Course Title	Mechanical Measurements
Credit Hours	2
Theoretical Hours	2
Practical Hours	0



Brief Course Description:

- ❖ Principles of linear measurements, linear measurements, standards for measurements (metric and inch), tools of measurements, verniers and micrometer angular measurement, combination set, gauge blocks, inspection tools and gauges, dial indicating gauge, surface finish measurements. Mechanical Measurements Laboratory

Course Objectives:

At the end of this course student will be able to:

1. distinguish classifying measuring & layout tools by their accuracy and capacity
2. converting between different measuring systems
3. care of measuring & layout tools
4. testing measuring & layout tools



Detailed Course Description:

Unit Number	Unit Name	Unit Content	Time Needed
1.	Introduction	<ul style="list-style-type: none"> definitions, importance, Linear measurements metric and USA customary system, measuring units multiplying and divides, conversion between the two systems, care of measuring tools 	
2.	Measurements	<ul style="list-style-type: none"> Linear measuring: Steel rule, steel tapes, trammels, kinds, sizes accuracy of vernier caliper, micrometer, transferring measurements between tools. Angular measurements, steel square, combination set 	
3.	Layout	<ul style="list-style-type: none"> definitions, importance, tools for layout: surface plate, angle plate, v-blocks 	
4.	Testing measuring & layout tools	<ul style="list-style-type: none"> Testing Steel rule, steel tapes, trammels, kinds, sizes accuracy of vernier caliper, micrometer, 	



Evaluation Strategies:

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

Teaching Methodology:

- ❖ Lecture

Text Books & References:

Text Book:

1. Technical Drafting, William Spence, Dean , Michael B. Atkins, Chas. A. Bennett Co.
2. Engineering Drawing, P. Collier & R. Wilson, Hutchinson of London
3. Metalwork Technology and practice, Victor E. Repp, USA

References:





Engineering Program

Specialization	Common
Course Number	20212122
Course Title	Mechanical Measurements Laboratory
Credit Hours	1
Theoretical Hours	0
Practical Hours	3



Brief Course Description:

- ❖ Measuring lengths with tape, metal rulers, calipers and micrometers, measuring angles with protractors combination sets, use of gauges blocks, comparing dimensions and flatness with dial-indicating gauge. Layout using tools and template

Course Objectives:

At the end of this course student will be able to:

1. Measuring length up to accuracy of 1/100
2. comparing heights up to accuracy of 1/100
3. layout works using proper techniques

Detailed Course Description:

Unit Number	Unit Name	Unit Content	Time Needed
1.	Measuring	<p>The student should practicing measuring</p> <p>Linear lengths with:</p> <ul style="list-style-type: none"> ▪ steel ruler, tapes ▪ vernier caliper, micrometer <p>Angles with:</p> <ul style="list-style-type: none"> ▪ protractors combination sets 	
2.	Layout	<p>The student should practicing layout</p> <ul style="list-style-type: none"> ▪ Simple shapes with layout tools ▪ Complicated shapes with template 	

Evaluation Strategies:

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

Engineering Program

Specialization	Advanced Welding Technology
Course Number	20214221
Course Title	Metals Machining
Credit Hours	2
Theoretical Hours	2
Practical Hours	0



Brief Course Description:

- ❖ Introduction to metal removal processes, basic machining calculations, cutting and machining, holding devices, lubricants and cutting fluids, sawing operation and power sawing (hacksaws, band saws), drilling machines, drills and drilling operations, turning, shaping, manual grinding.

