KGCE IN MECHANICAL ENGINEERING - MODEL CURRICULUM							
Programme Title : KGCE in Mechanical Engineering						**Notional Hours: 2880**	
COURSE NAME & CODE	**TOPIC / MODULE**	**THEORY (Hrs)**	**PRACTICAL (Hrs)**	**OBJECTIVE OF MODULE**	**OUTCOME OF MODULE**	**METHEDOLOGY**	**TOOLS REQUIRED**
		480	**620**	**YEAR 1**			
BASIC MATHEMATICS & SCIENCE (1001)	**Module M1** Basic Mathematics calculations & Algebra	40	0	OB 1.1 To understand principles of basic mathematics and calculation including Fraction, Ratio & Proportions, Basic Algebra	**Will be able to:** MO-1.1 Perform basic mathematical calculations in Fraction, Ratio & Proportions, Basic Algebra	- Lecture - Use of smart class rooms - Use of instructional guidelines	- Laptop & Projector - Guideline documents
	Module M2 Mensuration and Trigonometry	40	0	OB 2.1 To understand principles of Mensuration and Trigonometry	MO-2.1 Perform basic mathematical calculations and solve sample probles related to Mensuration and Trigonometry	- Lecture - Use of smart class rooms - Use of instructional guidelines	- Laptop & Projector - Guideline documents
	Module M3 Basic Science	40	0	OB 3.1 To understand principles of basic Science including System of units, Unit Conversion Mass/weight/volume/density, Work/power/energy, Velocity/Speed, elasticity	MO-3.1 Understand the concepts of basic science including : System of units, Unit Conversion MO-3.2 Define - Mass/weight/volume/density, Work/power/energy, Velocity/Speed, elasticity	- Lecture - Use of smart class rooms - Use of instructional guidelines	- Laptop & Projector - Guideline documents
	Module M4 Basic Science	40	0	OB 4.1 To understand principles of basic Science including Heat, Pressure & Temperature and thier applications. OB 4.2 To Understand the concepts of Basic electricity - AC/DC/Voltage, Current , Resistance, Ohms law	MO-4.1 Define - Heat, Pressure & Temperature and their applications MO-4.2 Explain - AC/DC/Voltage, Current , Resistance, Ohms law	- Lecture - Use of smart class rooms - Use of instructional guidelines	- Laptop & Projector - Guideline documents
	Module M1 Introduction to	8	0	OB 1.1 To understand different instruments used in engineering drawing	MO-1.1 List various instruments used in engineering drawing MO-1.2 State uses of various drawing instruments MO-1.3 Use various instruments to draw sample exercises	- Lecture - Demonstration	

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Engineering Drawing **(1002)**	Introduction to Engineering Drawing Practice	10	0	OB 1.2 To understand freehand sketching, lettering and dimensioning	MO-1.4 Understand the application of freehand sketching, lettering and dimensioning, Layouting and title block MO-1.5 List various dimensioning methods MO-1.6 Solve problems based on different dimensioning methods	- Lecture - Demonstration	- Scales, Compass, Drawing board, Clips, Mini drafter, Pencils, Drawing sheets, Stencils, Instrument box - Laptop & Projector
	Module M2 Geometrical Drawing	20	0	OB 2.1 To understand Geometric constructions and drawings of various objects and shapes	MO-2.1 Draw lines, angles, triangles, squares, polygons, threads, fasteners based on sample exercises	- Lecture - Demonstration	
	Module M3 Orthographic Projection	20	0	OB 3.1 To draw orthographic projections of various objects	MO-3.1 State the concept of quadrants in engineering drawing MO-3.2 Differentiate first angle and third angle projection MO-3.3 Prepare orthographic projection of given sample objects	- Lecture - Demonstration	
	Module M4 Shop floor drawing	22	0	OB 4.1 To undestrand and draw shop floor drawings	MO-4.1 State the importance of shop floor drawing in industry MO-4.2 Prepare isometric drawings of given sample objects MO-4.3 Prepare assembly drawing of given sample products	- Lecture	
		6	0	OB 1.1 To understand general discipline rules for a trainee laid down by the institute and workplace	**Will be able to:** MO-1.1 List the general discipline rules of the institute	- Lecture - Use of smart class rooms - Use of instructional guidelines	- Laptop & Projector - Guideline documents

