SHRI VISHWAKARMA SKILL UNIVERSITY

(A STATE GOVT SKILL UNIVERSITY ESTABLISHED BY GOVT.OF HARYANA)

Name of the Skill Faculty: Skill Faculty of Engineering & Technology

Name of the Programme/Course: B. Voc. (Mechanical-Manufacturing)

Duration of the course: 6 Semesters/3 Years

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Credit Allocation:

Type	No. of hrs.	Credit
Theory	15	1
Practical	30	1
On-the-Job Training (OJT)	30	1

B. Voc Mechanical Manufacturing (Session 2024-25) onwards
Semester: I

			Credit				Hours				Marks						
											Theroy			Practical			Total
Subject Code	Category	Subject Name	L	T	P	C	L	T	P	C	I	E	T	I	E	T	T+P
24UMEE29 24UMEE30	Disciplinary/ Interdisciplinary Major	Major Course-1 (Workshop Practice)	2	0	2	4	30	0	60	90	15	35	50	35	15	50	100
24UMEE31 24UMEE32		Major Course-2 (Introduction to CNC Machine)	2	0	2	4	30	0	60	90	15	35	50	35	15	50	100
24UCHM01 24UCHM02	Multidisciplinary	Multidisciplinary-1 (Applied Chemistry)	2	0	1	3	30	0	30	60	15	35	50	35	15	50	100
24UENG01 24UENG02	Ability Enhancement Courses (AEC)	AEC-1 (English Language and Business Communication)	1	0	1	2	15	0	30	45	30	70	100	0	0	0	100
24UENG03 24UENG04		AEC-2 (Employability Skills)	1	0	1	2	15	0	30	45	15	35	50	35	15	50	100
24UMEE33	Skill Enhancement Courses (SEC)-OJT /Project/Workshop	EDUCAD Lab	0	0	2	2	0	0	60	60	0	0	0	70	30	100	100
24DYSH02	Value Added Courses	VAC-1 (Yoga and Health Skills-II)	2	0	0	2	30	0	0	30	30	70	100	0	0	0	100
		Total	**10**	**0**	**9**	**19**	**150**	**0**	**270**	**420**	**120**	**280**	**400**	**210**	**90**	**300**	**700**

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B. Voc Mechanical Manufacturing (Session 2024-25) Onwards Semester II																		
			Credit				Hours				Theory Marks			Practical Marks			Total	
	Category	Subject	L	T	P	C	L	T	P	C	I	E	T	I	E	T	T+P	
24UMEE34 24UMEE35	Disciplinary/ Interdisciplinary Major	Major Course-3 Measurement & Metrology	2	0	2	4	30	0	60	90	15	35	50	35	15	50	100	
24UMEE36 24UMEE37		Major Course-4 CNC Programming & Machining	2	0	2	4	30	0	60	90	15	35	50	35	15	50	100	
24UMEE38 24UMEE39		Major Course-5 Industrial Best Practices	2	0	2	4	30	0	60	90	15	35	50	35	15	50	100	
24UPHY01 24UPHY02	Multidisciplinary	Multidisciplinary-1 (Applied Physics)	2	0	1	3	30	0	30	60	15	35	50	35	15	50	100	
24UMEE40	Skill Enhancement Courses (SEC)-OJT /Project/Workshop	Skill Practice-I	0	0	2	2	0	0	60	60	0	0	0	70	30	100	100	
24UEVS01	Value Added Courses	Environmental Science	2	0	0	2	30	0	0	30	30	70	100	0	0	0	100	
24UMEE41	Research Project/ Dissertation	Internship	0	0	2	2	0	0	60	60	0	0	0	70	30	100	100	
		Total	10	0	11	21	150	0	330	480	90	210	300	280	120	400	700	

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24UMEE29	**Workshop Practice**	L	T	P	C
		2	0	0	2

Course Objective:

The aim of this course is to develop an understanding of the basic concepts of manufacturing processes and application of machines used in a mechanical workshop including pedestal grinding, hydraulic power saw, horizontal bend machine, lathe and milling.

Course Outcomes:

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

[CO1] Understand the basic concepts of manufacturing process.

[CO2] Identify the cutting tools and their applications.

[CO3] Understand milling & lathe machine tool and associated machining operations

[CO4] Perform hole making operations like drilling, boring, reaming.

[CO5] Perform grinding process and other super finishing processes

Unit	Title	Content	Hr.	Qualification	NOS
1	**Introduction of manufacturing processes**	Introduction to primary manufacturing processes casting, fabrication, metal cutting, metal forming (cold/hot forming), forging, rolling, extrusion and drawing	8	CNC Machining	CSC/N0456 V1.0 CSC/N0457 V1.0 CSC/N0458 V1.0 CSC/N0461 V1.0 CSC/N0452 V1.0
2	**Metal Cutting Tools**	Bench-Vice types & uses, vice clamp, Hacksaw and blades, specifications, Files– Specifications, description, materials, grades, cuts, File elements, uses, types of file, care and maintenance of files. Power Saw, Bend Saw, Circular saw machines for metal cutting	6		
3	**Introduction to conventional lathe machine**	Introduction to lathe, Lathe parts, classification of lathe machines, specification of lathe, lathe accessories, Lathe operations: - Plain and step turning, facing, parting off, taper turning, eccentric turning, drilling, reaming, boring, threading and knurling, form turning, spinning.	6		

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4	**Introduction to conventional milling machine**	Introduction to milling machine, types of Milling machines, milling cutters, milling operations – face milling, angular milling, form milling, straddle milling and gang milling. dividing head and indexing types, Up milling and down milling.	5		
5	**Grinding and super finishing processes**	Types of grinding machines, Application and use of pedestal grinder, General Dressing tools used in grinding, wheel characteristics, specifications, lapping, honing, factor effecting selection of wheels. Loading, glazing and trueing of grinding wheel.	5		

Text Books:

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.