Course Objectives:

At the end of this course student will be able to:

1. explain basics of metal cutting
2. calculate cutting speeds
3. list steps of cutting metals using hacksaws, band saws
4. list steps of drilling holes as designed
5. list steps of operating lathe machine
6. list steps of operating shaping machine
7. tell order of Planing fat and bevel surfaces



Unit Number	Unit Name	Unit Content	Time Needed
1.	Fundamentals of machining	<ul style="list-style-type: none"> Mechanics of cutting, cutting forces and power, Temperatures in cutting, Tool life, Machine ability, cutting fluids 	
2.	Power sawing	<ul style="list-style-type: none"> Power hacksaw, bandsaw, blade & bands, 	
3.	Drilling & reamers	<ul style="list-style-type: none"> Drilling machine, drills, sleeves, sockets, and chucks, drilling, cutting speed, feeds, center drills, hand & machine reamering 	
4.	Turning and Hole making	<ul style="list-style-type: none"> The turning process, lathes and lathe operation, Boring and boring machines, Drilling, Tapping and taps 	
5.	Disk cutting	<ul style="list-style-type: none"> Disk cutting machine, disks, 	
6.	Shaping & planning	<ul style="list-style-type: none"> Planning and shaping machines and their uses, tools, 	
		<ul style="list-style-type: none"> 	

Evaluation Strategies:

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

Teaching Methodology:

- ❖ Lecture & classroom tasks
- Application in workshop

Text Books & References:

Text Book:

1. Fundamentals of Machine Technology by C. Thomas Olivo.
2. Workshop Technology by W. Chapman, Edward Arnold.





Engineering Program

Specialization	Advanced Welding Technology
Course Number	20214222
Course Title	Metals Machining Workshop
Credit Hours	2
Theoretical Hours	0
Practical Hours	6



Brief Course Description:

- ❖ This course is designed for entry-level in metal works, based on developing technical senses of students by metal cutting in welding workshops, sawing by band and hack saws, cutting different profiles by disk cutting machines, drilling by stand and manual drilling machines, chamfering joints by shaping and chamfering machines, manual grinding, disk cutting.

Course Objectives:

At the end of this course student will be able to:

1. explain basics of metal cutting
2. calculate cutting speeds
3. cut metals using hacksaws, band saws, and disk-cutting
4. drill holes as designed by stand and manual drills
5. operate shaping machine
6. Plain fat and bevel surfaces



Lab Number	Lab Name	Lab Content	Time Needed
1.	Shaping & planning	<p>The student should practicing on :</p> <ul style="list-style-type: none"> ▪ Mantling and dismantling (machine vice) ▪ Install cutting tools with arbors, holders, adapters ▪ Operate the machine heads & movements ▪ Install work-piece with vises & holding devices ▪ shaping process ~ Flat surface bevels, and chamfers ~ Grooves & keyways 	
2.	Hand grinding & cutting machine	<p>The student should practicing on :</p> <ul style="list-style-type: none"> ▪ Balancing and Mantling grinding wheels ▪ Operate the machine ▪ Grinding & cutting process ~ Welded joints ~ Smoothing edges 	
3.	Hand and stand drill	<p>The student should practicing on :</p> <ul style="list-style-type: none"> ▪ Balancing and Mantling chucks ▪ Setup and operate the machine ▪ Drilling holes & chamfering 	
4.	Hacksaws and band saws	<p>The student should practicing on :</p> <ul style="list-style-type: none"> ▪ Choosing and Mantling sawing (blades and bands) ▪ Setup and operate the machine ▪ Sawing round & profiles bares 	

Evaluation Strategies:

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

Teaching Methodology:

- ❖ Workshop applications

Text Books & References:

Text Book:

1. Fundamentals of Machine Technology by C. Thomas Olivo.
2. Workshop Technology by W. Chapman, Edward Arnold.

References:



Engineering Program

Specialization	Common
Course Number	20212231
Course Title	Manufacturing Processes
Credit Hours	2
Theoretical Hours	2
Practical Hours	0



Brief Course Description:

- ❖ Hot and cold working of metals, elastic deformation, rolling, forging, extrusion, drawing, pipe and tube manufacturing, casting, molding, and foundry processes. Metal cutting methods, turning, drilling, milling, sawing, planing. Machining cutters and machining operations.

Course Objectives:

This course is designed to introduce student in manufacturing process specialization to the basic process, hot and cold working of metal like:

Plastic deformation; Rolling; Forging; Extrusion; Drawing and Foundry processes.

