Scheme and Syllabus

of

Programme

on

DIPLOMA IN VOCATION
IN
MECHANICAL MANUFACTURING

INDUSTRY PARTNERS

SKH METALS, SENIOR INDIA & ROOP AUTO

(2024 – 2026)

By

Department of Automotive Studies

Skill Faculty of Engineering & Technology

SVSU

Programme Co-ordinator: Ms. Ekta (SKH Metals & SI)

: Mr. Vaibhav Raghav (Roop Auto)

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Ekta (MS & Prog. Co-ordinator)

Scheme for Diploma in Vocation in Mechanical Manufacturing is in the following Table 1.

Table: 1

SEMESTER-1																	
Subject Code	Course Name	Credits				Hrs/Week				Marks							
										Theory(T)			Practical (P)			Total	
		L	T	P	C	L	T	P	TO	I	E	TO	I	E	TO	(T+P)	
24DENG01 24DENG02	*English Language and Communication Skills	1	0	1	2	1	0	2	3	15	35	50	35	15	50	100	
24DCHM01 24DCHM02	**Applied Chemistry	2	0	1	3	2	0	2	4	15	35	50	35	15	50	100	
24DYHS01	***Yoga & Health Skills-I	2	0	0	2	2	0	0	2	30	70	100	0	0	0	100	
24DMEE01 24DMEE02	Machine Tool-I	2	0	2	4	2	0	4	6	15	35	50	35	15	50	100	
24DMEE03 24DMEE04	Fabrication Processes-I	2	0	2	4	2	0	4	6	15	35	50	35	15	50	100	
24DMEE05	****Engineering Graphics and Drawing	0	0	3	3	0	0	6	6	0	0	0	70	30	100	100	
Total		9	0	9	18	9	0	18	27	90	210	300	210	90	300	600	

SEMESTER-2																	
Subject Code	Course Name	Credits				Hrs/Week				Marks							
										Theory(T)			Practical (P)			Total	
		L	T	P	C	L	T	P	TO	I	E	TO	I	E	TO	(T+P)	
	#AEC (Ability Enhancement)-II	2	0	0	2	2	0	0	2	30	70	100	0	0	0	100	
24DPHY01 24DPHY02	**Applied Physics	2	0	1	3	2	0	2	4	15	35	50	35	15	50	100	
24DEVS01	***Environmental Science	2	0	0	2	2	0	0	2	30	70	100	0	0	0	100	
24DMEE06 24DMEE07	Machine Tool-II	2	0	2	4	2	0	4	6	15	35	50	35	15	50	100	
24DMEE08 24DMEE09	Fabrication Processes-II	2	0	2	4	2	0	4	6	15	35	50	35	15	50	100	
	##Fundamental of Computers	1	0	2	3	1	0	4	5	15	35	50	35	15	50	100	
24DMEE10	Skill Enhancement Practice	0	0	4	4	0	0	8	8	70	30	100	0	0	0	100	
Total		11	0	11	22	11	0	22	33	190	310	500	140	60	200	700	

For C.Voc. certification 4 weeks of training in industry is required for Industry exposure and exploration of job role Project/Internship/Practice

*Assessment fee will be charged as per SVSU Exam Ordinance

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SEMESTER-III																
Subject Code	Course Name	Credits				Hrs/Week				Marks						
										Theory(T)			Practical (P)			Total
		L	T	P	C	L	T	P	TO	I	E	TO	I	E	TO	(T+P)
24DMEE11	OJT	0	0	20	20	0	0	40	40	0	0	0	245	105	350	350
Total		**0**	**0**	**20**	**20**	**0**	**0**	**40**	**40**	**0**	**0**	**0**	**245**	**105**	**350**	**350**

SEMESTER-IV																
Subject Code	Course Name	Credits				Hrs/Week				Marks						
										Theory(T)			Practical (P)			Total
		L	T	P	C	L	T	P	TO	I	E	TO	I	E	TO	(T+P)
24DMEE12	OJT	0	0	16	16	0	0	32	32	0	0	0	245	105	350	350
24DMEE13	Project	0	0	4	4	0	0	8	8	0	0	0	70	30	100	100
Total		**0**	**0**	**16**	**16**	**0**	**0**	**40**	**40**	**0**	**0**	**0**	**315**	**135**	**450**	**450**

*Ability Enhancement Courses
** Multidisciplinary Courses

***Value Added Courses
**** Common course with Diploma in Mechanical Engineering

#Course syllabus and code will be provided by the SFASH./SFMSR

##Course Syllabus and code will be provided by Department of CS/IT

1 Credit Theory and Tutorial = 15 hrs
1 Credit Lab = 30 hrs.
Aligned Qualifications: Automotive Conventional Machining Technician and Automotive Welding Machine Operator (Manual and Robotics)

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SYLLABUS

First Year (SEMESTER-I)

D.Voc. in Mechanical Manufacturing

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Course Title	Machine Tool-I	Course Code	24DMEE01			
Specialization	Manufacturing	Structure (LTPC)	2	0	0	2
Offered for	Diploma in Vocation	Status	Core √		Elective	
Faculty	Skill Faculty of Engineering and Technology	Type	New √		Modification	
Pre-requisite	NIL	To take effect from	2024-2025			
Submission date	24/07/2024	Date of approval by BoS	24/07/2024			

Course Objective:	The aim of this course is to develop in students an understanding of some of the basic concepts of conventional machines, tools and instruments used in workshop.
Course Outcome:	Upon successful completion of this course, students will be able to: **CO1.** Understand the functioning of lathe machine and work holding devices. **CO2.** Use and selection of different types of measuring instruments/gauges for inspection. **CO3.** Apply tool selection criterion for various operations. **CO4.** Explain various lathe operations and analyse the quality products produced by lathe machine. **CO5.** Perform Lathe Maintenance operations
Theory Content	**Unit 1:** **Introduction to Conventional Lathe & work holding devices** Introduction to lathe machine, their type and its working principle. Different part of lathe and their work, Lathe bed function and construction. **Work holding devices:** Different types of chucks and their application, tailstock, centre and carrier. Jig and fixture- definition, difference, types and application. **Unit 2:** **Measuring Instruments/gauges & conventional hand tools** Introduction of basic measuring instruments, gauges use on shop floor. Identify the tools, measuring instruments and input materials required for the job. different types of hand tools and their uses such as chisel, files, spanners, hammers etc. **Unit 3:** **Cutting tools and machine parameters** Cutting parameters - cutting speed,limiting spindle speed, feed rate, depth of cut.Productivity, cycle time, machine hour rate.ISO nomenclature for inserts, turning and boring tools. Insert grades, coatings. Identification of Tool holder, left hand tool, right hand tool etc.Types of tool wear, tool life. **Unit 4:** **Turning Operation, Quality standard and inspection** Various Operations performed on conventional lathe like: OD/ID Turning, drilling, reaming, boring tapping etc. Standard operating procedure (SOP),Work Instructions, Inspection of final product through control plan. Visual inspection and defect in raw material, tools and equipment. **Unit 5:** **Maintenance of Lathe** Types of Maintenance. Common problems/malfunctions associated with Lathe Machines. Effects of backlash in machine slides and screws. Maintenance schedule of lathe machine.