Reference Books:

1. R.K. Jain and S.C. Gupta, Production Technology, A text book for Engineering students, Kanna Publishers.
2. Workshop Technology: Hazra & Choudhary

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		L	T	P	C
24UMEE30	**Workshop Practice -Lab**	0	0	2	2

Course Objective:

Aim of this course is to make student skilled to use lathe, milling and perform operation on lathe, milling hydraulic power saw machine, horizontal bend saw machine, grinding machine and replacement of grinding wheels/tool & equipment's.

Course Outcomes:

After completing this programme, participants will be able to:

[CO1] Perform various operation on lathe machine.

[CO2] Perform different operation on milling machine.

[CO3] Demonstrate the Dressing and Trueing process using grinding wheel.

[CO4] Use hydraulic power saw and horizontal bend saw.

S.No.	Experiment	Hrs.	Qualification	NOS
1	Marking out Lines, gripping suitably in vice jaw and hacksawing as per drawing.	4	CNC Machining	CSC/N0456 V1.0 CSC/N0457 V1.0 CSC/N0458 V1.0 CSC/N0461 V1.0 CSC/N0452 V1.0
2	Prepare a job using lathe machine as per given drawing.	8		
3	Prepared a job using milling machine as per given drawing.	8		
4	Prepared a single point cutting tool using grinding machine.	5		
5	Fit a new grinding wheel in pedestal grinding machine.	5		
6	Grinding of single point cutting tool using pedestal grinder.	4		
7	Dressing and Trueing of grinding wheel.	6		
8	Marking out Lines, gripping suitably in vice jaws, hacksawing to given dimensions.	6		
9	To demonstrate hydraulic power saw and cut a work piece using this machine.	6		
10	To demonstrate Horizontal Bend Saw and cut raw material using this machine	4		

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		L	T	P	C
24UMEE31	**Introduction to CNC Machine**	2	0	0	2

Course Objective:

Aim of this course is to develop an understanding of G and M Code, Part Programming, Work and Tool length offset compensation of CNC machine.

Course Outcomes:

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

CO1. Understand the basic concept of CNC machine & its part functions.
CO2. Interpret the drawing & Analyze the coordinate.
CO3. Understand the CNC Coding system
CO4. Prepare the part programming for different operations
CO5. Explore different types of control panel used in CNC machines.

Unit	Title	Content	Hr.	Qualification
1	**Introduction to Machining**	Introduction to Metal cutting, work materials, tool materials, properties. Mechanics of cutting, Types of chips continues, discontinuous and chip with built up edges, Single point cutting tool and multi point cutting tool, Tool nomenclature, Tool life and wear, Factor effecting tool life	6	CNC Machining
2	**Concept of CNC**	Conventional machining, History of CNC, need of CNC, applications & advantage of CNC over conventional machine, Different parts of CNC machine.	4	
3	**Coordinate System, work and tool holding**	Based on motion type (point to point, contouring system, number of axes, Coordinate system-absolute, incremental, Coordinates calculation, work holding devices and tool holding device.	**8**	
4	**CNC Machine parameter & Control panel, basic G and M codes**	Cutting speed, feed rate and depth of cut, spindle speed and its calculation, Cycle time, Run time. Basics of Machine operating Panel and its function. Basic G and M code	**8**	
5	**Basics of CNC Milling**	Introduction to CNC Milling, various type of tools, tool & work offsets, cutter radius compensation and wear compensation, coordinates for milling operations.	**4**	

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24UMEE32	**Introduction to CNC Machine Lab**	**L**	**T**	**P**	**C**
		0	0	2	2

Course Objective:

Aim of this course is to develop an understanding of the basic G and M Code, work, and Tool length offset compensation and perform various types of operations on CNC simulator.

Course Outcomes:

After completing this programme, participants will be able to:

CO1. Understand the working of CNC simulator & its part functions.
CO2. Demonstrate Tool & Work offset for CNC Turning on CNC simulator.
CO3. Perform Tool & Work offset for CNC Milling on simulator
CO4. Perform Turing & Milling operations on CNC simulator.
CO5. Diagnose the CNC programs on CNC Simulator.

S. No.	Experiment	Hrs.	Qualification	NOS
1	To understand Introduction of CNC Machines and functions of its different components.	2	CNC Machining	CSC/N0456 V1.0 CSC/N0457 V1.0 CSC/N0458 V1.0 CSC/N0461 V1.0 CSC/N0452 V1.0
2	To understand the Simulator operating panel, Control Panel keys and their functions.	4		
3	To Set up the CNC simulator for operations	4		
4	To understand the tool turret and different tool inserts in CNC simulator.	2		
5	To understand G & M code for preparation of part program using simulator	6		
6	To familiarize with different Coordinate system	4		
7	To understand the absolute, incremental coordinates system, Coordinates calculation.	4		
8	To Perform Work offset & tool offset on CNC Turning simulator.	4		
9	To make program for facing and turning in CNC Turning simulator.	14		
10	To Perform Work offset & tool offset on CNC Milling simulator.	4		
11	To make program for facing and Contour profile in CNC milling simulator.	12		

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24UMEE33	EDUCAD Lab	L	T	P	C
		0	0	2	2

Course Objective:

Aim of this course is to understand and escalate the importance of basic concepts and principles of Engineering Drawing. Enable the students with various concepts like dimensioning, conventions and standards related to working drawings in order to become professionally efficient. Ability to read and interpret engineering drawings created by others. Ability to draw orthographic projections

Course Outcomes:

After completing this programme, participants will be able to:

[CO1] Identify and use of different grades of pencils and other drafting instruments which are used in engineering field.