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		10		OB 1.2 To understand various safety practices while working in the workshop	MO-1.2 List and follow various safety practices and different precautions to be taken for safe working in workshop MO-1.3 Recognize and report all unsafe situations according to the safety rules MO-1.4 Locate positions of various safety equipments/tools/personal protective equipments in the workplace MO-1.5 Identify and take necessary precautions on fire and safety hazards according to the safety policy MO-1.6 Identify different types of fire extinguisher and use them under different circumstances	- Lecture - Use of smart class rooms - Demonstration	- Laptop & Projector - Fire extinguisher - Fire buckets
		10		OB 1.3 To understand general First-Aid treatment	MO-1.7 Identify and list the policies and procedures in regard to illness or accident MO-1.8 List general first aid practice do's and don'ts MO-1.9 Display the first aid treatment to be given for electric shocks, burns caused by direct flame or by chemical, large wounds with or without severe bleeding, eye injuries etc.	- Demonstration - Use of smart class rooms - Role play	- First Aid kit - Laptop & Projector
	Module M1 Introduction to Mechanical Engineering and Workshop Safety	18	0	OB 1.4 To understand the basic concepts of Mechanical Engineering - Force, Work, Power, Pressure, Heat, Temperature, Density, Energy, Stress, Strain Fuels, Engines, Pumps etc. Simple Mechanisms - Effort, load, mechanical advantage, Centre of gravity Friction - Laws of friction, Coefficient of friction, Lubrication Power transmission	MO-1.10 Explain the importance Mechanical engineering in industry MO-1.11 Define terms Force, Work, Energy, Power, Pressure, Heat, Temperature, Density with units MO-1.12 List various fuels used MO-1.13 List various engines used in industry MO-3.14 Differentiate IC & EC engines MO-1.15 List various pumps used industry MO-1.16 Explain the concept of Effort, load, mechanical advantage, Centre of gravity, Laws of friction, Coefficient of friction, Lubrication MO-1.17 List various power transmission methods	- Lecture - Use of smart class rooms	- Laptop & Projector

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		16	0	OB 1.5 To understand the basics of metallurgy & material science OB 1.6 To understand different mechanical properties of metals & Testing of materials OB 1.7 To be familiar with types of heat treatment processes OB 1.8 To be familiar with mechanical working of metals - Hot working, Hot rolling, Piercing, Drawing, Spinning, Extrusion, Cold working, Squeezing, Hobbing etc.	MO- 1.18 List different materials used in industry MO-1.19 Differentiate ferrous and non ferrous metal properties MO-1.20 List different ferrous and non ferrous metals MO-1.21 Explain different mechanical properties of metals - Ductility, Malleability, Strength, Toughness, Stiffness, Elasticity, Hardness, Brittleness, Machinability, Fatigue MO-1.22 Explain different heat treatment processes MO-1.23 State different testing methods for metals MO 1.24 Explain different mechanical working methods for metals	- Lecture - Use of smart class rooms	- Laptop & Projector
Module M2 General Workshop Practice		16	0	OB 2.1 To understand the importance of general workshop in industry - Fitting - Sheet metal - Welding - Smithing & Forging - Foundry - Carpentry	MO-2.1 Explain the importance of general workshop MO-2.2 List various sub sections in general workshop MO-2.3 Explain the importance of Smithing & Forging MO-2.4 Explain the importance of Foundry MO-2.5 Explain the importance of Carpentry	- Lecture - Use of smart class rooms - Demonstration	- Laptop & Projector - Fitting sample models - Sheet metal joint sample models - Welded sample models - Turning sample models
