First Year B.Voc Industrial Automation 2025-26
SEMESTER I

Sr. No.	Category	Course Code	Course Name	Teaching Scheme					Evaluation Scheme			
				L	T	P	Hrs./ Week	Cr	Components	Max	Min for Passing	
1	PCC	25BVT1101	Machine Tool Technology	3	0	0	3	3	CA1	10		40
									MSE	30		
									CA2	10		
									ESE	50	20	
2	PCC	25BVT1102	General Mechanical Engineering-I	3	0	0	3	3	CA1	10		40
									MSE	30		
									CA2	10		
									ESE	50	20	
3	PCC	25BVT1103	Industrial Engineering	3	0	0	3	3	CA1	10		40
									MSE	30		
									CA2	10		
									ESE	50	20	
4	PCC	25BVT1104	Measurement Technique and Tools	3	0	0	3	3	CA1	10		40
									MSE	20		
									CA2	10		
									ESE	50	20	
5	IKS	25BVT1105	Constitution of India	2	0	0	2	2	CA1	25		20
									MSE	--		
									CA2	25		
									ESE	--	--	
6	AEC	25BVT1106	Communication Skill	2	0	0	2	2	CA1	25		20
									MSE	--		
									CA2	25		
									ESE	--	--	
7	PCC	25BVT1101L	Machine Tool Technology Laboratory	0	0	2	2	1	CA1	25		40
									CA2	25		
									OE	50	20	
8	PCC	25BVT1102L	General Mechanical Engineering-I Laboratory	0	0	2	2	1	CA1	25		40
									CA2	25		
									OE	50	20	
9	PCC	25BVT1103L	Industrial Engineering Laboratory	0	0	2	2	1	CA1	25		40
									CA2	25		
									OE	50	20	
10	PCC	25BVT1104L	Measurement Technique and Tools Laboratory	0	0	2	2	1	CA1	25		40
									CA2	25		
									OE	50	20	
				0	0	0	0	12	CA1	50		

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• Phone : 02162 - 261122 , 200100
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• Institute Code : Engg. DTE EN-6545
• BCA 6545, MCA 6545, B.Voc 6545

11	OJT	25BVT1107	Metal Arc Welding (CSC/Q0204)						CA2	50		80
									OE	50	40	
			Total	**16**		**08**	**24**	**32**		**1100**		
Total Contact Hours-24 Total Credits - 32												

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• BCA 6545, MCA 6545, B.Voc 6545

First Year B.Voc Industrial Automation 2025-26
SEMESTER II

Sr. No.	Category	Course Code	Course Name	Teaching Scheme					Evaluation Scheme			
				L	T	P	Hrs./ Week	Cr	Components	Max	Min for Passing	
1	PCC	25BVT1201	Industrial Management	3	0	0	3	3	CA1	10		40
									MSE	30		
									CA2	10		
									ESE	50	20	
2	PCC	25BVT1202	Total Quality Management	3	0	0	3	3	CA1	10		40
									MSE	30		
									CA2	10		
									ESE	50	20	
3	PCC	25BVT1203	Entrepreneurship	3	0	0	3	3	CA1	10		40
									MSE	30		
									CA2	10		
									ESE	50	20	
4	PCC	25BVT1204	General Mechanical Engineering - II	3	0	0	3	3	CA1	10		40
									MSE	20		
									CA2	10		
									ESE	50	20	
5	AEC	25BVT1205	Development of Life Skills	2	0	0	2	2	CA1	25		20
									MSE	--		
									CA2	25		
									CA2	--	--	
6	PCC	25BVT1201 L	Industrial Management Laboratory	0	0	2	2	1	CA1	25		40
									CA2	25		
									OE	50	20	
7	PCC	25BVT1202 L	Total Quality Management Laboratory	0	0	2	2	1	CA1	25		40
									CA2	25		
									OE	50	20	
8	PCC	25BVT1203 L	Entrepreneurship Laboratory	0	0	2	2	1	CA1	25		40
									CA2	25		
									OE	50	20	
9	PCC	25BVT1204 L	General Mechanical Engineering – II Laboratory	0	0	2	2	1	CA1	25		40
									CA2	25		
									OE	50	20	
10	OJT	25BVT1206	CNC Setter Cum Operator (CSC/Q0120)	0	0	0	0	12	CA1	50		80
									CA2	50		
									OE	100	40	
			Total	**14**		**08**	**22**	**30**		**1050**		
Total Contact Hours –22 Total Credits - 30												