[CO2] Utilize various types of lines used in engineering drawing.

[CO3] Construction of scales and diagonal scale, isometric scale, isometric projections and views.

[CO4] Generate isometric (3D) drawing from different 2D (orthographic) views/sketches.

[CO5] Draw projections of point, lines, planes, solids, isometric projections and sections of solids including cylinders, cones, prisms and pyramids using Mini-Dafter and CAD.

[CO6] Use AutoCAD or other drafting software for making fast engineering drawings and even animating the assembly drawings.

Unit	Title	Content	Hr.	No of sheets	Qualification	NOS
1	**Introduction to Engineering Drawing**	Definition of Engineering Drawing, Introduction to various drawing instruments-materials, layout and drawing sheets and drawing boards, pencil grades. Different types of lines as per BIS specifications, vertical, horizontal and inclined lines. Principles of dimensioning: Types, elements, placing, different methods Different geometrical figures such as –triangles, rectangles, circles, ellipses, parabola, hexagonal and pentagon. Definition and classification of lettering, different strokes used.	10	04	CNC Machining	CSC/N0456 V1.0 Interpret Engineering Drawings(turning)

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2	**Scales, Common Symbols and conventions**	Scales-their needs and importance, types of scales, Representative Fraction (R.F.) and length of scale. Construction of Plain and diagonal scale. Material conventions, general symbols used in mechanical/production drawings Electrical fitting symbols for domestic interior installations Safety symbols used in engineering works	8	03		
3	**Orthographic Projection**	Basic orthographic projections such as: - Projections of points in different quadrants - Projection of line (1st angle and 3rd angle) - Line parallel to both planes - Line perpendicular to any one of the principal plane - Line inclined to any one of the principal plane and parallel to other - Projection of Solid-Cube, Cuboid, Cone, Prism, pyramid -Three views of orthographic projections of different objects (At least one sheet in 3rd angle)	**16**	05		
4	**Sectional and Isometric Views**	Identifications of surfaces, Importance and salient features of sectioning of objects. Description of full section and half section view. Fundamental of isometric projections and isometric scale, Isometric views of different objects.	**6**	02		
5	**Graphics using CAD**	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,	**20**	06		

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		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.				

Text Books:

1. A Text Book of Engineering Drawing by Surjit Singh; Dhanpat Rai & Co., Delhi
2. Engineering Drawing by PS Gill; SK Kataria & Sons, New Delhi
3. Elementary Engineering Drawing in First Angle Projection by ND Bhatt; Charotar, Publishing House Pvt. Ltd., Anand
4. Engineering Drawing I & II by JS Layall; Eagle Parkashan, Jalandhar

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24UMEE34	**Measurement & Metrology**	L	T	P	C
		2	0	0	2

Course Objective:

This course aims to equip students with essential skills and knowledge in measurement and metrology, focusing on practical applications and theoretical understanding.

Course Outcomes:

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

[CO1] Understand about measurement systems and their components

[CO2] Utilize various measuring instruments for mechanical measurement.

[CO3] Apply calibration techniques of measuring instruments.

[CO4] Understand the basic dimensional and statistical concepts of metrology.

[CO5] Implement GD&T Principles at shop floor for inspectional accuracy of the job.

Unit	Title	Content	Hr.	Qualification	NOS
1	**Introduction to Measurement**	Aim, Definition of measurement and metrology, types, related terminologies, accuracy and precision, methods of measurements, units of measurement, Concept of error, sources of error, Measurement standards, calibration of measuring instruments	8	CNC Machining	CSC/N0461 Performing metrology and inspection on the workpiece
2.	**Measuring Instruments**	Common measuring instruments/gauges- Vernier calliper, micrometre, dial gauge, height gauge, spirit level, slip gauges, surface plate, ring, plug, feeler, thread, radius gauges, Bevel protractor, Sine bar, angle Gauges, Comparators, their types, relative merits and limitation.	6		
3	**Linear and Angular measurement applications**	Gear teeth measurement, Screw thread measurement, Fasteners, Taper & Radius measurement using different measuring instruments.	6		
4	**Limits, Fit and Tolerance**	Limits, Fit and Tolerances: Definitions; Tolerance zone and grades, Hole and shaft system, Geometric tolerances, Tylor's principle of gauging, Design of tolerances for various applications; Tolerance analysis in manufacturing and assembly	5		
5	**GD&T**	Introduction to GD&T parameters- such as straightness, flatness, parallelism, cylindricity etc. Surface finish/surface roughness.	5		

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Text Book:

- Engineering Metrology, R.K. Jain, Khanna Publishers, Delhi, 2009.
- Bewoor & Kulkarni, "Metrology & amp; Measurement" Tata McGraw Hill, 2009.
- D. James, and S, Meadow, "Geometric Dimensioning and Tolerancing", Marcel Dekker, 1995

Reference Books:

- Engineering Metrology, Gupta I.C., Dhanpat Rai Publications.
- Engineering Metrology and Measurements, N.V.Raghavendra and L.Krishnamurthy, Oxford University Press.
- Metrology and Measureemnt, Anand K Bewoor and Vinay A Kulkarni, McG

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24UMEE35	Measurement & Metrology Lab	L	T	P	C
		0	0	2	2

Course Objective:

This course is designed to provide students with hands-on experience of measuring instruments/gauges used in engineering and manufacturing.

Course Outcomes:

After completing this programme, participants will be able to:

[CO1] Understand various linear and angular measuring instruments.

[CO2] Demonstrate dimensional measurement with linear and angular measuring instruments.

[CO3] Perform Thread ring gauge, Pitch gauge, screw gauge and bevel protector.

[CO4] Demonstrate and use of Feeler gauge, snap gauge, ring gauge, plug gauge, sine bar and slip gauges

[CO5] Perform measurement of gear thread, screw teeth and fastener.