		24	0	OB 2.2 To understand various hand tools in fitting section - Vices, Hammers, Chisels, Files, Scraper, Hacksaw, Surface plate, Scriber, Punches, V-Block, Angle plate, Try square, Drills, Reamer, Taps, Dies etc OB 2.3 To understand various operations to be carried out in fitting section - Chipping, Filing, Scrapping, Grinding, Sawing, Marking, Drilling, Reaming, Tapping & Dieing OB 2.4 To understand various measuring instruments & equipments used in fitting section	MO 2.6 List and Explain the various fitting operations MO-2.7 List various measuring instruments and gauges used in workshop MO-2.8 List various hand tools used in Fitting section MO-2.9 Explain the uses of various hand tools used in Fitting section MO-2.10 List different types of files and their uses MO-2.11 Explain different types of filing methods	- Lecture - Use of smart class rooms - Demonstration	- Laptop & Projector

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Professional Knowledge-I (Trade Theory) **(1021)**		16	0	OB 2.5 To understand various hand tools, measuring instruments, operations and equipments in sheet metal	MO-2.12 List and Explain the various operations, measuring instruments and gauges used in Sheet metal workshop MO-2.13 List various hand tools used in Sheet metal section MO-2.14 Explain the uses of various hand tools used in Sheet metal section	- Lecture - Use of smart class rooms - Demonstration	- Laptop & Projector - Various sample models on sheet metal joints - Riveted joints
		8	0	OB 3.1 To understand the basics of metal joining processes-Welding	MO-3.1 Explain the importance of metal joining MO-3.2 List different metal joining processes MO-3.3 List the advantages of different metal joining processes	- Lecture - Use of smart class rooms - Demonstration	- Laptop & Projector - Various sample models on metal joints
		4	0	OB 3.2 To understand various welding techniques	MO-3.4 List various welding techniques used in industry	- Lecture - Demonstration	- Laptop & Projector
		10	0	OB 3.3 To understand edge preparation methods OB 3.4 To understand the process of electric arc welding	MO-3.5 Explain the need of edge preparation in welding MO-3.6 List various edge preparation methods MO-3.7 Effect of edge preparation models in welding joints. MO-3.8 State the principle of electric arc welding MO-3.9 Demonstrate set up procedure for welding machine connections to weld on MS plate observing standard procedures	- Demonstration - Practical exercises	- Arc welding machine with accessories & Tools
		6	0	OB 3.5 To understand different types of welding electrodes	MO-3.10 List different types of welding electrodes MO-3.11 State the system of electrode coding MO-3.12 State the method of storage of electrodes	- Lecture - Demonstration	- Welding electrodes
		6	0	OB 3.6 To understand functions of electrode flux coating	MO-3.13 Explain the functions of flux coating MO-3.14 Define coating factor MO-3.15 Describe the characteristics of flux coating on electrodes	- Lecture	- Laptop & Projector

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	Module M3 Metal Joining Processes	4	0	OB 3.7 To understand electrode size and current range	MO-3.16 List different electrode sizes and current ranges	- Lecture	
		4	0	OB 3.8 To understand the selection of polarities in welding	MO-3.17 Define types of polarity MO-3.18 Distinguish between straight and reverse polarity	- Lecture	
		16	0	OB 3.7 To understand different hand tools and equipments used for Arc welding	MO-3.19 List various hand tools used for arc welding MO-3.20 State uses of different hand tools MO-3.21 Identify different arc welding hand tools according to the requirement	- Lecture - Use of smart class rooms - Demonstration	- Laptop & Projector - Arc welding machine with accessories & Tools
		14	0	OB 3.8 To understand welding of Ferrous metals, Non ferrous metals and alloys	MO-3.22 Explain welding of Low carbon steel MO-3.23 Explain welding of Tool steel MO-3.24 Explain welding of Cast iron MO-3.25 Explain welding of Stainless steel MO-3.26 Explain welding of Aluminium & Copper MO-3.27 Explain welding of Aluminium & Copper alloys	- Lecture	- Laptop & Projector