Title of the Course: Machine Tool Technology Course Code: 25BVT1101	L	T	P	Credit
	3	-	-	3

Course Prerequisite: Student should have basic knowledge of mechanical drawing, GD &T, basic lathe and milling operations, grinding machines, shaping machines, slotting machines.

Course Description: Student should have basic knowledge of mechanical drawing, GD &T, basic lathe and milling operations, grinding machines, shaping machines, slotting machines.

Course Objectives: Subject aims to provide this student with:

1. Familiarise with Working of Standard Machine Tools Such As Lathe, Shaping, planing, Milling,Grinding, slotting machines.
2. To emphasize on importance of safety in machine operation.
3. Familiarise with jigs & fixtures.of various types of software.

Course Outcomes:

CO	After the completion of the course the student should be able to
CO1	Identify and use the different applications of turning operations on Lathe machine.
CO2	Know about the SHAPING, PLANING & SLOTTING MACHINES usages and its applications in Tool Manufacturing.
CO3	Aware of different types of Milling machines and its usage w.r.t. the Tooling manufacturing as Vertical Milling/Horizontal Milling and different attachments used in the process of milling.
CO4	Do the operation on grinding machines for Surface grinding, Cylindrical grinding, Conical grinding, re-sharpening of Tooling.
CO5	Know about the usage of Jigs and fixtures for manufacturing mass production on CNC machines, welding SPMs, robotic spot welding operations in Auto Industries.

CO-PO Mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	P011
CO1	3			3							
CO2	3	3	3	2	3						
CO3	2	3		3							3
CO4	3	1	3	1					2		
CO5	3		3					3			1

Assessment Scheme:
Two components of Continuous Assessment (CA-1, CA-2), Mid Semester Examination (MSE) and End Semester Examination (ESE) having 20%, 30% and 50% weightage respectively.

Assessment Component	Marks
CA1	10
MSE	30
CA2	10
ESE	50

CA1 and **CA2** are based on Assignment/ Surprise test/ Quiz/Seminar/Group discussions/presentation, etc.
MSE is based on 50% of course content.
ESE is based on 100% course content with 60-70% weightage for course content covered after MSE.

Course Contents:

Unit No.	Unit Title and Contents	Hours
1	**Centre Lathe** The Centre lathe and its principle of working, Types of lathes, Lathe specification and size, Features of lathe bed, Head stock and tail stock, Feed mechanism and change-gears. carriage saddle, Cross slide, Compound rest, Tool post, Apron mechanism, lathe accessories, Chucks, Face plate, Angle plate, Driving plate, Lathe doges, mandrills, Steady rest, Lathe attachments, Lathe operations-plane and step turning, Taper turning, Screw cutting, Drilling, Boring, reaming, Knurling, Parting off, Under cutting, Relieving, Types of lathe tools and	**08**