S.No.	Experiment	Hrs.	Qualification	NOS
1	To determine least count of different instruments such as Vernier caliper, micrometer, dial gauge, height gauge etc.	8	CNC Machining	CSC/N0461 Performing metrology and inspection on the workpiece
2	To demonstrate dimensional measurement of given specimen using linear Measuring Instruments (Vernier calipers, scale, measuring tape, micro-meter, height gauge etc.)	12		
3	To inspect different parameters of a given job using instruments/gauges. (Thread ring gauge, Pitch gauge, screw gauge, bevel protector etc)	6		
4	To demonstrate the working of various gauges used in industry for inline inspection such as Feeler gauge, snap gauge, ring gauge, plug gauge, Slip gauges and other similar gauges.	6		
5	To measure angle of a given specimen using combination sets and Sine bars.	8		
6	To perform spindle alignment test on lathe using dial gauge.	8		
7	To perform spindle alignment test on milling.	6		
8	To check and demonstrate inspection of Outer Diameter and Internal Diameters of given components	6		

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24UMEE36	CNC Programming & Machining	L	T	P	C
		2	0	0	2

Course Objective:

This course aims to provide students with a thorough understanding of CNC machining, including programming and different operations.

Course Outcomes:

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

CO1. Understand Control Panel Functions

CO2. Interpret the drawing & Analyze the coordinate.

CO3. Create and Execute CNC Programs for different operations.

CO4. Understand of basic tools required for CNC operations.

Unit	Title	Content	Hr.	Qualification
1	**Introduction to control Panel**	Control Panel keys & their functions, feed handle, feed override, spindle speed override, mode function, MDI, Spindle (CW) & (CCW) Rotation directions, Machine zero position, work zero-point.	4	CNC Machining
2	**Introduction to G codes and M codes**	Introduction to all G codes and M codes and their functions., work/tool offset, Tool nose radius compensation left/right, Tool orientation, Tool cutting direction, Tool number position.	4	
3	**CNC programming**	Starting the CNC machine, steps of creating a program, create manual program for CNC through coordinates for various operations like Facing, OD Turning, taper turning, Drilling, Grooving, etc.	**8**	
4	**CNC Turning Operations**	Introduction to canned cycle. Steps of creating a program using canned cycle, create canned cycle program for CNC through coordinates for various operations like Facing, OD Turning, ID turning, taper turning, radius, chamfer, Drilling, Grooving, etc.	**10**	
5	**CNC Milling Operations**	Introduction to CNC milling operations, G and M codes, Programming for milling operations such as: Facing, contour/profile cutting, drilling & tapping etc.	**4**	

Text Books:

- CNC Machines by By B. S. Pabla, M. Adithan(First Edition), New Age International (P) Ltd.
- Tilak Raj, "CNC Technology & Programming", Dhanpat Rai publishing Company (P) ltd., N Delhi.

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24UMEE37	CNC Programming & Machining lab	L	T	P	C
		0	0	2	2

Course Objective:

This course is designed to provide students with a thorough understanding and hands-on experience in CNC machining, focusing on both turning and milling operations.

Course Outcomes:

After completing this programme, participants will be able to:

CO1. Demonstrate the CNC part programming for different operations
CO2. Understand Geometry and different Offsets in CNC machines
CO3. Perform Tool and Work Offsets in CNC Turning & Milling
CO4. Operate different control panels.
CO5. Demonstrate CNC Turning & Milling Operations on CNC machines.

Sr. No.	Experiment	Hrs.	Qualification	NOS
1	To understand the method of making Geometry and wear offsets in CNC Machine.	2	CNC Machining	Programming (turning) (CSC/N0458) Setting and operating CNC lathes (CSC/N0452) Finalize and deliver work pieces (CSC/N0453)
2	To Perform tool offset and work offset in CNC Turning.	2		
3	To operate the Machine operating panel, Control Panel keys and their functions.	4		
4	To operate different G & M code in CNC turning machine.	4		
5	To test and prove the program on the CNC Machine and to make a program of facing and OD Turning.	6		
6	To carry out turning operations by using turning cycles and execution of an OD Step Turning operation on CNC Lathe machine.	8		
7	To carry out OD turning operations using CNC Part programming with canned cycle (G71 & G70) and execution of an operation on CNC Lathe machine.	8		
8	To carry out external grooving operation using CNC Part programming and execution of an operation on CNC Lathe machine	8		
9	To Perform the work & tool offsets on CNC Milling Machine	2		
10	To perform facing Operation on CNC Milling Machine	4		
11	To perform drilling Operation on CNC Milling Machine	4		
12	To perform Pocket/contour profile operation on CNC Milling Machine	4		
13	To perform Tapping Operation on CNC Milling Machine	4		

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24UMEE38	Industrial Best Practices	L	T	P	C
		2	0	0	2

Course Objective:

To provide comprehensive knowledge and skills in occupational hazards, ergonomic principles, electrical safety, fire prevention, health considerations, and maintenance schedules in industrial settings, ensuring safety and efficiency in the workplace.

Course Outcomes:

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

CO1: Identify hazards in the workplace that pose a danger or threat to their safety or health, or that of others.
CO2: Control unsafe or unhealthy hazards and propose methods to eliminate the hazard.
CO3: Analyse the potential safety or health hazard both verbally and in writing, citing the occupational Health and Safety Regulations as well as supported legislation.
CO4: Understand the role of health and safety in the workplace pertaining to the responsibilities of workers, managers, supervisors.
CO5: Implement Time Based Maintenance (TBM) schedules and Failure Based Maintenance (FBM).