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Textbook	1. Workshop Technology by BS Raghuvanshi: Dhanpat Rai and Sons Delhi 2. Elements of Workshop Technology by SK Choudhry and Hajra: Asia Publishing House 3. A Text Book of Production Engineering by PC Sharma; S Chand and Company Ltd. Delhi 4. A Text Book of Manufacturing Science and Technology by A Manna, Prentice Hall of India, Delhi.
References	1. Production Technology: Jain & Gupta 2. Machine Tool Technology (Hindi): JK Kumar 3. Workshop Technology: Hazra & Choudhary

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Course Title	Machine Tool-I Lab	Course Code	24DMEE02			
Specialization	Manufacturing	Structure (LTPC)	0	0	2	2
Offered for	Diploma in Vocation	Status	Core √		Elective	
Faculty	Skill Faculty of Engineering and Technology	Type	New √		Modification	
Pre-requisite	NIL	To take effect from	2024-2025			
Submission date	24/07/2024	Date of approval by BoS	24/07/2024			
Course Objective:	Aim of this course is to make student skilled to perform operation as per the given specification on conventional lathe/drilling/boring machine on various materials like Mild steel/stainless steel, aluminum / aluminum alloys, copper / copper alloys, cast iron, plastic with right selection of tools & equipment.					
Course Outcome:	After completing this programme, participants will be able to: **CO1.** Use the different measuring instruments/gauges for inspection of the final product. **CO2.** Perform preparations for operating conventional turning machines. **CO3.** Understand job drawings and complete jobs as per specifications in the allotted time. **CO4.** Perform inspection of the job for the desired dimensions and shape. **CO5.** Perform post machining operation.					
Laboratory Content	**List of Experiments:** 1. Demonstration and use of Measuring instruments for checking dimensions of given component. 2. Demonstration and use of gauges for inspection of given component. 3. Demonstration and use of dial test indicator 4. Demonstration and use of slip/bore/hole gauges. 5. Demonstration and use thread gauges (ring/plug/profiles). 6. Setting up of machine tool and machine parameter for work piece. 7. Set-up the conventional lathe machine to perform turning operations & inspect the first-run piece for conformance to specifications by using precision gauges/instruments 8. Set up the drilling, reaming and tapping machine, produce the component and inspect the part as per drawing 9. Set-up the conventional boring machine to perform boring operations 10. Check/replace worn out tools timely and safely with new tools and perform minor maintenance activities					
References	1. https://nitsri.ac.in/Department/Mechanical%20Engineering/MEC_405_Book_2,_for_Unit_2B.pdf 2. https://www.pdfdrive.com/mechanical-measurement-metrology-e160293687.html 3. https://www.youtube.com/watch?v=xarj36BpiB4 4. https://www.gdandtbasics.com/gdt-symbols/					

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Course Title	Fabrication Process-I	Course Code	24DMEE03			
Specialization	Manufacturing	Structure (LTPC)	2	0	0	2
Offered for	Diploma in Vocation	Status	Core √		Elective	
Faculty	Skill Faculty of Engineering and Technology	Type	New √		Modification	
Pre-requisite	NIL	To take effect from	2024-2025			
Submission date	24/07/2024	Date of approval by BoS	24/07/2024			

Course Objective:

The aim of this course is to develop in students an understanding of the basic concepts of SMAW, OAW, tools and instruments used in welding shop.

Course Outcome:

Upon successful completion of this course, students will be able to:

- **CO1.** Understanding the importance of the PPE used in SMAW/MMAW and OAW
- **CO2.** Understand the Arc and Gas Welding Equipment's, consumables, tools and accessories.
- **CO3.** Understand the Welding Terminology and Welding symbols as per BIS & AWS.
- **CO4.** Understanding of Welding positions as per EN &ASME: flat, horizontal, vertical and overhead position.
- **CO5.** Understand the types of Inspection methods such as DPT/DPI/PT and VI.

Theory Content

Unit 1:

Introduction of SMAW/MMAW & OAW and Safety in Manual Metal Arc Welding and OAW

Introduction and definition of welding, Principle of arc welding, Weldability of metals, Applications of MMAW and advantage and disadvantage of MMAW.

Safety precautions in Shielded Metal Arc Welding(SMAW), and Oxy Acetylene Welding(OAW) Importance of Safety, Safety apparels – Leather Apron, Leather Gloves, Leather Cape with Sleeves, Hand Screen, Chipping/Grinding Goggles, Respirator and Exhaust Ducting, Welding Hand Screen and Helmet, Plain Goggles. Fire and Fire Fighting equipment.

Unit 2:

SMAW/MMAW Equipments, tools and accessories and Types of Weld Joint

SMAW Welding Equipments, tools and accessories, Welding Machines (Power Sources) – Welding Transformer, Welding Rectifier, Welding Generator, Advantages of Inverter based welding power sources. Electrode Holder, Earth Clamp, Welding Cables. Arc length, Polarity in DC Arc welding, Different welding Positions used in welding. Types of electrodes, coating factor, Standard length of electrodes, Functions of electrodes in MMAW, Identification of electrodes. Types of material used in flux coated electrodes, electrode coding, Storages of electrode.

Types of welding joints, Welding symbols as per BIS & AWS.

Unit 3:

Welding Terminology and Material Preparation Method

Weld Bead, Weld Pool, Root Gap, Toe, Throat, Weld Face, Reinforcement, Penetration and Parts of a weld- Joint root, Groove face, Root face, Root edge, Root gap/opening, Bevel angle, Groove angle, Groove radius.

Tool and equipment used in metal cutting, and List of common welding tools, Cleaning, Importance of cleaning, Methods of cleaning- Chemical Method of Cleaning and Mechanical Method of cleaning.

Unit 4:

OAW Equipments, tools and accessories

Oxy-Acetylene Welding (OAW) Equipments, tools and accessories Types of oxy-acetylene flames and uses. Gas welding filler rods, specifications and sizes. - Gas welding fluxes – types and functions. Acetylene gas properties and flash back arrestor, Oxygen gas and its properties.

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	Color coding for different gas cylinders. Uses of single and double stage Gas regulators. Gas welding techniques. Rightward and Leftward techniques. **Unit 5:** **Types of Welding Defects and Inspections** Welding defects, external welding defects -Internal welding defects and its remedies Types of Inspection Methods, destructive and NDT methods -Perform surface defects inspection by Dye Penetrant Inspection(DPI), Perform Visual Inspection(VI) of welding joints.
Textbook	1. Workshop Technology by BS Raghuvanshi: Dhanpat Rai and Sons Delhi 2. Welding Engineering and Technology – R. S. Parmar, M/s. Khanna Publishers, 2-B Nath Market, Nai Sarak, Delhi – 110006 3. Welding engineering and technology by R.S. Khurmi 4. Welding processes and technology for engineers by Dr. B.S. Natchimuthu 5. Handbook of welding technology by Dr.S.R.Pandya 6. Welding technology for engineers and Technicians by Dr. R.R.P.Singh Delhi.
eferences	1. Production Technology: Jain & Gupta 2. Elements of Workshop Technology by SK Choudhry and Hajra: Asia Publishing House 3. Workshop Technology: Hazra & Choudhary 4. A Text Book of Production Engineering by PC Sharma; S Chand and Company Ltd. Delhi 5. A Text Book of Manufacturing Science and Technology by A Manna, Prentice Hall of India, Delhi **Digital Content Links:** 1. https://www.youtube.com/watch?v=BLRbYO3yAW4 2. https://www.youtube.com/watch?v=wXA-ULF8FEw 3. https://www.youtube.com/watch?v=rsBXTRJJvVA 4. https://www.youtube.com/watch?v=0PYqceXZ2F8 5. https://www.youtube.com/watch?v=BLRbYO3yAW4 6. https://www.youtube.com/watch?v=zV16K4bI5hE 7. https://www.youtube.com/watch?v=_xPlocjTyas 8. https://www.youtube.com/watch?v=JhGYPvJYVQw 9. https://www.youtube.com/watch?v=Bk16izPuN0g 10. https://www.youtube.com/watch?v=OJQra1bFmEQ 11. https://www.youtube.com/watch?v=9qwbaWM7bzc