Detailed Course Description:

Unit Number	Unit Name	Unit Content	Time Needed
1.	Rolling of metals	<ul style="list-style-type: none"> ▪ Introduction, the flat – Rolling process, flat rolling practice, rolling mills, various rolling processes, rolling defects and mills 	
2.	Forging metals	<ul style="list-style-type: none"> ▪ Introduction, Open – Die forging, impression – die and closed – die forging, various forging operation, forge ability of metals, forging defects, forging machines 	
3.	Extrusion and Drawing of metals	<ul style="list-style-type: none"> ▪ Introduction, the extrusion process, hot extrusion, cold extrusion. Extrusion defects, extrusion equipment. The drawing process, drawing practice, drawing defects, drawing equipment 	
4.	Sheet – Metal Forming Processes	<ul style="list-style-type: none"> ▪ Shearing, sheet metal characteristics and form ability, bending sheets, plates, and tubes 	
5.	Foundry Tools and Equipment	<ul style="list-style-type: none"> ▪ moulding boxes, moulding machines, moulding and core making, moulding materials (sand, binds, additives), Properties of moulding sand, types of moulding sand, testing moulding sand, moulding processes, green sand moulding, gates and risers, types of gates, patterns, cores 	
6.	Casting methods	<ul style="list-style-type: none"> ▪ permanent moulding casting, semi – permanent moulding casting, die casting centrifugal casting, shell moulding process, casting defects, cleaning of casting, inspection of casting 	

Evaluation Strategies:

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

Teaching Methodology:

- ❖ Lecture

Text Books & References:

Text Book:

1. Manufacturing Engineering and technology, 5th edition, Serope Kalpakjian and Steven, R. Schmid, 2006 by Pearson Education, Inc Pearson Prentice Hall USA.

References:

1. Manufacturing Processes and Systems. Last edition, Phillip F Ostwald and Jairo Munoz, Copyright. 1997 by John Wiley and sons.
2. Production Technology last edition, HMT Bangalore, Taate Mc Graw – Hill Publishing Company.





Engineering Program

Specialization	Common
Course Number	20203215
Course Title	Reclamation by Welding
Credit Hours	2
Theoretical Hours	2
Practical Hours	0



Brief Course Description:

- ❖ Mechanical and Chemical Corrosion, Factors affecting reclamation method, Types and method of reclamation welding, metal spraying. Plasma Spraying and Chemical methods reclamation of engine, hand forming technology, painting technology.

Course Objectives:

The main objectives of this course to get the student familiar with the reclamation types such:

1. Metal spraying.
2. Plasma spraying.
3. Chemical methods.

To get the student familiar with hand forming technology, painting technology, and types of corrosion.

Detailed Course Description:

Unit Number	Unit Name	Unit Content	Time Needed
1.	Corrosion	<ul style="list-style-type: none"> Types of corrosion, identifying of reclamation, the advantages of reclamation, economics for reclamation, preparing pieces for reclamation 	
2.	Reclamation	<ul style="list-style-type: none"> Factors affecting reclamation methods, rod welding. Heating reclamation, Oxyacetylene reclamation, open arc system 	
3.	Metal spraying	<ul style="list-style-type: none"> oxyacetylene spraying, plasma spraying, chemical reclamation 	
4.	Reclamation of engine parts	<ul style="list-style-type: none"> Automobile parts reclamation, Cranks, Axes, Radiators, Armed parts, Pipes 	
5.	Hand Forming Technology	<ul style="list-style-type: none"> Repairing frame parts, Hand forming tools, Removing the corrosion, Repairing techniques for fiberglass material 	
6.	Painting Technology	<ul style="list-style-type: none"> Preparing the car for painting, Types of paints, Painting tools, Painting process, Surface finish and polishing, Safety precautions 	

Evaluation Strategies:

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

Teaching Methodology:

- ❖ Laboratory

Text Books & References:

Text Book:

1. Welding Technology Fundamentals, William A Bowditch and E. Bowditch, Goodheart – Willcox - publisher, 2005.

References:

1. Welders Handbook, By Richard Finch, Amazona, 2002.



Engineering Program

Specialization	Common
Course Number	20203216
Course Title	Reclamation by Welding Workshop
Credit Hours	1
Theoretical Hours	0
Practical Hours	3



Brief Course Description:

- ❖ Application of different kinds of Reclamation by welding, and hand forming of metal sheets, panting technology.