		14	0	OB 3.9 To understand Gas welding process OB 3.10 To understand different tools & equipments required to perform Gas welding OB 3.11 To be familiar with different types flames and mechanism of Arc cutting	MO-3.28 Explain the mechanism of gas welding MO-3.29 Explain the importance of filler rods MO-3.30 List different tools & Equipments used in Gas welding MO-3.31 Explain different types of flames MO-3.32 Explain the process of setting a gas welding plant	- Lecture	- Laptop & Projector - Gas welding machine with accessories & Tools

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	Module M4 Lathe & Lathe operations	10	0	OB 4.1 To understand importance and various parts of Lathe	MO-4.1 List different types of lathes MO-4.2 Identify different parts of lathe MO-4.3 State the importance of various parts in lathe	- Lecture - Demonstration	- Laptop & Projector
		8	0	OB 4.2 To understand various tools used in turning operation	MO-4.4 List various hand tools used for working in a lathe MO-4.5 State the uses of various hand tools used in lathe operation MO-4.6 Explain the nomenclature of lathe cutting tool	- Lecture - Demonstration	- Laptop & Projector
		10	0	OB 4.3 To understand various operations carried out in Lathe	MO-4.7 List different operations which can be performed in lathe MO-4.8 State the importance of cutting speed, feed, depth of cut in turning MO-4.9 Explain various taper turning methods	- Lecture - Demonstration - Use of smart class rooms	- Laptop & Projector
		10	0	OB 4.4 To understand functions of various lathe attachments & accessories	MO-4.10 List types of lathe attachments MO-4.11 State the applications of different lathe attachments & accessories	- Lecture - Demonstration - Use of smart class rooms	- Laptop & Projector
	Module M1 Fitting Practice	0	90	OB 1.1 To be familiar with the usage of fitting hand tools and operations OB 1.2 Plan and organize the work to make job as per specification applying different types of basic fitting operation OB 1.3 Check for dimensional accuracy following safety precautions. OB 1.4 To perform basic fitting operations – marking, Hack sawing, Chiseling, Filing, Scraping, Drilling, Taping and Grinding etc.	MO-1.1 Demonstrate the usage of various hand tools used in fitting workshop MO-1.2 Perform various fitting operations following safety precautions MO-1.3 Use measuring and marking tools effectively MO-1.4 Perform filing practice, surface filing, marking of straight and parallel lines with odd leg calipers, steel rule, try square etc MO-1.5 Perform Chipping flat surfaces along a marked line. MO-1.6 Finding centre of round bar with the help of 'V' block and marking block. MO-1.7 Sawing along a straight line, curved line, on different sections of metal	- Demonstration - Practical Exercises	'- General hand tools & equipments used in fitting section

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			120	OB 1.5 To perform various exercises in fitting section - Filing Practice - Cutting Practice - Chipping Practice - L joint - V Joint - Typical joint comprising of all operations (Accuracy: ± 0.25mm)	MO-1.8 Make a rectangular section of given dimension with the MS flat MO-1.9 Make a L joint of given dimension as per drawing MO-.1.10 Make a V joint of given dimension as per drawing MO-1.11 Make fittings/joints as per given sample drawings	- Demonstration - Practical Exercises	- General hand tools & equipments used in fitting section
	Module M2 Sheet metal Practice	0	60	OB 2.1 To be familiar with the usage of sheet metal hand tools and operations	MO-2.1 Demonstrate the usage of various hand tools used in sheet metal workshop MO-2.2 Perform various sheet metal operations following safety precautions MO-2.3 Mark straight lines, circles, profiles and various geometrical shapes and cutting the sheets with snips.	- Demonstration - Practical Exercises	- General hand tools & equipments used in sheet metal section