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Course Title	Fabrication Process –I Lab	Course Code	24DMEE04			
Specialization	Manufacturing	Structure (LTPC)	0	0	2	2
Offered for	Diploma in Vocation	Status	Core √		Elective	
Faculty	Skill Faculty of Engineering and Technology	Type	New √		Modification	
Pre-requisite	NIL	To take effect from	2024-2025			
Submission date	24/07/2024	Date of approval by BoS	24/07/2024			
Course Objective:	Aim of this course is to make student skilled to perform SMAW/MMAW and OAW operation as per the given specification on various materials like Mild steel/stainless steel/aluminium with right selection of tools & equipment without any welding defects.					
Course Outcome:	After completing this programme, participants will be able to: **CO1.** Perform welding cable connections and set welding parameters for given job. **CO2.** Perform SMAW/MMAW and OAW in different welding positions **CO3.** Understand job drawing and complete jobs as per specifications in allotted time **CO4.** Identify welding defects and their remedies. **CO5.** Perform different inspection tests such as DPT/DPI/PT and VI.					
Laboratory Content	**List of Experiments:** 1. Demonstration of machinery used in SMAW and OAW. 2. Demonstration of safety equipments and their uses. 3. Setting of Oxy- Acetylene Welding equipments and lighting and setting of flame 4. To make a square butt joint on mild steel sheet of 2 mm thick in flat position using oxyacetylene gas welding. 5. Setting of SMAW machine and accessories and striking an arc. 6. Deposit straight line bead on MS plate in flat position by SMAW. 7. To make a fillet T/lap joint on mild steel flat 10 mm thick in flat position using SMAW. 8. To make a single v-butt joint on MS Flat 10 mm thick in flat position using SMAW/MMAW. 9. To make a single V butt joint on MS plate 10mm thick in vertical position. 10. Perform DPT/DPI/PT on welded Job.					

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Course Title	Engineering Graphics and Drawing	Course Code	24DMEE05			
Specialization	Engineering Sciences	Structure (LTPC)	0	0	3	3
Offered for	Diploma in Vocation and Diploma in Engineering	Status	Core √		Elective	
Faculty	Skill Faculty of Engineering and Technology	Type	New √		Modification	
Pre-requisite	NIL	To take effect from	2024-2025			
Submission date	24/07/2024	Date of approval by BoS	24/07/2024			

Course Objective: The aim of this course is to develop drafting and sketching skills, to know the applications of drawing equipment and get familiarize with Indian Standards related to engineering drawings..

Course Outcome:

By the end of this course, the student will be able to:

- **CO1.** Understand the language of graphics and familiarize with Indian Standards related to engineering drawings
- **CO2.** Develop drafting and sketching skills & application of drawing equipments.
- **CO3.** Read various engineering curves, projections and dimensioning styles.
- **CO4.** Develop skills to translate ideas into sketches and draw.
- **CO5.** Develop skills to visualize actual object or a part of it, based on drawings.

Laboratory Content

Unit 1:

Introduction to Engineering Drawing

Introduction to drawing instruments, materials, layout and sizes of drawing sheets and drawing boards.,Types of drawings: detail drawings, sub-assembly drawings, general arrangement drawings, installation drawings, exploded views.

Different types of lines in Engineering drawing as per BIS specifications

Practice of vertical, horizontal and inclined lines, geometrical figures such as triangles, rectangles, circles, ellipses and curves, hexagonal, pentagon with the help of drawing instruments.

Unit 2:

Dimensioning Technique

Necessity of dimensioning, method and principles of dimensioning (mainly theoretical instructions)

Dimensioning of overall sizes, circles, threaded holes, chamfered surfaces, angles, tapered surfaces, holes, equally spaced on P.C.D., counter sunk holes, counter bored holes, cylindrical parts, narrow spaces and gaps, radii, curves and arches

Scales -their needs and importance (theoretical instructions), type of scales, definition of R.F. and length of scale

Drawing of plain and diagonal scales

Unit 3:

Orthographic Projections and Sectioning

Theory of orthographic projections (Elaborate theoretical instructions), Projection of points, lines, planes and geometric solids.

Projection of nuts and bolts, rivets , threads and fasteners.

Sectioning: Importance and salient features

Drawing of full section, half section, partial or broken out sections, Offset sections, revolved sections and removed sections.

Convention sectional representation of various materials, conventional breaks for shafts, pipes, rectangular, square, angle, channel, rolled sections

Orthographic sectional views of different objects.

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	Unit 4: **Isometric Views** Fundamentals of isometric projections and isometric scale. Isometric views of combination of regular solids like cylinder, cone, cube and prism and geometric features, **Unit 5:** **Introduction to AutoCAD and GD&T** **AutoCAD:** Meaning, need of computer graphics, CAD, screen structure and toolbars in AutoCAD, coordinate system, Drawing Limits, Units. LINE command, coordinates-Absolute, incremental, polar. POLYLINE, CIRCLE (3P,2P, TTR), ARC, ELLIPSE Different geometrical commands for making figure e.g. triangle, rectangle, hexagon, pentagon, parabola. Editing Commands-Scale, erase, copy, stretch, lengthen and explode. Use of SNAP, GRID and ORTHO mode for selection of points quickly. Use of these modes while picking points in LINE, CIRCLE, PLINE, ARC, ELLIPSE etc commands. Drawing projections of lines and solids. Drawing orthographic projections of different objects (at least 2 sheets) AutoCAD for the isometric views. [Making single computer sheet showing all the three views and an isometric (in single split screen view) of any object showing understanding of use of AutoCAD in making isometric views – at least 1 sheet] Draw the various Electrical circuit and panel layout using CAD software. **Geometric Dimensioning and Tolerances:** Introduction, symbols used for GD& T: Straightness, flatness, squareness, parallelism, roundness, cylindricity, non-contact profiling systems. Surface finish: Introduction, terminology, specifying roughness on drawings, surface roughness parameters. AutoCAD skill of student is evaluated in internal assessment only not in external exam.
Textbook	1. PS Gill, "Engineering Drawing", SK Kataria & Sons, New Delhi. 2. ND Bhatt, "Elementary Engineering Drawing in First Angle Projection", Charotar Publishing House Pvt. Ltd., Anands. 3. T. Jeyapoovan, "Engineering Drawing and Graphics using AutoCAD", Vikas Publishing House Pvt, Ltd Noida. 4. Sham Tickoo and D. Sarvanan, "AutoCAD : For Engineers & Designers", Wiley India Pvt.Ltd., Delhi
References	1. Surjit Singh, "A Text Book of Engineering Drawing", Dhanpat Rai & Co., Delhi. 2. S.R.Singhal and O.P.Saxena, "A Text Book of Engineering Drawing", Asian Publisher, Delhi. 3. RB Gupta, "Engineering Drawing", Satya Prakashan, New Delhi.