Unit	Title	Content	Hr.	Qualification
1	**Occupational Hazard and Control Principles**	Safety, History and development, National Safety Policy. Occupational safety and Health Act (OSHA), Occupational Health and Safety administration - Laws governing OSHA and right to know. Accident – causation, investigation, investigation plan, Methods of acquiring accident facts, Supervisory role in accident investigation	5	CNC Machining
2	**Ergonomics at Work Place**	Ergonomics Task analysis, Preventing Ergonomic Hazards, Work space Envelops, Visual Ergonomics, Ergonomic Standards, Ergonomic Programs. Hazard cognition and Analysis, Human Error Analysis – Fault Tree Analysis – Emergency Response - Decision for action – purpose and considerations	5	
3	**Electrical Safety, Fire Prevention and Protection**	Electrical PPE, first aid such as in cases of bleeding, burns, choking, electric shock, bandaging procedures. Fire Triangle, Fire Development and its severity, Effect of Enclosures, early detection of Fire, Classification of fire and Fire Extinguishers. Detailed concept of 5S and safety used in Industries	6	

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4	**Health Considerations at Work Place**	Types of diseases and their spread, Health Emergency. Personal Protective Equipment (PPE) – types and advantages, effects of exposure and treatment for engineering industries, municipal solid waste. Environment management plans (EMP) for safety and sustainability.	**6**
5	**Introduction to Maintenance and Maintenance schedules:**	Maintenance Concepts, functions and objectives of maintenance, method of maintenance, Failure Based Maintenance (FBM), Contractual Maintenance, Reliability Centered Maintenance (RCM), Time Based Maintenance (TBM), Condition Based Monitoring (CBM) or Dynamic Predictive Maintenance (DPM), Total Productive Maintenance (TPM) Maintenance scheduling and its importance, scheduling procedure for Break down maintenance and Preventive maintenance	**8**

Text Books:

1. Goetsch D. L.,(1999), "Occupational Safety and Health for Technologists, Engineers and Managers", Prentice Hall.
2. Heinrich H.W.,(2007),"Industrial Accident Prevention A Scientific Approach", McGraw-Hill Book Company National Safety Council and Associate (Data) Publishers Pvt. Ltd., (1991),
3. "Industrial Safety and Pollution Control Handbook.

References

1. CollingD.A.,(1990),"IndustrialSafetyManagementandTechnology",PrenticeHall,New Delhi.
2. Della D.E., and Giustina, (1996), "Safety and Environmental Management", Van Nostrand Reinhold International Thomson Publishing Inc.

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24UMEE39	**Industrial Best Practices Lab**	**L**	**T**	**P**	**C**
		0	0	2	2

Course Objective:

Equip students with the knowledge and skills to identify, implement, and maintain effective safety measures, including personal protective equipment, accident prevention, first aid, electrical, mechanical, and work safety protocols, and conduct hazard identification and risk assessments in industrial settings.

Course Outcomes:

After completion of this course Students will be able to

CO1: Demonstrate the correct usage of various personal protective equipment (PPE) used in different industrial settings, ensuring an understanding of their importance in maintaining personal safety.

CO2: Analyze common types of accidents in industrial environments, understand their causes, and suggest preventive measures to enhance workplace safety.

CO3: Identify various types of first aid techniques and their appropriate applications in industrial scenarios. enabling them to respond effectively to workplace injuries and emergencies.

CO4: Understand the principles of electrical safety, identify potential electrical hazards, and implement appropriate safety measures to prevent electrical accidents in industrial settings.

CO5: Identify mechanical hazards and apply safety protocols and protective measures to minimize risks associated with mechanical equipment and operations in the industry

S.No.	Experiment	Hrs.	Qualification	NOS
1	Identification and knowledge of different types of personal protective equipment used in Industry.	6	CNC Machining	
2	To determine different type of accident, occur in industry.	6		
3	To determine different types of first aid used in industry.	6		
4	To determine different types of electrical safety used in Industry.	6		
5	To determine different types of mechanical safety used in Industry.	6		
6	To determine different types of work safety used in Industry.	6		
7	To determine HIRA (Hazard identification and risk assessment) in industry.	6		
8	To develop the check-sheet for a particular example input parameter, output parameter and its impact.	6		
9	Organize a workspace following the 5S methodology (Sort, Set in Order, Shine, Standardize, Sustain) and measure improvements in efficiency.	6		

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		L	T	P	C
24UMEE40	**Skill Practice-I**	0	0	2	2

Course Objective:

This course is designed to provide students with hands-on experience in industrial component design and machining as per given drawing and tolerances.

Course Outcomes:

After completing this programme, participants will be able to:

[CO1] Create Industrial Component Drawings.

[CO2] Demonstrate Machining of different components on CNC Turning & Milling.

[CO3] Set-up the process flow for manufacture the part.

S.No.	Experiment	Hrs.	Qualification	NOS
1	Prepare the industrial component drawing in AutoCAD, including 2D views (with all necessary perspectives, dimensions, and tolerances) and a 3D rendering.	15	CNC Machining	CSC/N0461 Performing metrology and inspection on the workpiece
2	Preparing machined components (as per the drawing) on CNC Turning of given quality standards which are free from false tool cuts, burrs and sharp edges, conforming to general dimensional tolerance +/-0.1mm	15		
3	Preparing machined components (as per the drawing) on VMC of given quality standards which are free from false tool cuts, burrs and sharp edges, conforming to general dimensional tolerance +/-0.1mm	15		
4	Preparing male & female part for assembly (as per the drawing) on CNC Turning of given quality standards which are free from false tool cuts, burrs and sharp edges, conforming to general dimensional tolerance +/-0.1mm.	15		

Text Books:

- CNC Machines by By B. S. Pabla, M. Adithan(First Edition), New Age International (P) Ltd.
- Tilak Raj, "CNC Technology & Programming", Dhanpat Rai publishing Company (P) ltd., N Delhi.