			110	OB 2.2 To carry out different exercises in sheet metal section viz. simple sheet metal joints as per drawing and join them by soldering, brazing and riveting - Straight cutting practice - Sheet metal joints - Industrial products	MO-2.4 Bend sheet metal into various curvature form, wired edges- straight and curves. Fold sheet metal at angle using stakes. MO-2.5 Make sheet metal joints and products of given dimension as per drawing - Locked grooved joint - Double grooved joint - Knocked up & Paned down joint - Riveted joints (Lap & Butt joint) - Any useful products viz. Tray, Cup, Dust pan etc.	- Demonstration - Practical Exercises	- General hand tools & equipments used in sheet metal section
Professional Skill-I (Trade Practical)		0	40	OB 3.1 To be familiar with the usage of Arc Welding hand tools and operations	MO-3.1 Demonstrate set up procedure for welding machine connections to weld on MS plate observing standard procedures	- Demonstration - Practical Exercises	- General hand tools used in welding section

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(1029)	**Module M3** Welding Practice		200	OB 3.2 To perform various exercises on electric arc welding (down hand position) 1. Striking and maintaining the arc in straight lines 2. Straight line welding 3. Square butt joint 4. Single V butt 5. Lap joint 6. Fillet joint	MO-3.2 Demonstrate arc striking skills MO-3.3 Demonstrate arc welding in a straight line MO-3.4 Demonstrate tack welding MO-3.5 Make a square butt weld joint in down hand position MO-3.6 Make a single/double V butt weld joint in down hand position MO-3.7 Make a lap weld joint in down hand position MO-3.8 Make fillet weld joint in down hand position MO-3.9 Make any general purpose products eg. frames, shelves, tables etc	- Demonstration - Practical Exercises	- Arc welding machine with accessories & Tools '- General hand tools & equipments used in welding section
			110	OB 3.3 To perform various exercises on gas welding 1. Setting up gas welding plant 2. Setting up different Gas flames 3. Gas welding with and without filler rod 4. Straight line welding	MO-3.10 Demonstrate the gas welding plant set up exercise MO-3.11 Demonstrate various gas flames MO-3.12 Demonstrate gas welding with and without filler rod MO-3.13 Demonstrate gas welding in straight line	- Demonstration - Practical Exercises	- Gas welding plant with accessories & Tools '- General hand tools & equipments used in welding section
		0	80	OB 4.1 To be familiar with the usage of hand tools used in Lathe OB 4.2 To be familiar with tool grinding of single point cutting tool	MO-4.1 Demonstrate the usage of various hand tools and measuring instruments used in turning MO-4.2 Perform single point cutting tool grinding operation	- Demonstration - Practical Exercises	- Lathe, Bench type Grinding machine, General hand tools, instruments, equipments, attachments and accessories used in turning section

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	Module M4 Conventional Turning	0	150	OB 4.3 To perform various exercises on Lathe 1. Centering and Facing 2. Plane Turning 3. Step Turning 4. Taper Turning 5. Ball and Curve turning 6. Thread cutting	MO-4.3 Demonstrate the centering of a work piece in a four jaw chuck MO-4.4 Demonstrate facing operation in lathe MO-4.5 Perform plane turning operation in lathe MO-4.6 Make step turning model in lathe as per given drawing MO-4.7 Make taper turning model in lathe as per given drawing MO-4.8 Perform ball and curve turning in lathe as per given drawing MO-4.9 Perform thread cutting in lathe as per given drawing	- Demonstration - Practical Exercises	- Lathe, Bench type Grinding machine, General hand tools, instruments, equipments, attachments and accessories used in turning section
	On the Job Training (OJT)		160	OB 1.1 To be familiar with industrial environment and production process	MO-1.1 Identify on-field application of different welding techniques Identify/execute maintenance requirements/activities in public sector institutions like hospitals, old age homes etc	- Demonstration - Industrial Visit	To be completed outside the academic hours or in vacation.