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SYLLABUS

First Year (SEMESTER-II)

D.Voc. in Mechanical Manufacturing

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Course Title	Machine Tool-II	Course Code	24DMEE06			
Specialization	Manufacturing	Structure (LTPC)	2	0	0	2
Offered for	Diploma in Vocation	Status	Core √		Elective	
Faculty	Skill Faculty of Engineering and Technology	Type	New √		Modification	
Pre-requisite	NIL	To take effect from	2024-2025			
Submission date	24/07/2024	Date of approval by BoS	24/07/2024			
Course Objective:	The aim of this course is to develop in students an understanding of some of the basic concepts of conventional Grinding/milling machines, tools and instruments used in workshop.					
Course Outcome:	Upon successful completion of this course, students will be able to: **CO1.** Understand the functioning of the milling machine and its related work-holding devices. **CO2.** Understand the functioning of the Grinding machine and wheel parameters. **CO3.** Apply tool selection criteria for various operations. **CO4.** Explain various milling operations and analyze the quality of products produced by the milling machine. **CO5.** Analyze milling/grinding Maintenance operations.					
Theory Content	**Unit 1:** **Introduction to Conventional milling & work holding devices** Introduction to milling machine, their type and its working principle. Different part of milling and their work. **Work holding devices:** chuck, collet, angle piece, clamping elements like studs, T-nut, T- bolt, fly nuts etc., vice, jig and fixture, milling cutters, pallet shuttles, taper sleeves and holders. **Unit 2:** **Introduction to Conventional Grinding Machine** Introduction to grinding machine, their type and its working principle. different types of wheel, dressers, their description and uses. Types of Grinding wheel material and applications. **Unit 3:** **Milling & Grinding machine parameters** Cutting parameters - cutting speed, feed rate, depth of cut. Set the grinding parameters such as wheel revolutions, wheel approach speed, etc. and position cutting Tool and work piece as per work instructions **Unit 4:** **Milling/Grinding Operation, defects and remedies** Various Operations performed on conventional milling like: face milling, side milling, angle milling of parts, etc. Cylindrical and surfaces grinding operation, step grinding on cylindrical grinding machine, Grinding defects vibration, chattering, glazing and loading, their causes and remedies **Unit 5:** **Maintenance of Milling & Grinding Machine** Common problems/malfunctions associated with milling & grinding Machines. Preventive maintenance and its necessity, Maintenance schedule of milling & grinding machine.					
Textbook	1. Workshop Technology by BS Raghuvanshi: Dhanpat Rai and Sons Delhi 2. Elements of Workshop Technology by SK Choudhry and Hajra: Asia Publishing House 3. A Text Book of Production Engineering by PC Sharma; S Chand and Company Ltd. Delhi 4. A Text Book of Manufacturing Science and Technology by A Manna, Prentice Hall of India, Delhi.					

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References	1. Production Technology: Jain & Gupta 2. Machine Tool Technology (Hindi): JK Kumar 3. Workshop Technology: Hazra & Choudhary

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Course Title	Machine Tool-II Lab	Course Code	24DMEE07			
Specialization	Manufacturing	Structure (LTPC)	0	0	2	2
Offered for	Diploma in Vocation	Status	Core √		Elective	
Faculty	Skill Faculty of Engineering and Technology	Type	New √		Modification	
Pre-requisite	NIL	To take effect from	2024-2025			
Submission date	24/07/2024	Date of approval by BoS	24/07/2024			

Course Objective:	Aim of this course is to make student skilled to perform operation as per the given specification on conventional milling/grinding machine on various materials like Mild steel/stainless steel, aluminum / aluminum alloys, copper / copper alloys, cast iron, plastic with right selection of tools & equipment.
Course Outcome:	Upon successful completion of this course, students will be able to: **CO1.** Understand the functioning of milling machine and its related work holding devices. **CO2.** Understand the functioning of Grinding machine and wheel parameters. **CO3.** Apply tool selection criterion for various operations. **CO4.** Explain various milling operations and analyse the quality products produced by milling machine. **CO5.** Analyze milling/grinding Maintenance operations.
Laboratory Content	**List of Experiments:** 1. Demonstration of milling machine, parts and their use. 2. Demonstration of grinding machine, parts and their use. 3. Setting up of milling machine tool and machine parameter for work piece. 4. Setting up of grinding machine tool and machine parameter for work piece. 5. Set-up the conventional milling machine to perform milling operations & inspect the first-run piece for conformance to specifications by using precision gauges/instruments 6. Set up the grinding wheel & machine to perform grinding operation and inspect the first run piece for conformance to specifications by using precision gauges/instruments 7. Check/replace worn out grinding wheel timely and perform minor maintenance activities 8. Check/replace worn out milling tools timely and safely with new tools and perform minor maintenance activities

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Dean Engineering Shri Vishwakarma Skill University

Course Title	**Fabrication Process-II**	**Course Code**	**24DMEE08**			
Specialization	Manufacturing					
Offered for	Diploma in Vocation	**Structure (LTPC)**	**2**	**0**	**0**	**2**
Faculty	Skill Faculty of Engineering and Technology	**Status**	Core √	Elective		
Pre-requisite	NIL	**Type**	New √	Modification		
Submission date	**24/07/2024**	**To take effect from**	**2024-2025**			
		Date of approval by BoS	**24/07/2024**			
Course Objective:	The aim of this course is to develop in students an understanding of the basic concepts of GTAW/TIG, GMAW/MIG/MAG, tools and instruments used in welding shop.					
Course Outcome:	Upon successful completion of this course, students will be able to: **CO1.** Understand the importance of the PPE used in GMAW and GTAW. **CO2.** Understand GTAW and GMAW Equipment's, tools and accessories. **CO3.** Understand the process variables of GTAW and GMAW. **CO4.** Understand the Welding positions as per EN &ASME: flat, horizontal, vertical and overhead position. **CO5.** Understand the types of Inspection such as MPT/MPI					
Theory Content	**Unit 1:** **GTAW/TIG Equipments, tools and accessories** Introduction and definition of TIG welding, TIG Welding Equipments, tools and accessories, Safety precautions in Gas Tungsten Arc welding(GTAW), Advantages and limitations of GTAW. **Unit 2:** **Process Variables of GTAW and its Applications** Process variables of GTAW, Tungsten electrodes types & uses, sizes and preparation, GTAW Torches types, parts and their functions, GTAW filler rods and selection criteria. Argon / Helium gas properties and uses, Applications of GTAW. **Unit 3:** **GMAW/MIG/MAG Equipments, tools and accessories** Introduction to GMAW /MIG/MAG, Various other names of the process. (MIG/MAG/CO2 welding), MIG Welding Equipments, tools and accessories, Advantages of GMAW welding over SMAW, limitations and applications. **Unit 4:** **Process Variables of GMAW and its applications** Process variables of GMAW, Wire feed system types, care and maintenance, Welding wires used in GMAW, standard diameter and codification as per AWS, Name of shielding gases used in GMAW and its applications. **Unit 5:** **Types of Welding Defects and Inspections** Welding defects, external welding defects -Internal welding defects, TIG/GTAW and GMAW/MIG welding defects and its remedies. Types of Inspection Methods, destructive and NDT methods -Perform surface defects inspection by Dye Penetrant Inspection, Perform Visual Inspection of welding joints and MPT/MPI.					
Textbook	1. Workshop Technology by BS Raghuvanshi: Dhanpat Rai and Sons Delhi 2. Welding Engineering and Technology – R. S. Parmar, M/s. Khanna Publishers, 2-B Nath Market, Nai Sarak, Delhi – 110006 3. Welding engineering and technology by R.S. Khurmi 4. Welding processes and technology for engineers by Dr. B.S. Natchimuthu 5. Handbook of welding technology by Dr.S.R.Pandya					