Course Objectives:

After presenting this course student should:

1. Use different types of reclamation.

Detailed Course Description:

Lab Number	Lab Name	Lab Content	Time Needed
1.	The student should practicing on different types of reclamation like	<ul style="list-style-type: none"> ▪ Rod welding ▪ Heating reclamation ▪ Metal spraying (by oxyacetylene, Plasma) ▪ Reclamation of engine parts ▪ Automobile parts reclamation (crank, axes, radiators, armed parts, pipes) 	
2.	The student should practicing on hand forming technology like	<ul style="list-style-type: none"> ▪ Repairing frame parts, Hand forming tools, Removing techniques for fiberglass material, Removing the corrosion 	
3.	The student should practicing on Painting technology	<ul style="list-style-type: none"> ▪ Painting process, Surface finish and polishing, safety precautions 	



Evaluation Strategies:

Exams		Percentage	Date
Exams	Assignments	30%	--/--/----
	Mid-tern exam	20%	--/--/----
	Final practical exam	50%	--/--/----
Homework and Projects			
Discussions and lecture Presentations			

Teaching Methodology:

- ❖ Laboratory

Text Books & References:

Text Book:

1. Welding Technology Fundamentals, William A Bowditch and, E. Bowditch, Goodheart – Willcox - publisher, 2005.

References:

1. Welders Handbook, By Richard Finch, Amazona, 2002.



Engineering Program

Specialization	Advanced Welding Technology
Course Number	20214131
Course Title	Conventional Welding Technology
Credit Hours	3
Theoretical Hours	3
Practical Hours	0



Brief Course Description:

- ❖ Welding theory, welding processes, Oxyacetylene welding equipment, flame, welding positions, visual inspecting welding, cutting with oxyacetylene; arc welding, electric current for arc welding, types of arc welding machines, electrodes, types, specification, numbering system.

Course Objectives:

At the end of this course the student will be able to:

1. Explain welding process.
2. tell steps of preparing and positioning joints
3. recognize different types of flames
4. Identify components of Oxyacetylene welding equipments
5. tell steps of setup AC, DC welding machine
6. identify welding errors



Detailed Course Description:

Lab Number	Lab Name	Lab Content	Time Needed
1.	Welding introduction	<ul style="list-style-type: none"> welding classification, welding process, welding positions, welding inspection 	
2.	shielded arc welding	<ul style="list-style-type: none"> Electrical circuit for arc welding, welding electrodes & numbering , types of machine Ac, Dc specifications , techniques for starting the arc 	
3.	Oxyacetylene welding and cutting	<ul style="list-style-type: none"> Oxyacetylene welding equipment, welding & cutting torches, regulators, flame types, equipments, , introduction to the process of gas metal arc welding in the flat and horizontal position. 	

Evaluation Strategies:

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

Teaching Methodology:

- ❖ Laboratory

Text Books & References:

Text Book:

1. Welders Gulde – by James E. Brumbaugh, last edition.
2. Theodore Audel and Co. a division of Howard W. Sans and Co, USA.

References:

1. Welding Technology, American Technical Society Chicago last edition, J. W Giachino W. weeks G.s Johnson.
2. Modern Welding, by A.D Althouse C.H Turnquist and W.A. Bowditch, South Holland Illinois.





Engineering Program

Specialization	Advanced Welding Technology
Course Number	20214132
Course Title	Welding workshop 1
Credit Hours	2
Theoretical Hours	0
Practical Hours	6



Brief Course Description:

- ❖ Setup and operating oxyacetylene welding equipment. Oxyacetylene welding in flat, horizontal, vertical, and overhead positions. Setup and operating arc welding machine. Welding 10mm thick metal sheets in all welding positions.