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Course Title	Applied Chemistry	Course No. :	24UCHM01 (Theory) 24UCHM02 (Lab)		
Specialization	Basic Sciences	Structure (LTP)	2	0	1
Offered for	UG (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:	The aim of this course is to impart knowledge about the numerous materials used in fabricating and manufacturing devices for the comfort of life. The selection, characterization and suitability assessment of natural raw materials essentially requires principles and concepts of Applied Chemistry. Technology is being increasingly based on the electronic, atomic and molecular level modifications.				
Course Outcome:	By the end of this course, the student will be able to: **CO1:** Understand and analyse microscopic chemistry in terms of atomic and molecular orbitals and intermolecular forces **CO2:** Rationalize periodic properties such as ionization potential, electronegativity, oxidation states and electron affinity. **CO3:** Understand the classification and general properties of engineering materials such as metal, alloys, glasses, cement, refractory and composite materials using knowledge of chemical bonding. **CO4:** Understand and assess the suitability of water source for domestic and industrial application, effluents and minimize water pollution. Understand corrosion and develop economical prevention technique. **CO5:** Choose fuel and polymers suitable for economical industrial processing to obtain eco- friendly finished products. List major chemical reactions that are used in the synthesis of molecules.				
Contents of the course	**Unit:1 Chemistry in ancient India and Structure of Atom** a) **Chemistry in ancient India**: Historical evidences of Chemistry, a brief introduction to ancient texts in Chemistry (Rasayan Shastra), Maharishi Kanad's concept of Atoms, Metals and metal working Technology (Copper, Gold, Zinc, Iron & Steel). b) **Structure of Atom:** Rutherford model of atom, Bohr's atomic model, quantum numbers and their significance, de-Broglie equation and Heisenberg uncertainty principle, de-Broglie concepts of dual nature, Heisenberg uncertainty principle and some basic numerical, electronic configuration. **Unit-2 Periodic Properties & Chemical Bonding**				

RJ Himani MK2

	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 electron affinity and their periodicity. Ionic, covalent and coordinate bond and their properties, Metallic bonding (electron cloud model) and properties (like texture, conductance, luster, ductility and malleability). **Unit-3 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, Factors affecting to corrosion, methods of prevention of corrosion. **Unit-4 Fuel and their Classification** Definition, characteristics, classification, Calorific value, preparation, composition, properties, and uses-producer gas, water gas, LPG, CNG and oil gas. Petroleum and brief idea of refining into various fractions and their characteristics and uses. Calorific value of fuel. **Unit-5 Industrial important materials** **Polymers:** Introduction and classification of polymer. Preparation, properties and uses of Polythene, P.V.C, Nylon, natural and synthetic rubber and phenol-formaldehyde resin and its application in industry. Brief introduction and application of Fertilizer, Glass, Cements, Refractories.
Textbook	1. Engineering Chemistry-I concept and application by Jit Chakraborty. Asimesh Dutta Gupta, Ravikanth Kamlekar 2. Dharampal, The Beautiful Tree: Indian Indigenous Education in the Eighteenth Century, Dharampal Classics Series, Rashtrotthana Sahitya, Bengaluru, 2021. 3. D. M. Bose, S. N. Sen and B. V. Subbarayappa, Eds., A Concise History of Science in India, 2nd Ed., Universities Press, Hyderabad, 2010. 4. Dharampal, Indian Science and Technology in the Eighteenth Century: Some Contemporary European Accounts, Dharampal Classics Series, Rashtrotthana Sahitya, Bengaluru, 2021. 5. Chemistry, Satyaprakash, Khanna Publishing House 6. Understanding Chemistry, C.N.R Rao 7. Chemistry in Engineering & Tech., Vol. I& II, Rajaram, Kuriacose (TMH) 8. Engineering Chemistry, Shashi Chawla (Dhanpat Rai and co.) 9. Engineering Chemistry, P.C. Jain, Monica Jain (Dhanpat Rai& Co.)

	10. Engineering chemistry, S.S Dara (S.Chand & co.)
References	1. A text book of Engineering Chemistry by M. Thirumala Chary, E. Laxminarayana and K. Shashikala. 2. Spectroscopy (Vol-4) by K.L. Kapoor 3. Hydrogen – A fuel for Automatic Engines, Prashukumar G P, ISTE 4. Dr. G. H. Hugar and Prof A. N. Pathak, Applied Chemistry Laboratory Practices, Vol. I and Vol. II, NITTTR, Chandigarh, Publications, 2013-14. 5. Agnihotri, Rajesh, Chemistry for Engineers, Wiley India Pvt.Ltd., 2014. 6. Jain & Jain, Engineering Chemistry, Dhanpat Rai and Sons; New Delhi, 2015.
Laboratory Content	<u>List of Experiments</u> 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 sample. 6. To determine the inorganic nitrogen (Nitrate Nitrogen) in the given water sample. 7. To calculate the Total Kjeldahl Nitrogen in the given water sample. 8. Proximate analysis of coal: Gravimetric estimation of moisture in given coal sample. 9. Determine the pH of given sample using pH meter 10. Determination of calorific value of solid or liquid fuel using bomb calorimeter. 11. Detection of metal iron in the rust (solution of rust in concentrated HCl may be given). 12. Synthesis of a polymer Urea Formaldehyde resin/Phenol Formaldehyde resin. 13. Determination of surface tension. 14. Determination of residual chloride content of water 15. Estimation of Dissolved Oxygen, Dissolved Carbon Dioxide. **Note: Minimum 6-8 Experiments to be performed**

English Language and Business Communication

Course Code: 24UENG01

Course Credit: 01(1-0-0)
Max. Marks: 50 (15I+35E)

Objective:

To train students to enhance their skills in written as well as oral communication through practical conduct of this course. This course will help students in understanding the principles and techniques ofbusiness communication.