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	6. Welding technology for engineers and Technicians by Dr. R.R.P.Singh Delhi.
References	1. Production Technology: Jain & Gupta 2. Elements of Workshop Technology by SK Choudhry and Hajra: Asia Publishing House 3. Workshop Technology: Hazra & Choudhary 4. A Text Book of Production Engineering by PC Sharma; S Chand and Company Ltd. Delhi 5. A Text Book of Manufacturing Science and Technology by A Manna, Prentice Hall of India, Delhi **Digital Content Links:** 1. https://www.youtube.com/watch?v=Sr76Cg8wMj0 2. https://www.youtube.com/watch?v=Xy7LqRc7K5Q 3. https://www.youtube.com/watch?v=v0SNF8VKAzI&list=PLSWRPBzGkib8hKN-HUiyg4T4GXu-xqAeG&index=9 4. https://www.youtube.com/watch?v=GrmuX0pEFds&feature=youtu.be 5. https://youtu.be/sR8mLOMey7U 6. https://youtu.be/Vnfdl2cJU4k 7. https://www.youtube.com/watch?v=dLKCH9xsBZM 8. https://youtu.be/GvUPN_kFgdE 9. https://www.youtube.com/watch?v=PK7w6YTfZTQ 10. https://youtu.be/4Jc8kR3LDbs 11. https://www.youtube.com/watch?v=YUWhHl2Gnn8 12. https://www.youtube.com/watch?v=yjBhZ3rXpRg

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Course Title	Fabrication Process-II Lab	Course Code	24DMEE09			
Specialization	Manufacturing	Structure (LTPC)	0	0	2	2
Offered for	Diploma in Vocation	Status	Core √		Elective	
Faculty	Skill Faculty of Engineering and Technology	Type	New √		Modification	
Pre-requisite	NIL	To take effect from	2024-2025			
Submission date	24/07/2024	Date of approval by BoS	24/07/2024			
Course Objective:	Aim of this course is to make student skilled to perform GTAW/TIG and GMAW/MIG operation as per the given specification on various materials like Mild steel/stainless steel/aluminium with right selection of tools & equipment without any welding defects.					
Course Outcome:	After completing this programme, participants will be able to: **CO1.** Perform setting of GMAW machine and perform welding in different types of joints on MS sheet/plate by GMAW in various positions. **CO2.** Perform the setting of GTAW machine and perform welding by GTAW in different types of joints on different metals in different positions. **CO3.** Understand job drawing and complete jobs as per specifications in allotted time. **CO4.** Perform identification of welding defects and their remedies. **CO5.** Perform the testing of welded joints by MPT/MPI method.					
Laboratory Content	**Experiment:** 1. Demonstration of machinery and tools used in GTAW and GMAW. 2. Demonstration of safety equipments used in GTAW/GMAW and their uses. 3. Setting of GTAW machine and accessories and striking an arc 4. To make a butt joint on MS/Al sheet of 2 mm thick in flat position using TIG welding. 5. Setting of GMAW machine and accessories and striking an arc. 6. Deposit straight line bead on MS plate in flat position by GMAW/MIG/MAG. 7. To make a butt joint on MS sheet of 10 mm thick in flat position using TIG welding. 8. To make a T- joint on MS sheet of 10 mm thick in flat position using TIG welding. 9. Perform Magnetic Particle Test on welded work pieces.					

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Course Title	Skill Enhancement Practice	Course Code	24DMEE10			
Specialization	Manufacturing	Structure (LTPC)	0	0	4	4
Offered for	Diploma in Vocation	Status	Core √		Elective	
Faculty	Skill Faculty of Engineering and Technology	Type	New √		Modification	
Pre-requisite	NIL	To take effect from	2024-2025			
Submission date	24/07/2024	Date of approval by BoS	24/07/2024			
Course Objective:	The objective of this course is to prepare students to use applications of the theory and practical learned during the course. It will also help students to develop in-depth knowledge of the machines and industry processes. This workshop helps students how to carry out hand on activities in the field of interest of the student.					
Course Outcome:	After completing this programme, participants will be able to: Will be able to perform fabrication and machining activities as per the drawing.					
Activities	Some of the suggested activities are given below: 1. Exercise related to the fabrication of components. 2. Exercise related to the machining of components.					

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Dean Engineering
Shri Vishwakarma Skill University

SYLLABUS

Second Year (SEMESTER-III)

D.Voc. in Mechanical Manufacturing

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Course Title	OJT	Course Code	24DMEE11			
Specialization	Manufacturing	Structure (LTPC)	0	0	20	20
Offered for	Diploma in Vocation	Status	Core √		Elective	
Faculty	Skill Faculty of Engineering and Technology	Type	New √		Modification	
Pre-requisite	Basic workshop, safety and machine tools	To take effect from	2024-2025			
Submission date	24/07/2024	Date of approval by BoS	24/07/2024			
Course Objective:	OJT aims to bridge the gap between academic learning and industry application and to upgrade their skills and professional knowledge.					
Course Outcome:	After completing this program, participants will be able to: **CO1.** Understand the industry culture. **CO2.** Performing industry operation. **CO3.** Understanding various industrial processes.					
OJT Areas	1. Welding 2. CNC Machining 3. Quality 4. Inspection 5. Assembly					

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SYLLABUS

Second Year (SEMESTER-IV)

D.Voc. in Mechanical Manufacturing

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Course Title	OJT	Course Code	24DMEE12			
Specialization	Manufacturing	Structure (LTPC)	0	0	20	20
Offered for	Diploma in Vocation	Status	Core √		Elective	
Faculty	Skill Faculty of Engineering and Technology	Type	New √		Modification	
Pre-requisite	Basic workshop, safety and machine tools	To take effect from	2024-2025			
Submission date	24/07/2024	Date of approval by BoS	24/07/2024			
Course Objective:	OJT aims to bridge the gap between academic learning and industry application and to upgrade their skills and professional knowledge.					
Course Outcome:	After completing this program, participants will be able to: **CO1.** Understand the industry culture. **CO2.** Performing industry operations. **CO3.** Understanding various industrial processes					
OJT Areas	1. Welding 2. CNC Machining 3. Quality 4. Inspection 5. Assembly					

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Course Title	Project	Course Code	24DMEE13			
Specialization	Manufacturing	Structure (LTPC)	0	0	16	16
Offered for	Diploma in Vocation	Status	Core √		Elective	
Faculty	Skill Faculty of Engineering and Technology	Type	New √		Modification	
Pre-requisite	Basic workshop, safety and machine tools	To take effect from	2024-2025			
Submission date	24/07/2024	Date of approval by BoS	24/07/2024			
Course Objective:	The objective of this course is to prepare students to use applications of the theory and practical learned during the course. It will also help students to develop an industry or research-oriented project. This course helps students how to carry out project/studies in the field of interest of the student or as given by the industry.					
Course Outcome:	After completing this program, participants will be able to: Apply theoretical and practical knowledge learned during classroom teaching and OJT.					
Content	Some of the suggested project activities (not confined to) are given below; One project has to be performed with a group of 3-5 students and student will have to fabricate, demonstrate the project and also prepare the project report and make presentation under the joint mentorship of University and industry. 1. Projects connected with repair and maintenance of machines/ quality control/ increasing productivity/ installation, calibration and testing of machines/ wastage reduction/ fabrication/ efficiency-related. 2. Projects related to fabrication/machining of components.					