	their uses, Brief description of semi-automatic lathes such as capstan and turret lathes, their advantages and disadvantages over Centre lathe, types of job done on them. General and periodic Maintenance of a Centre lathe.	
2	**Shaping, Planing & Slotting Machines** Working principles of planer, shaper and Slotter, Differences and similarities among them, quick return mechanism applied to the machines. types of work done on them, types of tools used, their geometry, General and periodic maintenance of a shaper. DRILLING & BORING MACHINES: Types of tools used in drilling and boring. Classification of drilling and boring machines, principle of working and constructional details of simple and radial drilling M/C and general and periodic maintenance. Operations like facing, counter boring, tapering.	**08**
3	**Milling Machines** Types of milling machines, constructional features of horizontal milling M/C. general maintenance of the machine, types of milling cutters, milling operations like plane milling, space milling, angular milling form milling, straddle milling, gang milling, Negative rake milling, cutting speed and speed for different tools in up and down milling. Simple, compound and differential indexing, milling of spur gears and racks.	**08**
4	**Grinding Machines** Common abrasives, grinding wheel materials, Bonds, Grain and grit of abrasive, Grain structure and shapes of common wheels, various speeds and feeds, Use of coolants, Methods of grinding, Types of grinding machines, precision finishing operations like honing. BROACHING MACHINES: Types of work done on broaching machine. Simple types of broaches and their uses, Types of broaching machines.	**08**
5	**Jigs And Fixtures** Object of Jigs and Fixture, Difference between jigs and fixtures, Principle of location, Principle of clamping, Locating and clamping devices. Types of jigs - Simple open and closed (or box) jigs. Drill jigs-bushes (Fixed, Liner, Renewal, Slip). Template, Plate jigs. Channel jigs, Leaf jigs, Simple example of milling, turning, grinding, horizontal boring fixtures and broaching fixtures. Welding fixtures COOLING PROCESS: Cooling and cutting fluids, difference between coolant and	**08**

	cutting fluid, function and action of cutting fluids, Requirement of good cutting fluids, their selection for different materials and operations AUTOMATION OF MACHINE TOOLS: Introduction to CNC lathe (Computer Numerical Control Lathe) and FMS (Flexible Manufacturing System) Introduction only.	

Textbooks			
Sr. No.	**Title**	**Author**	**Publisher**
1	Elements Of Workshop Technology Vol-2	S K Hajra Choudhury, A K Hajra Choudhury, Nirjhar Roy	Media Promoters & Publisher PVT. LMT.
2	Production technology (Manufacturing Processes)	P.C. Sharma	S. Chand
3	Production technology	O.P. Khanna	Dhanpat Rai publication, New Delhi ,2010
4	Tool Engineering & Design	G.R. Nagpal	G.R. Nagpal

Title of the Course: General Mechanical Engineering-I Course Code: 25BVT1102	L	T	P	Credit
	3	-	-	3

Course Prerequisite: Student should have basic knowledge of heat, work, and energy transfer, essential for understanding engines and other thermal systems.

Course Description: This subject provides students with a comprehensive understanding of principles of thermal engineering to maintain thermal related equipments as well as understand the basics of IC engine.

Course Objectives:

1. Develop a strong foundation in the principles of heat and energy transfer,
2. Apply these principles to design and analyze various thermal systems, ultimately contributing to the efficient and sustainable use of energy.

Course Outcomes:

CO	After the completion of the course the student should be able to
CO1	Understand and explain fundamental thermodynamic concepts including heat, work, thermodynamic processes, and properties of working substances.
CO2	Apply laws of thermodynamics to devices based on thermodynamics.
CO3	Describe the construction, working principles, and differences between external and internal combustion engines, specifically petrol and diesel engines, and understand the concept of engine horsepower.
CO4	Identify different components of steam boilers, condensers & its working.
CO5	Explain the classification, working principles, and applications of steam turbines and gas turbines.

CO-PO Mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	P011
CO1	3			3							
CO2	3	3	3	2	3						
CO3	2	3		3							3
CO4	3	1	3	1					2		
CO5	3		3					3			1

Assessment Scheme:
Two components of Continuous Assessment (CA-1, CA-2), Mid Semester Examination (MSE) and End Semester Examination (ESE) having 20%, 30% and 50% weightage respectively.

Assessment Component	Marks
CA1	10
MSE	30
CA2	10
ESE	50

CA1 and **CA2** are based on Assignment/ Surprise test/ Quiz/Seminar/Group discussions/presentation, etc.

MSE is based on 50% of course content.

ESE is based on 100% course content with 60-70% weightage for course content covered after MSE.