		480	**960**	**YEAR 2**			
	Module M1 Material Estimation & Costing	20	0	OB 1.1 To understand the elements of material estimation in construction projects/jobs	MO-1.1 Identify the Material and its type to be used for a particular job MO-1.2 Calculate the surface area, volume of given sample products MO-1.3 Calculate the required material quantity for given sample products	- Lecture - Use of smart class rooms	- Laptop & Projector
		20	0	OB 1.2 To understand importance of costing in job	MO-1.4 Prepare the material estimation sheet for costing MO-1.5 Calculate the Man-hours required for completing the job MO-1.6 Prepare the estimation & costing sheet for the required job	- Lecture - Use of smart class rooms	- Laptop & Projector
		16	0	OB 2.1 To understand different welding symbols and terminologies, Various Welding positions (1G to 6G)	MO-2.1 Explain the necessity of weld symbols and terminologies MO-2.2 Show different weld symbols in a drawing MO-2.3 Indicate different weld terminologies in drawing	- Lecture	- Laptop & Projector

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Professional Knowledge-II (Trade Theory) **(2021)**	**Module M2** Welding - Arc & Gas	24	0	OB 2.2 To understand different welding defects and inspection of weld joints	MO-2.4 List out various welding defects MO-2.5 Explain the causes of different welding defects viz. distortion, lack of fusion, lack of penetration, porosity, crack, undercut, inclusions, blow holes etc. MO - 2.6 List out different welding inspection techniques MO-2.7 Explain visual inspection method MO-2.8 Differentiate different destructive testing methods MO-2.9 Differentiate different non destructive testing methods MO-2.10 List the applications of NDT	- Lecture - Use of smart class rooms	- Laptop & Projector - Sample models
		16	0	OB 2.3 To understand the process of arc cutting and Gas cutting	MO-2.11 Explain the metal arc cutting & Gas cutting process MO-2.12 State equipments and accessories used in arc cutting & Gas cutting MO-2.13 Demonstrate the set up for Arc cutting & Gas cutting	- Lecture - Demonstration - Use of smart class rooms	- Arc welding machine with accessories & Tools - Gas welding plant with accessories & Tools
		40	0	OB 2.4 To understand special welding processes used in industry viz. - TIG - MIG - Resistance welding - Submerged Arc Welding - Electro slag welding - Electron Beam welding - Carbon Arc welding - Plasma Arc Welding - Laser Beam Welding - Thermit welding	MO-2.14 List different modern welding techniques MO-2.15 Explain the characteristics of inert gases MO- 2.16 Explain different welding techniques MO-2.17 Explain the TIG welding process MO-2.18 List out the parts of TIG welding set up MO-2.19 Demonstrate the set up for TIG welding	- Demonstration - Practical exercises	- Laptop & Projector

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	Module M3 Fitting & Bench work	40	0	OB 3.1 Detailed study of important tools and terminologies used in fitting shop jobs - Drill & Reamers : Types, characteristics, nomenclature - Screw threads, Taps & Dies : Screw thread Terminology, applications - Nut, Bolt, Keys, Other Fastenings - Gauges - Interchangeability - Importance of surface finish - Limits, Fits & Tolerance - Precision measuring instruments Linear, Angular & Surface	MO - 3.1 Explain the types of Drill-(Taper shank, straight shank) parts . Drill angle-cutting angle for different materials, cutting speed feed. R.P.M. for different materials. Drill holding devices etc. MO - 3.2 List various screw threads and its applications MO-3.3 State the applications and types of taps & dies MO-3.4 Explain the types of gauges and its uses MO-3.5 Explain Lapping & Honing MO-3.6 Explain Limits, Fits & Tolerance MO-3.7 State the principle of measurement with Vernier Height gauge, Vernier caliper, micrometer and dial gauge.	- Lecture - Demonstration - Use of smart class rooms	- Laptop & Projector
	Module M4 Machine Tools	24	0	OB 4.1 To understand various power tools & machine tools used in workshop - Power tools - Shaper - Milling Machine - Planning machine - Slotting Machine - Grinding Machine - Drilling Machine - CNC Machines & Programs	MO-4.1 List various types of power tools and its applications MO-4.2 List various types of machine tools MO-4.3 Explain the working of various machine tools MO-4.4 State the uses of various machine tools MO-4.5 State the importance of CNC machines in industry MO-4.6 List different G-code & M-codes used in CNC machines	- Lecture - Demonstration - Use of smart class rooms	- Laptop & Projector