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English Language and Communication Skills

Course Credit: 01(1--0)

Max. Marks: 50(15I+35E)

Course Code: **24DENG01**

Objectives:

- To enhance the language and communication competence of learners with an emphasis on English for Specific Purposes (ESP) through communication skills related activities.

Learning Outcomes: After this course, the learners will be able to

1. Communicate effectively in diverse situations.
2. Frame sentences for their professional and personal communication needs.
3. Draft meticulous resumes, letters, minutes and presentations.
4. Comprehend and understand intermediate level of passages and audios.

Units	Topics
I Communication Skills	Meaning, Process and Types of Communication; Principles of Effective Communication;
II Grammar and Vocabulary	Use of Tenses, Articles, Prepositions, Conjunctions, Subject-verb concord, Word formation: Base, Prefixes, Suffixes Synonyms, Antonyms, One-word substitutes
III Listening Skills	Process and types of listening, deterrents to listening process, Essentials of good listening. Listening Comprehension and Note-Taking
IV Writing Skills	Report writing, Agenda and Minutes; Letter Writing: Business letters, Cover letters, Electronic mail; Resume Writing
V Speaking Skills	Preparing for interviews- Types of interviews, Group discussion; Effective ways of performing well in interviews; Public Speaking

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ecommended Readings:

- Joseph, C. J., Myall, E. G., and A. Biswas, eds. *A Comprehensive Grammar of Current English*. New Delhi: Inter University P, 2014.
- Lata, Pushp, and Sanjay Kumar. *Communication Skills*. 2nd ed. New Delhi: OUP, 2019.
- Monippally, Matthukutty, M. *Business Communication: From Principles to Practice*. NewDelhi: McGraw Hill Pub., 2018.
- Mukerjee, H. S. *Business Communication: Connecting at Workplace*. New-Delhi: Oxford University Press, 2012.
- Murphy, H. A., Hildebrandt, H.W., and Thomas, J.P. *Effective Business Communication*. Boston: McGraw-Hill Companies, 1997.
- Ramesh, Gopalaswamy, and Mahadevan Ramesh. *The Ace of Soft Skills: Attitude, Communication and Etiquette for Success*. Noida: Pearson, 2019.
- Sandra, M. O. *Handbook of Corporate Communication and Strategic Public Relations: Pure and Applied*. New Delhi: Routledge, 2004.
- Sinha, K. K. *Taxmann's Business Communication*.4th Revised ed. New Delhi: Taxmann's Pub., 2018.
- Sinha, R. P. *Current English and Usage with Composition*. New Delhi: OUP, 2013.
- Taylor, Grant. *English Conversation Practice*. Indian ed. Chennai: McGraw Hill Education Pvt. Ltd., 2017.

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English Language and Communication Skills Practical

Course Credit: 01(0-1-0)

Max. Marks: 50(35I+15E)

Course Code: 24DENG02

Course Objective: This course is designed to strengthen the communication abilities of the learners by providing them hands-on practice.

Learning Outcomes: After completing this course, the learns will be able to

1) Demonstrate knowledge and understanding of a range of professional or public communication situations.
2) Perform effectively in diverse professional and public communication situations like interviews and negotiations, drafting emails and resume etc.

Details:

1. Situational Conversations
2. Listening Skills
3. Resume Writing
4. Mock Interviews
5. Group Discussion
6. Presentation Skills
7. Negotiation Skills
8. Email Writing
9. Public Speaking

Note: The teacher should play the role of the facilitator and allow the learners maximum time to practice these activities. The focus should be primarily on helping the learners overcome the LSWR barrier and gradually move towards honing these skills to enable the learners use them in professional communication situations.

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(UG Certificate) For D. Voc/Diploma

Course Title – Yoga and Health Skills- I

Course Credit: 02 (2-0-0)

Course Code:24DYHS01
Max. Marks: 100(30I+70E)

Objectives:

- To enable the student to have knowledge of Yoga.
- To possess emotional stability.
- To attain higher level of consciousness.

Learning Outcomes: After the completion of the course, the learners will be able to

1: Know and understand about basic Yoga.
2: Apply the knowledge of about different school of yoga to practice it traditionally.
3: Explaining the importance of health.
4: Apply knowledge of yoga asana for mental, physical and social well- being.
5: Understand the need of mediation techniques to practice it on daily basis.

Unit	Statement
1 **Introduction to Yoga**	Yogic Prayer Mantra, Meaning and Definition of Yoga, Aim and Objectives of Yoga, Misconceptions of Yog. Importance of Yoga in modern era.
2 **Yoga Practices**	Raja Yoga (AshtangaYoga), Bhakti Yoga, Karma Yoga, Hatha Yoga.
3 **Health**	Meaning, definition, yogic lifestyle, importance of yoga in health protection, measures to increase immunity.
4 **Yogic Management in Health Problems**	Cervical, Back Pain, Diabetes and Stress.
5 **Meditation**	Meaning, Types, Importance, General Instructions And Suggestions For Meditation, Physical, Mental and Spiritual Effects Of Meditation.

TEXT BOOKS

1. Yoga & yogic chikitsa - Singh Prof. Ramharsh , Chaukhamba Sanskrit pratishthan, Edition 2011
2. Swami Vivekananda: Jnana Yoga, Bhakti Yoga, Karma Yoga, Raja Yoga, Advaita Ashrama, Calcutta, 2002.
3. Prof. Ramharsh Singh -SwashthavrittaVigyan, Chaukhambha Sanskrit Prakashan, Varanasi, 1998.
4. Sriram Sharma Acharya- JivemSharadahShatam, AkhandJyoti Mathura 1998.
5. Prof. Ramharsh Singh-Yogewam Yogic Chitksha, Chaukhambha Sanskrit Prakashan, Varanasi, 1998.
6. SwasthaVrittaVigyanewam Yogic Chiktsha- Dr. RakeshGiri, SikhshaBharti, Uttrakhand.

REFERENCE BOOKS

1. Swami Kuvalyananda: Asana, Kaivalyadhama, Lonavla, 1993
2. Swami Satyananda Saraswati: Asana, Pranayama, Bandha, Mudra, Bihar School of Yoga, Munger, 2006
3. Basavaraddi, I.V. & others: YOGASANA: A Comprehensive description about Yogasana, MDNIY, New Delhi, 2011.
4. Basavaraddi, I.V. & others: Yogic Sukshma Evam Sthula Vyayama, MDNIY, New Delhi, 2011.

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PHYSICS

APPLIED PHYSICS							
D.Voc (Common for all Branches)							
L	T	P	Credits	Core Course	Internal Examination	:	15
2	0	0	2	24DPHY01	External Examination	:	35
Effective from Session:				2024-25	Total	:	50
Date of BoS approval:				23-07-2024	Duration of Exam	:	3 Hrs
Prerequisite							

Instruction for Paper Setter:

1. There should be 11 questions in the End Term examinations question paper.
2. The first (1st) question should be compulsory and cover the entire syllabus. This question should be objective, single line answers or short answer type question of total 10 marks.
3. Apart from question 1 which is compulsory, rest of the paper shall consist of 5 units as per the syllabus. Every unit shall have two questions each of 5 marks each. However, the student shall be asked to attempt only one of the twoquestions in the unit. Individual questions may contain sub-parts / sub-questions.
4. Each Unit shall have a marks weightage of 8.
5. The questions are to be framed keeping in view the learning outcomes of the course / paper. The standard / level of the questions to be asked should be at the level of the prescribed textbook.
6. The requirement of (scientific) calculators / log-tables / data – tables may be specified if required.