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

1. Students would be able to understand the nature, structure, types and process of various dimensions of communication and apply them in communication.
2. Students would be able to make effective presentations in various business/professional situations incorporating the ethics of good negotiations and assertive behavior.
3. Students would develop competency to understand and perform the diversity of the globalized multicultural world.
4. Students would be able to draft various types of documents used inside the organization for various types of communication.
5. Students would develop interview skills and competency incorporating the use of different social media platforms for networking.

Units	Topics
I Basics of Communication	Meaning, Process and Types of Communication; Principles of Effective Communication; Process and types of listening, deterrents to listening process, essentials of good listening.
II Presentation Skills	Prerequisites of effective presentation, format of Presentation. Negotiations-types, structures and basics of negotiations; Assertive behavior.
III Multicultural World and Communication	Business Communication in a globalized and multicultural world; understanding cultural diversity and developing cultural competency and inter-cultural business communication skills; Barriers to cross-cultural communication and strategies to overcome them.
IV Written Communication	Mechanics of writing, report writing, agenda and minutes; business correspondence – business letter format, style of letter arrangement, types of letters, electronic mail; Resume Writing
V Communication in Practice	Preparing for interviews- types of interviews, process of interview and group discussion; effective ways of performing well in interviews; Social media and Networking, Social media profiles, Editing and Posting onsocial media;

Recommended Readings:

- Bovee, C., & Thill, J.V., and Raina, R.L. *Business Communication Today*. New York: Pearson, 2016.
- Lata, Pushp, and Sanjay Kumar. *Communication Skills*. 2nd ed. New Delhi: OUP, 2019.
- Lehman, C. M., Dufrene D. D., and Sinha, M. *BCOM: The South Asian Perspective on Business Communication*. New Delhi: Cengage Learning, 2016.
- Monippally, Matthukutty, M. *Business Communication: From Principles to Practice*. New Delhi: 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.
- Post, Emily. *The Etiquette Advantage in Business*. New York: Collins, 2005.
- 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.
- Taylor, Grant. *English Conversation Practice*. Indian ed. Chennai: McGraw Hill Education Pvt. Ltd., 2017.

English Language and Business Communication Practical

Course Code: 24UENG02

Course Credit: 01(0-1-0)
Max. Marks: 50(35I+15E)

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
10) Extempore Speech

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.

EMPLOYABILITY SKILLS

Course Code: 24UENG03

Course Credit: 01(1-0-0)
Max. Marks: 50(15I+35E)

Objective: This course will introduce students to Basics of Employability Skills with a focus on Attitude, Communication, Etiquettes etc. to enable them practice or showcase professional behavior in formal context.

Learning Outcomes:

1. Learners will be able to use soft skills effectively.
2. Learners will demonstrate a professional behaviour at workplace.
3. Learners will learn Interview skills with ability to prepare for interviews and perform well in the same.
4. Learners will be able to deal with various types of customers in an effective manner.

Unit Name	• Contents
Soft Skills	• Soft Skills- Introduction to soft skills, Aspects and importance of soft skills. • Personality Development: Types of personality: • SWOT Analysis, Goal Setting
Organizational Behavior	• Types of Behavior, • Emotional Intelligence, • Time Management, • Decision Making • Critical Thinking • Team Intelligence and Leadership
Interview Skills	• Interview- Types, and Process, • Resume Writing • Job Application; • Research about Industry and • Mapping of Job Competencies with Personal Skills
Interpersonal Skills	• Workplace communication • Active listening, • Positive Attitude • Negotiation Skills

Suggested Readings:

- Bovee, C., & Thill, J.V., and Raina, R.L. *Business Communication Today*. New York: Pearson, 2016.
- Lata, Pushp, and Sanjay Kumar. *Communication Skills*. 2nd ed. New Delhi: OUP, 2019.
- Lehman, C. M., Dufrene D. D., and Sinha, M. *BCOM: The South Asian Perspective on Business Communication*. New Delhi: Cengage Learning, 2016.
- 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.
- Post, Emily. *The Etiquette Advantage in Business*. New York: Collins, 2005.
- 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.
- Taylor, Grant. *English Conversation Practice*. Indian ed. Chennai: McGraw Hill Education Pvt. Ltd., 2017.

Employability Skills Practical

Course Code:

Course Credit: 01(0-1-0)
Max. Marks: 50(35I+15E)

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. Role Play in Business Affairs
2. Group Discussion
3. Resume writing
4. Listening Skills
5. Telephone etiquettes
6. Team building
7. Presentation skills
8. SWOT
9. Goal Setting

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.

(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.

APPLIED PHYSICS							
B.Voc. (Common for all Branches)							
L	T	P	Credits	Core Course	Internal Examination	:	15
2	0	0	2	24UPHY01	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 unitshall 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.

Objectives

The aim of this subject is to provide the students with the basic concepts of measurement, properties of fluid, laser and fibre optics, Nanoscience etc.

Course Outcomes:

After completing this subject, student should be able to:

CO1. Learn about Indian knowledge system.
CO2. Understand about properties of matter and thermal physics with examples.
CO3. To explain the fundamentals of LASER and its applications.
CO4. To learn the basics of fibre optics and their applications.
CO5. To explain fundamentals of photo conductivity, Nanoscience along with their practical applications

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

Properties of Matter and Thermal Physics: Definition and types of stress and strain, Hooke's law, Fluid properties – density, Specific weight, Specific gravity, Surface tension, Viscosity, Pressure – atmospheric pressure, gauge pressure, absolute pressure, Pascal's law, buoyancy, Introduction to laminar and turbulent flow. Modes of heat transfer- thermal conductivity.