	Module M1 English & Communication	5	10	OB 1.1 To understand communication and self management skills OB 1.2 To understand English Literacy - functional English, reading & writing	MO-1.1 Demonstrate knowledge of various methods of communication - verbal, non-verbal-visual; Greetings & self introduction, Asking & responding to question, formal & informal communication MO-1.2 Demonstration of writing sentences and paragraphs on topics related to the subject, discussions on current happenings	- Lecture - Demonstration - Use of smart class rooms - Mock discussions, Interviews	- Laptop & Projector

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Employability Skills & Entrepreneurship (2001)	**Module M2** Communication & Behavioral Skills	5	10	OB 2.1 To understand Behavioral skills - Personal strength analysis, social responsibility, role modeling	MO-2.1 Identify specific do's and don'ts for avoiding common body language mistakes MO-2.2 Execute time management and planning skills, Skills to crack interviews MO-2.3 Demonstration of impressive appearance and groomed personality, ability to self- explore MO-2.4	- Lecture - Demonstration - Use of smart class rooms - Mock discussions, Interviews	- Laptop & Projector
	Module M3 Information Technology	20	40	OB 3.1 To understand Information and communication technology skills OB 3.2 To be familiar with internet and its applications	MO-3.1 Understand the basics of computers, Operating system, MS-Word, MS-Excel software's MO-3.2 Create simple documents like - resume, letter writing, job application etc., MO-3.3 Printing document, Familiar with usage of shortcuts, Creating and Editing of Text, Formatting the Text. MO-3.4 Use Web browsers and search engines, Creating & using e-mail id for communication	- Lecture - Demonstration - Use of smart class rooms	- Laptop & Projector
	Module M4 Entrepreneurship	25	5	OB 4.1 To understand Entrepreneurial skills	MO-4.1 Describe the significance of entrepreneurial values and attitude. MO-4.2 Demonstrate the knowledge of attitudinal changes required to become an entrepreneur MO-4.3 Explain the ways to set up an enterprise and different aspects involved viz., legal, compliances, Marketing aspect, Budgeting, etc	- Lecture - Demonstration - Use of smart class rooms	- Laptop & Projector
	Module 1 Arc and Gas Welding	0	350	OB 1.1 To perform arc welding in vertical and overhead positions, pipe welding, shaft welding 1. Straight line (vertical) 2. Straight line (horizontal) 3. Straight line (overhead) 4. Square butt (overhead) 5. Round fillet joint 6. Shaft butt joint	MO-1.1 Make straight line weld/joint in vertical position MO-1.2 Make straight line weld/joint in horizontal position MO-1.3 Make straight line weld/joint in overhead position MO-1.4 Make a square butt joint in overhead position MO-1.5 Make a round fillet joint & shaft butt joint MO-1.6 Make useful products	- Demonstration - Practical Exercises	- Arc welding machine with accessories & Tools

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		0	100	OB 1.2 To perform gas welding operation in down hand position	MO-1.7 Make a lap weld joint in down hand position MO-1.8 Make a corner weld joint in down hand position	- Demonstration - Practical Exercises	- Gas welding plant with accessories & Tools
	Module 2 Advance welding techniques - TIG	0	120	OB 2.1 To be familiar with exercises on Arc cutting & Gas cutting	MO-2.1 Demonstrate the set up for arc cutting & Gas cutting MO-2.2 Demonstrate arc cutting & & Gas cutting in straight line MO-2.3 Demonstrate arc cutting in circle MO - 2.4 Perform simple arc cutting & & Gas cutting exercises in various shapes.	- Demonstration - Practical Exercises	- Arc welding machine with accessories & Tools - Gas welding plant with accessories & Tools
		0	100	OB 2.2 To be familiar with TIG welding equipment and accessories OB 2.3 To be familiar with exercises on TIG welding (DHP/VP)	MO-2.5 Demonstrate the set up for TIG welding MO-2.6 Demonstrate bead deposit exercise using TIG welding MO-2.7 Make square butt joint exercise using TIG welding MO-2.8 Perform simple welding exercises using TIG welding machine	- Demonstration - Practical Exercises	- TIG welding machine with accessories & Tools
