

Engineering Program

Specialization	Welding Technology
Course Number	20203111
Course Title	Welding Technology (1)
Credit Hours	2
Theoretical Hours	2
Practical Hours	0



Brief Course Description:

- ❖ Types of welding, types of welded joints, welding position, weld ability, Electrical Arc welding, Gas welding, Oxygen Cutting of metal.

Course Objectives:

The main objectify of this course to get the student familiar with the welding process types such as arc welding

1. To introduce student it fundamentals of weld.
2. To inform student with principle of arc welding, gas welding, gas cutting and their equipment.



Detailed Course Description:

Unit Number	Unit Name	Unit Content	Time Needed
1.	Introduction to welding	<ul style="list-style-type: none"> Heat source as a basis for classification, other joining processes, cutting metals 	
2.	Fundamentals of welding	<ul style="list-style-type: none"> Selecting the appropriate welding process, metallurgy mechanical and physical properties of metals, types of joints, types of welding position, welding problems, producing good welds 	
3.	Gas welding equipment and supplies	<ul style="list-style-type: none"> Gas welding rods and fluxes, oxygen and acetylene cylinders, welding Torches, gas pressure regulators 	
4.	Gas welding process	<ul style="list-style-type: none"> Selecting the welding rod and flux, oxyacetylene flame characteristics 	
5.		<ul style="list-style-type: none"> Torch manipulation and movements making a weld without a filler rod 	
6.	Oxyacetylene Cutting equipment and supplies		
7.	Oxyacetylene Cutting		
8.		<ul style="list-style-type: none"> Arc welding Equipment and supplies: Welding power sources, DC and AC, electrodes 	
9.	Arc welding process	<ul style="list-style-type: none"> Selecting a power source, the electric arc, the required Current determine, selecting the proper electrode, welding positions, types of joints, weld preparation, welding problems 	

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. 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, Last edition.
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Engineering Program

Specialization	Welding Technology
Course Number	20203213
Course Title	Welding Technology (2)
Credit Hours	3
Theoretical Hours	3
Practical Hours	0



Brief Course Description:

- ❖ Air cutting electrical Resistance Welding, Fraction welding, Thermit, welding, explosive welding, cold pressure welding, Submerged Arc welding, Gas shielded- Arc welding, Ultrasonic welding, Explosive welding, Electron beam welding, Laser welding.

Course Objectives:

The main objectives of this course are:

1. Introduce student to fundamentals of electrical arc cutting.
2. To inform students with principle of different types of electrical resistance welding, fraction welding, thermit welding.
3. To teach student different method of modern welding technology such as:
 - Inert Gas arc welding (TIG, MIG).
 - Submerged arc welding.
 - Plasma arc welding, electro slag welding, electron –beam welding, Laser welding
4. *To explain the principle of weldability.*
5. *To know how to weld the different metals.*
6. *To teach students welding symbols.*
7. *To teach students methods of welding testing and inspection.*



Detailed Course Description:

Unit Number	Unit Name	Unit Content	Time Needed
1.	Arc cutting	<ul style="list-style-type: none"> Carbon arc cutting, Air metallic arc cutting 	
2.	Arc Cutting Equipment and Supplies	<ul style="list-style-type: none"> Equipment for : carbon arc cutting, metallic electrode arc cutting, air carbon arc cutting, Oxygen arc cutting 	
3.	Inert Gas Arc Welding	<ul style="list-style-type: none"> Gas arc welding principles, Types of gas arc welding, Gas tungsten arc welding process (GTAW) (TIG), striking the arc, TIG instructions and practice. GMAW (MIG) principles, practice And techniques 	
4.	Inert Gas Arc Welding Equipment and Supplies	<ul style="list-style-type: none"> Gas arc welding station equipment, Helium, Argon, Carbon Dioxide equipment (Cylinders, Regulators, Flowmeters on/off Valves). Arc welding power sources, electrode holders, Tungsten electrode Torch, Nozzles, MIG unit 	
5.	Modern welding technology	<ul style="list-style-type: none"> Submerged Arc welding technology and their equipment Plasma arc welding technology and their equipment Electro slag welding technology and their equipment, Electron beam welding technology and their equipment, Laser welding technology and their equipment, Ultrasonic Laser welding technology and their 	
6.	Resistance Welding	<ul style="list-style-type: none"> Resistance welding: Machines, Machines controls, electrodes Resistance spot welding, multiple spot welding, seam welding projection, welding flash, welding upset, spike welding 	
7.	Other processes	<ul style="list-style-type: none"> Thermit welding and their equipment, Friction welding and their equipment, Pressure welding and their equipment, Explosive welding 	
8.		<p>Welding Pipes, Tubes and pressure vessels Welding Tools and Die Steels Welding Cast Iron and Wrought Iron Welding Copper and its alloys Problems, methods Welding Aluminum and its alloys Problems, methods Testing and inspecting welds</p>	

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

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Engineering Program

Specialization	Welding Technology
Course Number	20202111
Course Title	Manufacturing Processes (1)
Credit Hours	2
Theoretical Hours	2
Practical Hours	0



Brief Course Description:

- ❖ Hot and Cold working of metal,(Plastic Deformation, Rolling, Forging, Extrusion, Drawing, pipe and tube manufacturing,) and foundry processes.