UNIT III

Quantum Physics: Inadequacy of classical physics, need for quantum physics, Historical overview, Plank's hypothesis, Quantization of energy, Origin of quantum theory, Photoelectric effect, de Broglie hypothesis – matter waves, Wave-particle duality, Wave-packets, Phase velocity and Group velocity, Experimental evidence of de Broglie's hypothesis: Davisson–Germer experiment, Heisenberg uncertainty principle.

Unit-IV

Electromagnetic Theory: Faraday's law, Lenz's law, Differential form of Faraday's law expressing curl of electric field in terms of time-derivative of magnetic field and calculating electric field due to changing magnetic fields, energy stored in a magnetic field. displacement current and magnetic field arising from time-dependent electric field, Maxwell's equation in vacuum and non-conducting medium.

Unit V: Nanoscience and technology

Nanomaterials, types of nanomaterials, properties of nanomaterials, Density of states (0 dimensional, 1-dimensional, 2-dimensional, 3-dimensional), Top-down and bottom up approaches, Characterization of nanomaterials (Scanning Electron microscopes and Transmission electron microscopes).

Textbook

1. David Griffiths, Introduction to Electrodynamics
2. Nouredine Zettili, Quantum Mechanics: Concepts and Application
3. A. Ghatak, Optics, 7th Edition, McGraw Hill Education (India) Pvt Ltd.
4. O. Svelto, Principles of Lasers, 5th Edition, Springer.
5. Shotwell, K. Thyagarajan, Introduction to Fiber Optics, 1st Edition, Pearson Education India
6. Avadhanulu M. N. and P G Kshirsagar, A Text Book of Engineering Physics, 7th Edition, S. Chand
7. H K Malik and A K Singh, Engineering Physics, 2nd Edition, McGraw Hill Education (India) Pvt Ltd.

Applied Physics Lab

B.Voc. (Common for all Branches)

L	T	P	Credits	Core Course	Internal Examination	:	35
0	0	2	1	24UPHY02	External Examination	:	15
Effective from Session:				2024-025	Total	:	50
Date of BoS approval:				23-07-2024	Duration of Exam	:	3 Hrs

Objectives:

Students will be able to learn how physics and other disciplines have impacted and continue to impact each other and society.

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

1. Able to perform experiments of screw jack and worm and worm wheel.
2. Able to determine force constant using Hooke's law
3. Able to perform Bernoulli's theorem.

List of Practical's

1. To determine force constant of spring using Hooke's law
2. To determine the Moment of Inertia using a Flywheel.
3. To verify the Bernoulli's Theorem.
4. To study the variation of magnetic field with distance and to find the radius of coil by Stewart and Gee'sapparatus.
5. To study the characteristics of Cu-Fe thermo couple.
6. To find the value of Planck's constant by using a photo electric cell.
7. To determine the energy gap of a semiconductor diode.
8. Solar Cell: To study the V-I Characteristics of solar cell.
9. Light emitting diode: Plot V-I and P-I characteristics of light emitting diode.
10. Photoelectric effect: To determine work function of a given material.
11. LASER: To study the characteristics of LASER sources.
12. Optical fibre: To determine the bending losses of Optical fibres.

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

Note: Minimum 8 Experiments to be performed

Course Title	Environmental Science	Course Code	24UEVS01		
Specialization	Value Added Course/ Audit Course	Structure (LTP)	2	0	0
Offered for	UG	Status			
Faculty	SFASH	Type	Core √	Elective	
Credits	2		New √	Modification	
Hours	30	Marks	Internal	30	
Pre-requisite	Nil		External	70	
Submission date	13-07-2024	To take effect from	2024-2025		
		Date of approval by BoS	23-07-2024		
Course Objective	To develop foundation on principles of environmental studies and concept of structure and function of different compartments of the environment.				
Course Outcome	**On completion of this course, students will be able to:** CO1: Understand the fundamentals of environmental studies. CO2: Comprehend ecosystems and their dynamics. CO3: Implement corrective measures for the abatement of pollution. CO4: Understand the waste management techniques. CO5: Grasp environmental policies, legislation, and issues.				
Contents of the course	**Unit 1: Indian Knowledge System- Indigenous Practices, Air & Environment** Environment: Nature, Scope and Importance, Need for Public Awareness. Renewable and Non-Renewable Resources, Atmosphere: Introduction, layers of the atmosphere, Traditional agricultural practices - Organic farming, Crop rotation, Intercropping), Water management techniques - Stepwells, Tankas, Baolis, Forest management and conservation methods - Sacred groves, Agroforestry **Unit 2: Ecosystems** Concept, Structure and Function of an Ecosystem, Energy Flow in the Ecosystem, Bio-geochemical Cycles, Types of Ecosystem: Forest Ecosystem, Grassland Ecosystem, Desert ecosystem, Aquatic Ecosystems. **Unit 3: Environmental Pollution** Environmental Pollution: Definition, Causes, Effects and Control Measures. Different Types of Pollutions, Air Pollution, Water Pollution, Soil Pollution, Marine Pollution, Noise Pollution, Thermal Pollution, Environmental issues: Climate change, global warming, acid rain, ozone layer depletion **Unit 4: Waste Management, Environmental policies and legislation** Solid waste management Municipal solid waste management techniques: Bio Composting, Vermicomposting, Incineration, Landfill sites, Liquid waste management: Waste water and Standards for its discharge given by CPCB, Waste water treatment: Effluent Treatment Plant and Sewage treatment plant (STP), Wildlife Protection Act 1972, Forest Conservation Act 1980, Water (Prevention and control of Pollution) Act 1974, Air (Prevention and Control of Pollution) Act, 1981, Environment Protection Act, 1986				

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. Deevedi 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).