Course Objectives:

After presenting on this course the student will be able to:

7. Process Oxyacetylene
8. Electrical arc welding.
9. Process Oxyacetylene cutting.
10. Welding different Joints in all positions.



Detailed Course Description:

Lab Number	Lab Name	Lab Content	Time Needed
	Welding introduction	<ul style="list-style-type: none"> welding classification, welding process, 	
1.	shielded arc welding	<ul style="list-style-type: none"> Electrical circuit for arc welding, welding electrodes & numbering , types of machine Ac/Dc, techniques for starting the arc Practical experience in the use and application of shielded arc welding on various joint configurations in all position on plate , visual inspection 	
2.	Oxyacetylene welding and cutting	<ul style="list-style-type: none"> Equipments installation, oxyacetylene welding and cutting application, introduction to the process of gas metal arc welding in the flat and horizontal position. Destructive testing methods of weldments to develop welding procedure. 	

Evaluation Strategies:

Exams		Percentage	Date
Exams	Assignments	30%	--/--/----
	Mid-tern exam	20%	--/--/----
	Final practical exam	50%	--/--/----
Homework and Projects			
Discussions and lecture Presentations			



Teaching Methodology:

- ❖ Laboratory

Text Books & References:

Text Book:

3. Welders Gulde – by James E. Brumbaugh, last edition.
4. Theodore Audel and Co. a division of Howard W. Sans and Co, USA.

References:

3. Welding Technology, American Technical Society Chicago last edition, J. W Giachino W. weeks G.s Johnson.
4. Modern Welding, by A.D Althouse C.H Turnquist and W.A. Bowditch, South Holland Illinois.



Engineering Program

Specialization	Advanced Welding Technology
Course Number	20214231
Course Title	Advanced Welding Applications
Credit Hours	2
Theoretical Hours	0
Practical Hours	6



Brief Course Description:

- ❖ Setup and operating GMAW, SAW and GTAW welding equipment, welding ferrous metals with tungsten arc, welding non-ferrous metals with tungsten arc, welding stainless steel with tungsten arc. Examples.

Course Objectives:

At the end of this course the student will be able to:

1. setup welding equipments
2. Process different types of electrical resistance welding.
3. welding steel with GTAW
4. welding nonferrous materials with GTAW
5. Welding steel sheets with GMAW .
6. Practicing methods for testing welds.

Detailed Course Description:

Lab Number	Lab Name	Lab Content	Time Needed
1.	GTAW (Tungsten inert gas)	The student should practicing on the different positions of welding <ul style="list-style-type: none"> ▪ Welding steel joints up to 20 mm thickness ▪ Welding stainless steel joints ▪ Welding Aluminum joints 	
2.	GMAW (Gas-metal arc welding)	The student should practicing on the different types of welding like <ul style="list-style-type: none"> ▪ Welding steel joints up to 20 mm thickness ▪ Pip joints welding 	
3.	Welding inspection	<ul style="list-style-type: none"> ▪ The student should practicing on the visuals Inspection and testing 	



Evaluation Strategies:

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

Teaching Methodology:

- ❖ Laboratory

Text Books & References:

Text Book:

1. Welders Gulde – by James E. Brumbaugh, last edition.
2. Theodore Audel and Co. a division of Howard W. Sans and Co, USA.

References:

1. Welding Technology, American Technical Society Chicago last edition, J. W Giachino W. weeks G.s Johnson.
2. Modern Welding, by A.D Althouse C.H Turnquist and W.A. Bowditch, South Holland Illinois.



Engineering Program

Specialization	Advanced Welding Technology
Course Number	20212232
Course Title	Manufacturing Processes Workshop
Credit Hours	1
Theoretical Hours	0
Practical Hours	3



Brief Course Description:

- ❖ Application of following processes: forging, Drawing, extrusion, rolling. Sand Casting and Molding Procedures.