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 	

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Evaluation Strategies:

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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	Welding Technology
Course Number	20202211
Course Title	Manufacturing Processes (2)
Credit Hours	2
Theoretical Hours	2
Practical Hours	0



Brief Course Description:

- ❖ Metal Cutting Methods, Turning, Drilling, Milling, Sawing, Planning. Machining Cutters operations

Course Objectives:

This course is designed to introduce student in metal cutting processes specialization to the basic processes: Turning, Drilling, Milling, Sawing, Planning, Grinding and Machining cutter operations.



Detailed Course Description:

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 	
2.	Turning and Hole making	<ul style="list-style-type: none"> ▪ The turning process, lathes and lathe operation, Boring and boring machines, Drilling, drills, drilling machines, Reaming and Reamers Tapping and taps 	
3.	Machining Processes	<ul style="list-style-type: none"> ▪ used to produce various shapes: Milling, Broaching, sawing, and Filing: Milling and milling machines, Planning and shaping broaching and broaching machines, Sawing and Filing 	
4.	Finishing process	<ul style="list-style-type: none"> ▪ Grinding operations and machines 	

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. 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 Wilely and sons.
2. Production Technology last edition, HMT Bangalore, Taate Mc Graw – Hill Publishing Company.



Engineering Program

Specialization	Welding Technology
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, panting 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 Technolog	<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			

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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	Welding Technology
Course Number	20203112
Course Title	Welding technology 1 workshops
Credit Hours	1
Theoretical Hours	0
Practical Hours	3



Brief Course Description:

- ❖ Application of Oxy-Acetylene welding and cutting techniques, practicing of electrical Arc welding.

Course Objectives:

After presenting on this course the student should:

1. Process Oxyacetylene and electrical arc welding.
2. Process Oxyacetylene cutting.
3. Joint different types of parts of materials by welding.



Detailed Course Description:

Lab Number	Lab Name	Lab Content	Time Needed
1.		<ul style="list-style-type: none"> Practical experience in the use and application of shielded arc welding on various joint configurations in all position on plate 	
2.		<ul style="list-style-type: none"> 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:**

- Welders Gulde – by James E. Brumbaugh, last edition.
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References:

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Engineering Program

Specialization	Welding Technology
Course Number	20203214
Course Title	Welding technology 2 workshops
Credit Hours	1
Theoretical Hours	0
Practical Hours	3



Brief Course Description:

- ❖ Application of different kinds of resistance welding, and TIG, MIG, MAG welding, practicing methods for testing welds.

Course Objectives:

After presenting on this course the student should:

1. Process different types of electrical resistance welding.
2. Process TIG, MIG, MAG welding.
3. Joint different types of parts of materials by welding.
4. Practicing methods for testing welds.



Detailed Course Description:

Lab Number	Lab Name	Lab Content	Time Needed
1.	The student should practicing on the different types of welding like	<ul style="list-style-type: none"> ▪ resistance spot- welding ▪ resistance seam- welding projection ▪ resistance flash- welding ▪ resistance upset- welding ▪ TIG (Tungsten inert gas) ▪ MIG (metal inert gas) ▪ MAG (metal active gas) ▪ Submerged – Arc 	
2.		<ul style="list-style-type: none"> ▪ The student should practicing on the different types Inspection and testing – welds like: visual inspection, liquid penetrate inspection, magenetic particle inspection 	

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. 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.
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Engineering Program

Specialization	Welding Technology
Course Number	20202112
Course Title	Manufacturing Processes 1 Workshops
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:**

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References:

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2. Production Technology last edition, HMT Bangalore. Taate Mc Graw – Hill Publishing Company.

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Engineering Program

Specialization	Welding Technology
Course Number	20202212
Course Title	Manufacturing Processes 2 Workshops
Credit Hours	1
Theoretical Hours	0
Practical Hours	3



Brief Course Description:

- ❖ Applications of different kinds of metal cutting. Safety measures using measuring devices.

Course Objectives:

After presenting in this course the student should:

1. Operating different types of machines used metal cutting.



Detailed Course Description:

Lab Number	Lab Name	Lab Content	Time Needed
1.	The student should practicing on the different types of metal cutting Like	<ul style="list-style-type: none"> ▪ Turning process ▪ Drilling ▪ Reaming ▪ Tapping ▪ Milling ▪ Sawing ▪ Filing ▪ Broaching ▪ Finishing operation (Grinding Process) 	

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

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Engineering Program

Specialization	Welding Technology
Course Number	20203216
Course Title	Reclamation by Welding Workshops
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.

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