Course Objectives:

The course aims to inculcate skills among students with following objectives:

- Identify and measure physical quantities with accuracy.
- Represent physical quantities, understand the concepts of energy conservation and its applications.
- Acquire scientific skills to solve problems.
- Comprehend matter and environmental effects on it.
- Apply physical principles in different fields.

Course Outcomes:

After completing this subject, student should be able to:

CO1. Learn about Indian knowledge system.

CO2. Understand the physical quantities and their units along with measurements with accuracy

CO3. Solve scientific problems related to force, motion, work and energy.

CO4. Demonstrate competency in phenomena of electrostatics and electricity.

CO5. Apply the use of physical principles and analysis in various technical fields.

Detailed Contents:

UNIT I: Indian Knowledge System

Physics in Vedas, Atomic theory from Bhagavad-Gita, Indian invention of atomic theory, History of Electricity: From Ancient times to the Modern times, Maharishi Augustaya, History of light, Sound in Vedic Science, Indian Scientist in Physics: Acharya Kanada (Laws of motion), Aryabhatta, Sir C. V. Raman, Satyendra Nath Bose, Homi Jahangir Bhabha, Subrahmanyan Chandrasekhar, Vikram Ambalal Sarabhai.

UNIT II. Unit and Dimensions:

Physical quantities and units- fundamental and derived System of units: CGS, FPS, MKS, SI Dimension, dimensional formulae and SI units of physical quantities-distance, displacement, area, volume, density, velocity, acceleration, linear momentum, force, impulse, work, power, energy, pressure, surface tension, stress, strain) Dimensional equations, principle of homogeneity of dimensional equation, Application of dimensional analysis: checking the correctness of physical equation, conversion of system of unit (force, work, acceleration).

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UNIT III: Force, Motion, Work and Energy:

Scalar and vector quantities– definition and examples, representation of vector, types of vector (unit vector, position vector, co-initial vector, collinear vector, co-planar vector) Force and its units, resolution of force Newton's laws of motion, Linear momentum, Law of conservation of linear momentum, Impulse Circular motion: definition of angular displacement, angular velocity, angular acceleration, frequency, time period; Relation between linear and angular velocity, centripetal and centrifugal forces, Torque, angular momentum, moment of inertia and its physical significance, Definition, formula and SI unit: Work, Friction, Power- definition, Energy (Kinetic Energy and Potential Energy)

UNIT VI: Electrostatics and Electricity

Electric charge, unit of charge, conservation of charge, Coulomb's law of electrostatics, Electric field, electric lines of force, electric field intensity due to a point charge, Definition of electric flux, Gauss law, Capacitor and capacitance, Electric current and its SI Unit, direct and alternating current, Resistance, conductance, Series and parallel combination of resistances, Ohm's law,

Text Books:

1. "Text Book of Physics for Class XI (Part-I, Part-II)", N.C.E.R.T., Delhi.
2. "Text Book of Physics for Class XI (Part-I, Part-II)", N.C.E.R.T., Delhi.

Recommended Books:

1. Dr. HH Lal, "Applied Physics, Vol. I and Vol. II", TTTI Publications, Tata McGraw Hill, Delhi.
2. AS Vasudeva, "Applied Physics – I", Modern Publishers, Jalandhar.
3. R A Banwait, "Applied Physics – I", Eagle Prakashan, Jalandhar.
4. E-books/e-tools/relevant software to be used as recommended by AICTE/HSBTE/ NITTTR.
5. C. L. Arora, "Practical Physics", S Chand Publication.

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Applied Physics Lab							
D.VOC (Common for all Branches)							
L	T	P	Credits	Core Course	Internal Examination	:	35
0	0	2	1	24DPHY02	External Examination	:	15
Effective from Session:				2024- 25	Total	:	50
Date of BoS approval:				23-07-2024	Duration of Exam	:	3 Hrs

Course Objectives:

The course aims to inculcate skills among students with following objectives:

- to be familiarized with the physical property measuring tools.
- reading values and understanding their parts.
- to read values from the measuring tools.
- to compute physical properties of objects.
- to verify the laws of force.
- to compute atmospheric properties
- to compute force constant, Elastic constant, moment of inertia.
- to apply physical principles in different fields.

Course Outcomes:

After completing this subject, student should be able to:

CO1: Recognize the tool to measure the physical properties of the objects.

CO2: Use tools such as Vernier calliper, screw gauge, spherometer, etc. to measure physical properties of objects.

CO3: Investigate moment of inertia, resistance and resistivity.

CO4: Verify Ohm's and laws of resistance, room temperature, etc.

CO5: Solve problems to convert temperature into different scales.

PRACTICAL EXERCISES

1. Familiarization of measurement instruments and their parts (for example - Vernier calliper, screw gauge, spherometer, travelling microscope etc.), and taking a reading. (compulsory to all students)
2. To find diameter of solid cylinder using a vernier caliper
3. To find internal diameter and depth of a beaker using a vernier calliper and hence find its volume.
4. To find the diameter of wire using screw gauge
5. To find thickness of paper using screw gauge.
6. To determine the thickness of glass strip using a spherometer
7. To determine radius of curvature of a given spherical surface by a spherometer.
8. To determine force constant of spring using Hooke's law
9. Measuring room temperature with the help of thermometer and its conversion in different scale.
10. Determine the moment of inertia of a flywheel.
11. To verify Ohm's laws by plotting a graph between voltage and current.
12. To verify laws of resistances in series combination.
13. To verify laws of resistance in parallel combination.
14. Measurement of random errors of different objects.

Note- Experiment may be added as per the curriculum and ability.

Note: Minimum 8 Experiments to be performed

Reference Book:

1. B.Sc. Practical Physics, Geeta Sanon
2. B.Sc. Practical Physics, C. L. Arora
3. NCERT Class XI Practical Physics.
4. NCERT Class XII Practical Physics.

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CHEMISTRY

Course Title	Applied Chemistry	Course No. :	24DCHM01 (Theory) 24DCHM02 (Lab)		
Specialization	Basic Sciences	Structure (LTP)	2	0	1
Offered for	D.Voc (Vocational Courses)	Status	Core √	Elective	
Faculty	SFASH	Type	New √	Modification	
Pre-requisite	Nil	To take effect from	2024-2025		
Submission date		Date of approvalby BoS	23-07-2024		
Course Objective:	Objective of this course is to develop the concept, processes, theoretical principles and experimental findings in Chemistry. The selection, characterization and suitability assessment of natural raw materials essentially requires principles and concepts of Applied Chemistry.				
Course Outcome:	By the end of this course, the student will be able to: **CO1:** Sociable with the history of Chemistry and Indian Knowledge System **CO2:** Differentiate between different models of atoms and understand the electronic configuration ofatoms. **CO3:** Explore different periodic properties of elements. **CO4:** Identify different sources and quality of water. **CO5:** Categorize the types of fuels. **CO6:** Examine various types of corrosion and their preventive measures				
Contents ofthe course	**Unit 1: Chemistry in ancient India and Atomic Structure** Chemistry in ancient India: Historical evidences of Chemistry, a brief introduction to ancient texts in Chemistry (Rasayan Shastra). Maharishi Kanad's concept of Atoms Atomic Structure: Rutherford model of atom, Bohr's atomic model, quantum numbers and their significance, de-Broglie equation and Heisenberg uncertainty principle, electronic configuration of elements of atomic number 1 to 30. **Unit 2: Chemical Bonding** Ionic, covalent and coordinate bond and their properties, Metallic bonding (electron cloud model) and properties (like texture, conductance, luster, ductility and malleability). **Unit 3: Periodic Properties of Elements** Periodic law, periodic table and division of elements into s, p, d and f blocks introduction to properties like atomic radii and volume, ionic radii, ionization energy and electronaffinity and their periodicity. **Unit 4: Fuel and their Classification** Definition, characteristics, classification, Calorific value, preparation,				