Course Objectives:

After presenting in this course the student should:

1. Operating different types of machines used metal forming.
2. Prepare the sand mould and patterns.
3. Cast different type materials.



Detailed Course Description:

Lab Number	Lab Name	Lab Content	Time Needed
1.	Metal sheet forming	<ul style="list-style-type: none"> ▪ Bending ▪ Rolling ▪ Shearing ▪ Blanking and Pressing ▪ Visits to metal Forming Plants ▪ Sand casting ▪ Preparing of sand ▪ Preparing mould ▪ Casting of non ferrous metals ▪ Visit to casting plants 	

Evaluation Strategies:

Exams		Percentage	Date
Exams	Assignments	30%	--/--/----
	Mid-tern exam	20%	--/--/----
	Final practical exam	50%	--/--/----
Homework and Projects			
Discussions and lecture Presentations			

Teaching Methodology:

- ❖ Laboratory

Text Books & References:

Text Book:

1. Manufacturing Engineering and technology, 5th edition, Serope Kalpakjian and Steven R. Schmid, 2006 by Pearson Education, Inc Pearson Prentice Hall USA.

References:

1. Manufacturing Processes and Systems. Last edition, Phillip F Ostwald and Jairo Munoz, Copyright. 1997 by John Wiley and sons.
2. Production Technology last edition, HMT Bangalore. Taate Mc Graw – Hill Publishing Company.

Engineering Program

Specialization	Advanced Welding Technology
Course Number	20214241
Course Title	Quantity Surveying/ Welding
Credit Hours	2
Theoretical Hours	2
Practical Hours	0



Brief Course Description:

- ❖ Definition of quantities, raw material and welding consumable standards, raw materials calculations, consumable calculations, materials evaluation, metal removal rate, cost calculations, machining time calculations, quantities and cost analysis.

Course Objectives:

After presenting in this course the student will be able to:

1. calculate surfaces
2. identify metal raw materials
3. covert metal volumes to weights
4. elaborate tables of quantities and cost
5. Elaborate time- production diagrams

Detailed Course Description:

Lab Number	Capitol	Content	Time Needed
1.	introduction	▪ Definitions of quantities, welding raw materials standards, consumable standards.	
2.	Areas & volumes	▪ Definitions, calculation of regular and un regular surfaces, calculation of regular and un regular volumes	
3.	Conversion of volumes to mass	▪ System of unites and there multiples, abbreviations, conversion volumes to mass and inverse	
4.	Table of quantities	▪ Convert materials quantities to standard, Tables design, tables fillings,	
5.	Calculation of consumable	▪ Electrodes calculation, gases calculation, tips...,	
6.	Time – production diagrams	▪ Importance of time, identifying operation sequence, time consumption of operation, diagrams elaboration	

Evaluation Strategies:

Exams		Percentage	Date
Exams	Assignments	30%	--/--/----
	Mid-tern exam	20%	--/--/----
	Final practical exam	50%	--/--/----
Homework and Projects			
Discussions and lecture Presentations			

Teaching Methodology:

Laboratory

Text Books & References:

Text Book:

1. system dynamics, Katsuhiko Ogata, prentice-hall New Jersey
2. metalwork Technology and practice, Victor E. Repp, USA

References:

- 1.



Engineering Program

Specialization	Advanced Welding Technology
Course Number	20214134
Course Title	Welding Workshops 2
Credit Hours	2
Theoretical Hours	0
Practical Hours	6



Brief Course Description:

- ❖ Welding cast iron with oxyacetylene flame copper wire and without added materials, oxyacetylene cutting, and arc welding thick joints, pipe welding.