Professional Skill-II (Trade Practical) **(2029)**	**Module 3** Welding defects & inspection	0	40	OB 3.1 To understand different welding defects	MO-3.1 Identify different welding defects viz. distortion, lack of fusion, lack of penetration, porosity, crack, undercut, inclusions, blow holes etc.	- Demonstration - Practical Exercises	- Sample models
		0	60	OB 3.2 To be familiar with various welding inspection techniques	MO-3.2 Inspect a welded joint visually and identify different welding defects viz. distortion, lack of fusion, lack of penetration, porosity, crack, undercut, inclusions, blow holes etc.	- Demonstration - Practical Exercises	- Sample models
		0	50	OB 4.1 Make components of different fit for assembling as per required tolerance observing principle of interchangeability; and check for functionality. [Different Fit – Sliding, Angular, Step fit, 'T' fit, Square fit and Profile fit; Required tolerance: ±0.04 mm, angular tolerance: 30 min.]	MO 4.1 Recognize general concept of Limits, Fits and tolerance necessary for fitting applications and functional application of these parameters MO 4.2 Make components with different fits for assembling as per required tolerance level (Clearance, Interference and Transition fits) MO 4.3 Check tolerance and accuracy of components as defined with appropriate instruments observing standard procedure	- Demonstration - Practical Exercises	- General hand tools, Measuring instruments & equipments used in fitting section

COURSE NAME & CODE	TOPIC / MODULE	THEORY (Hrs)	PRACTICAL (Hrs)	OBJECTIVE OF MODULE	OUTCOME OF MODULE	METHEDOLOGY	TOOLS REQUIRED
	Module 4 Fitting , Bench work & Assembly	0	60	OB 4.2 Make & assemble components of different mating surfaces as per required tolerance by different surface finishing operations using different fastening components, ools and check its functionality. OB 4.3 Make Different Mating Surfaces – Dovetail fitting, Radius fitting, Combined fitting. OB 4.4 Perform Different surface finishing operations – Scraping, Lapping and Honing; OB 4.5 Make Different fastening components – Dowel pins, screws, bolts, keys and cotters using fastening tools, hand operated & power tools. Required tolerance - ±0.02mm, angular tolerance ± 10 min.]	MO 4.4 Make components with different fits for assembling as per required tolerance level. MO 6.23 Plan work in compliance with standard and collecting necessary information. MO 4.5 Produce different components with appropriate accuracy by observing standard procedure & method, as per specification using appropriate tools & machines. MO 4.6 Perform scraping and lapping of components to obtain required surface finish of different mating surface MO 4.7 Assemble different components using different fastening components, tools and check the functionality	- Demonstration - Practical Exercises	- General hand tools, Measuring instruments & equipments used in fitting section
		0	80	OB 4.6 Apply a range of skills to execute pipe joints, dismantle and assemble valves & fittings, Machine parts etc. OB 4.7 Plan, dismantle, repair and assemble different damaged mechanical components used for power transmission & check functionality. [Different Damage Mechanical Components – Pulley, Gear, Keys, Jibs and shafts.]	MO 4.8 Dismantle valves and fittings in pipes, applying range of skills; and check for defect as per standard procedure. MO 4.9 Demonstrate possible solutions in case of defect and perform tasks within the team for repair or replacement MO 4.10 Assemble valves and various pipe fittings using range of skills and observing standard procedure MO 4.11 Perform dismantling and appropriate repairing of mechanical components with accuracy applying range of skills and appropriate repairing processes. MO 4.12	- Demonstration - Practical Exercises	- General hand tools, Measuring instruments & equipments used in fitting section
Project Work **(2008)**	1.Students Project Work	0	160	OB 1.1 To be familiar with industrial environment and production process	MO-1.1 Identify on-field application of different welding techniques Identify/execute maintenance requirements/activities in public sector institutions like hospitals, old age homes etc	- Demonstration - Industrial Visit	
TOTAL	**1440**	255	1185				