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	composition, properties, and uses-producer gas, water gas, LPG, CNG and oil gas. **Unit 5: Water Chemistry and Corrosion** Impurities in water, methods of removal by filtration using sand beds, hardness of water, its types, causes and removal, disadvantages of hard water, importance of pH value in water usage. Corrosion: Introduction to corrosion, mechanism of corrosion, methods of prevention of corrosion.
Textbook	1. Text Book of Chemistry for Class XI& XII (Part-I, Part-II); N.C.E.R.T., Delhi. 2. Agarwal & Shikha, Engineering Chemistry, Cambridge University Press; New Delhi, 2015. 3. Agnihotri, Rajesh, Chemistry for Engineers, Wiley India Pvt. Ltd., 2014. 4. Jain & Jain, Engineering Chemistry, Dhanpat Rai and Sons; New Delhi, 2015. 5. Dharampal, The Beautiful Tree: Indian Indigenous Education in the Eighteenth Century, Dharampal Classics Series, Rashtrotthana Sahitya, Bengaluru, 2021. 6. D. M. Bose, S. N. Sen and B. V. Subbarayappa, Eds., A Concise History of Science in India, 2nd Ed., Universities Press, Hyderabad, 2010. 7. Dharampal, Indian Science and Technology in the Eighteenth Century: Some Contemporary European Accounts, Dharampal Classics Series, Rashtrotthana Sahitya, Bengaluru, 2021. 8. Dr. G. H. Hugar and Prof A. N. Pathak, Applied Chemistry Laboratory Practices, Vol. Vol. II and NITTTR, Chandigarh, Publicatións, 2013-14. I 9. Practical Chemistry by S.S. Dara.
References	1. C.N. R. Rao, Understanding Chemistry, Universities Press (India) Pvt. Ltd., 2011. 2. Dara, S. S. &Dr.S.S. Umare, Engineering Chemistry, S.Chand. Publication, New Delhi, New Delhi, 2015. 3. Dr. Vairam, S., Engineering Chemistry, Wiley India Pvt.Ltd., New Delhi, 2013 4. Dr. G. H. Hugar& Prof A. N. Pathak, Applied Chemistry Laboratory Practices, Vol. I and Vol. II NITTTR, Chandigarh, Publications. 5. Digital Content Links: 6. https://ncert.nic.in/textbook/pdf/kech101.pdf 7. Practical Chemistry by D N Bajpai – S. Chand Publishing 8. Advanced Practical Chemistry Book by pragatiprakash.
Laboratory Content	**List of Experiments** 1. To determine the viscosity and relative viscosity of given sample by using Ostwald's Viscometer. 2. Volumetric estimation of total hardness of given water sample using standard EDTA solution. 3. Estimation of total alkalinity of water volumetrically. 4. To calculate Biochemical Oxygen Demand (BOD) of the given water sample. 5. To calculate Total Dissolved Solids (TDS) present in the given water

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EVS

Course Title	Environmental Science	Course Code	24DEVS01		
Specialization	Value Added Course	Structure (LTP)	2	0	0
Offered for	D.Voc./Diploma	Status	Core √	Elective	
Faculty	SFASH	Type	New √	Modification	
Credits	2	Marks	Internal	30	
Hours	30		External	70	
Pre-requisite	Nil	To take effect from	2024-2025		
Submission date	13-07-2024	Date of approval by BoS	23-07-2024		
Course Objective	To create awareness among the students about our ecosystem, related problems and our role in that.				
Course Outcome	**On completion of this course, students will be able to:** CO1: Understand our environment. CO2: Comprehend ecosystems and biodiversity. CO3: Analyze atmospheric and climate dynamics. CO4: Evaluate urbanization and agricultural practices. CO5: Develop strategies for environmental pollution control.				
Contents of the course	**Unit 1: Indian Knowledge System- Indigenous Practices, Understanding our Environment** Environment: Definition, Scope and Importance, Natural Resources management: Forest Resources, Water Resources, Mineral Resources, Energy Resources, Food Resources, Land Resources., Traditional agricultural practices - Organic farming, Crop rotation, Intercropping), Water management techniques - Stepwells, Tankas, Baolis, Forest management and conservation methods - Sacred groves, Agroforestry **Unit 2: Ecosystem** Ecosystem: Introduction, structure, functions & Kinds of ecosystem. Energy flow in ecosystem, Biogeochemical cycles, Habitat and Ecological Niche, Species Interactions, Bio-geographic zones of India. **Unit 3: Atmosphere and Environmental Pollution** Atmosphere: Introduction, layers of the atmosphere, Climate Change: Greenhouse effect, Global warming, Ozone layer depletion, Deforestation, Air pollution: major air pollutants, classification of air pollutants, impact of air Pollution, controlling measures. Acid Rain. Water Pollution: Introduction, causes, impacts & waste water treatment. **Unit 4: Urbanization** Urbanization: Introduction, Manifestations of Urbanization, social economic and environmental problems in urbanization, Agriculture: Introduction, unsustainable patterns of modern industrialized agriculture, Green revolution, Soil erosion				

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Field Work	• Visit to a local area to document environmental assets river/forest/grassland/hill/mountain • Visit to a local polluted Site-Urban/Rural/Industrial/Agricultural • Participation in plantation drive and nature camps. • Campus environmental management activities such as solid waste disposal, water Management and sanitation, and sewage treatment
Text Books	1. Singh, J.S., Singh, S.P. & Gupta, S.R. (2006). Ecology, Environment and Resource Conservation. Anamaya Publications. 2. Odum, E.P., Odum, H.T. & Andrews, J. (1971). Fundamentals of Ecology. Philadelphia: Saunders. 3. Gilbert M. Masters and W. P. (2008). An Introduction to Environmental Engineering and Science, Ela Publisher (Pearson).
References	1. Deeveḍi M. (2021). Environment and ecology in the Indian knowledge system. Vidyanidhi prakashan. 2. Melissa K. Nelson and Daniel Shilling. (2018). Traditional Ecological Knowledge: Learning from Indigenous Practices for Environmental Sustainability. Cambridge University Press. 3. Krishnamurthy, K.V. (2003) Textbook of Biodiversity, Science Publishers, Plymouth, UK. 4. Manahan, S.E. (2022). Environmental Chemistry (11th ed.). CRC Press. 5. Central Pollution Control Board Web page for various pollution standards. https://cpcb.nic.in/standards/ 6. Ahluwalia, V. K. (2015). *Environmental Pollution, and Health*. The Energy and Resources Institute (TERI).

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