Course Objectives:

At the end of this course student will be able to:

1. Weld cast iron with oxyacetylene flame.
2. Cut thick steel with oxyacetylene flame.
3. Weld steel joints up to 20 mm thick.
4. weld pips

Detailed Course Description:

Lab Number	Lab Name	Lab Content	Time Needed
1.	oxyacetylene flame	<p>The student should practicing</p> <ul style="list-style-type: none"> ▪ cast iron welding with copper wire ▪ cast iron welding without added material ▪ Hand cutting thick steel sheets ▪ Automatic cutting 	
2.	Arc welding	<p>The student should practicing</p> <ul style="list-style-type: none"> ▪ Preparing the joints ▪ Welding thick steel joints ▪ 	
3.	Pip welding	<p>The student should practicing</p> <ul style="list-style-type: none"> ▪ Preparing the joints ▪ Pip welding 	



Evaluation Strategies:

Exams		Percentage	Date
Exams	Assignments	30%	--/--/----
	Mid-tern exam	20%	--/--/----
	Final practical exam	50%	--/--/----
Homework and Projects			
Discussions and lecture Presentations			

Teaching Methodology:

- ❖ Laboratory

Text Books & References:

Text Book:

References:

- 1.



Engineering Program

Specialization	Advanced Welding Technology
Course Number	20214133
Course Title	Advanced Welding Technology
Credit Hours	3
Theoretical Hours	3
Practical Hours	0



Brief Course Description:

- ❖ Advanced welding processes: theory, welding processes, GMAW, GTAW, SAW, and welding equipment. Welding arc forming. Electrodes: types, specification, numbering system.

Course Objectives:

At the end of this course student will be able to:

1. explain welding process of GMAW, GTAW, and SAW
2. tell specifications and advantages of advanced wilding machines
3. tell specifications and the codification of electrodes
4. inspect welded joints

Detailed Course Description:

Number	Chapter	Content	Time Needed
1.	Introduction	<ul style="list-style-type: none"> ▪ Welding categories, Advanced welding process ▪ Students have to see advance welding process in the industry 	
2.	GTAW (Tungsten inert gas)	<ul style="list-style-type: none"> ▪ Importance, process, electrical circuit, electrodes, gases and there use, 	
3.	GMAW (Gas-metal arc welding)	<ul style="list-style-type: none"> ▪ Importance, process, electrical circuit, electrodes, gases and there use, 	
4.	SAW (submerged arc welding)	<ul style="list-style-type: none"> ▪ Importance, process, electrical circuit, electrodes, gases and there use, 	
5.	Welding inspection	<ul style="list-style-type: none"> ▪ Welded joints specifications ▪ Welded joints errors 	

Evaluation Strategies:

Exams		Percentage	Date
Exams	Assignments	30%	--/--/----
	Mid-tern exam	20%	--/--/----
	Final practical exam	50%	--/--/----
Homework and Projects			
Discussions and lecture Presentations			

Teaching Methodology:

- ❖ Laboratory

Text Books & References:

Text Book:

References:

6.



Engineering Program

Specialization	Common
Course Number	20409111
Course Title	Industrial Supervision
Credit Hours	(2)
Theoretical Hours	(2)
Practical Hours	(0)



Brief Course Description:

- ❖ Supervising duties, training knowledge, introduction, job standards, job analysis, training needs assessment, training programs and curriculum, training evaluation, subordinates appraisal, job organization, and production orders forms filling

Course Objectives:

At the end of this course student will be able to:

1.

Detailed Course Description:

Number	Chapter	Content	Time Needed
1.	JOB STANDARDS	<ul style="list-style-type: none"> ▪ Definition, objectives, job levels, uses of job Standard, Vocational Job Standardization Law 	
2.	TRAINING NEEDS	<ul style="list-style-type: none"> ▪ Job analyzing, jobs training needs surveying, training needs study 	
3.	TRAINING	<ul style="list-style-type: none"> ▪ Curriculum design, training plans, methods of training 	
4.	SUPERVISOR DUTIES	<ul style="list-style-type: none"> ▪ Introduction, Position of supervisor in the organization, duties, losses prevention 	
5.	PRODUCTION ORGANIZATION	<ul style="list-style-type: none"> ▪ Introduction, definition, steps of production study, (A.S.M.E.) production diagrams, 	



Evaluation Strategies:

Exams		Percentage	Date
Exams	Assignments	30%	--/--/----
	Mid-tern exam	20%	--/--/----
	Final practical exam	50%	--/--/----
Homework and Projects			
Discussions and lecture Presentations			

Teaching Methodology:

Laboratory

Text Books & References:

Text Book:

References:

1. Principles of industrial supervising, PhD Al-Najjar Moh'd 2008.
2. VTC documentation



Engineering Program

Specialization	Advanced Welding Technology
Course Number	20214251
Course Title	Materials and Welding Testing
Credit Hours	2
Theoretical Hours	2
Practical Hours	0



Brief Course Description:

- ❖ Practicing forming processes and analyzing structure and properties of metals and alloys. Cold rolling, pressing bending, shearing processes, dimensions of raw metals. Welded joint faults, excessive heat effects over metal structure. Types of weld testing, visual test, destructive tests: tensile, impact, nondestructive tests: fluorescent, radiographic tests.

Course Objectives:

At the end of this course student will be able to:

- 1- study the structure of welded joints.
- 2- scan welded joints against faults, cracks, and excessive heat effects.
- 3- study welded metals under shearing, bending, rolling, and pressing loads.
- 4- perform welding tests; visual tests, destructive tests, and nondestructive tests.

Detailed Course Description:

Chapter No.	Chapter's Name	Chapter's Content	Duration (hrs)
1	Introduction	An introduction to welding inspection. Welding defects. Metal structure	4
2	Structure of welded joints	Studying the structure of welded metals. Scanning welded joints against faults and cracks. The effect of excessive heat on metal structure.	8
3	Welded metals under loads	Studying welded metals under shearing, bending, rolling, and pressing loads.	8
4	Welding tests 1	The destructive tests: tensile, impact.	6
5	Welding tests 2	The nondestructive tests: fluorescent, radiographic tests, and visual tests.	6



Evaluation Strategies:

Exams		Percentage	Date
3 exams	First exam	% 20	Week # 6
	Second exam	% 20	Week # 12
	Final exam	% 50	Week #16
research and presentation		% 10	
Total		100%	



Engineering Program

Specialization	Advanced Welding Technology
Course Number	20214252
Course Title	Materials and Welding Testing lab
Credit Hours	1
Theoretical Hours	0
Practical Hours	3



Brief Course Description:

- ❖ . Structural analysis of metals. Photo-electrical and thermo-electrical effects analysis. Chemical, mechanical, and electrical properties of metals. Welded joint faults, excessive heat effects over metal structure. Types of weld testing. Visual test, destructive tests: tensile, impact, nondestructive tests: fluorescent, radiographic. Examples.

Course Objectives:

At the end of this course student will be able to:

1. Perform structural analysis for metals.
2. Study chemical, physical, and mechanical properties of metals.
3. Scan welded joints against faults, defects, and excessive heat effects.
4. Perform welding tests: visual tests, destructive and non-destructive tests.
- 5.

Detailed Course Description:

Chapter No.	Chapter's Name	Chapter's Content	Duration (hrs)
1	Introduction	Metal testing precautions, Importance of sample preparation, writing of reports, and conclusions.	3 (1 lab)
2	Structural analysis	To perform structural analysis for metals. To analyze photo-electrical and thermo-electrical effects.	9
3	Properties of metals 1	Performing metal testing to study mechanical properties of metals.	12
4	Properties of metals 2	Performing metal testing to study physical and chemical properties of metals.	9
5	Welding inspection	Performing welding tests: visual tests, destructive and non-destructive tests. Scanning welded joints against faults, defects, and excessive heat effects.	15

Evaluation Strategies:

Exams		Percentage	Date
Exams	Assignments	30%	--/--/----
	Mid-tern exam	20%	--/--/----
	Final practical exam	50%	--/--/----
Homework and Projects			
Discussions and lecture Presentations			

Teaching Methodology:

Laboratory

Text Books & References:

Text Book:

- 1- "Modern welding", by Andrew D. Aithouse and colleagues. 10th edition, 2004.

References:

1. VTC documentation