Course Contents:

Unit No.	Unit Title and Contents	Hours
1	**Basics of Thermodynamics** Basic definition of heat, work, Thermodynamic process, parameters of working body and their units, Equation of state, Universal gas constant, Relation between heat capacity and temperature. Determination of quantity of heat.	**08**
2	**Laws of Thermodynamics** Elementary concept of laws of thermodynamics, first law and second law, Graphical representation of process, The work of expansion and compression of a gas, Change in the state of ideal gas-Isochoric, Isothermal and Adiabatic process, Carnot-cycle.	**08**
3	**IC ENGINES** External & internal combustion engines, working of diesel and petrol engine, horse power of IC engines.	**08**
4	**Steam Generators & Condensers** Construction and working of Babcock & Wilcox boiler, Cochran boiler, Steam condenser & its types.	**08**
5	**Steam & Gas Turbines** Steam turbine, classification and principle of operation, gas turbine.	**08**

Textbooks			
Sr. No.	**Title**	**Author**	**Publisher**
1	A Textbook of Thermal Engineering	R.S.Khurmi & J.K.Gupta	S.Chand Limited New Delhi 2022
2	Engineering Thermodynamics	R.K. Rajput	Laxmi Publications, New Delhi, 2007,
3	Internal Combustion Engines	V. Ganeshan	Tata McGraw Hills, New Delhi
4	Thermal Engineering	R.K. Rajput	Firewall media New Delhi,2005.

Title of the Course: Industrial Engineering Course Code: 25BVT1103	L	T	P	Credit
	3	-	-	3

Course Prerequisite: The prerequisites for learning Industrial Engineering is :
1. The ability to collect, analyze, and interpret data is vital for identifying trends, pinpointing areas for improvement, and tracking the effectiveness of quality control measures.
2. A solid grasp of calculus, linear algebra, and statistics is crucial for understanding and applying quality control techniques like Statistical Process Control (SPC).

Course Description: This course introduces students to the fundamentals of principles of industrial engineering & quality control.

Course Objectives:

1. Provides students the knowledge and skills to improve productivity, efficiency, and quality in various industrial settings.
2. This includes understanding and applying techniques for process optimization, quality management, and resource allocation.
3. Covers techniques for planning, scheduling, and controlling production activities.
4. The course will cover statistical quality control (SQC), quality assurance, and total quality management (TQM) principles to ensure products and services meet specified standards.
5. Students will explore methods for optimizing resource utilization, including material
6. handling, inventory management, and supply chain management.

Course Outcomes:

CO	After the completion of the course the student should be able to
CO1	Understand the principles and objectives of inspection and quality control, including statistical quality control tools and modern quality management systems such as ISO 9000, Kaizen, SixSigma, 5S, and TQM.
CO2	Explain and apply various work study techniques such as method study, process charts, flow diagrams, time study, and motion study to improve productivity and efficiency.
CO3	Understand the fundamentals of project management techniques including Critical Path Method(CPM) and Program Evaluation and Review Technique (PERT) for effective project scheduling and control.
CO4	Analyze different plant layout designs and factors influencing plant location, and explain the concepts of production planning, scheduling, and routing, dispatching, and follow-up functions.
CO5	Understand the principles and importance of material handling, identify various material handling equipment, and apply strategies to reduce material handling costs and improve efficiency.

CO-PO Mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	P011
CO1	3			3							
CO2	3	3	3	2	3						
CO3	2	3		3							3
CO4	3	1	3	1					2		
CO5	3		3					3			1

Assessment Scheme:
Two components of Continuous Assessment (CA-1, CA-2), Mid Semester Examination (MSE) and End Semester Examination (ESE) having 20%, 30% and 50% weightage respectively.

Assessment Component	Marks
CA1	10
MSE	30
CA2	10
ESE	50

CA1 and **CA2** are based on Assignment/ Surprise test/ Quiz/Seminar/Group discussions/presentation, etc.
MSE is based on 50% of course content.
ESE is based on 100% course content with 60-70% weightage for course content covered after MSE.

Course Contents:

Unit No.	Unit Title and Contents	Hours
1	**Inspection and quality control:** Inspection: Inspection and its objective, Types of inspection,Inspection standards, Duties of inspection foreman. Quality control: Concept of quality control, Elements of quality control, quality control groups, objectives of quality control. Statistical quality control, objectives of S.Q.C. Inspection by variables & attributes, Frequency distribution, mean, median & mode, standard deviation, X-R charts, P-Charts, C-Charts and acceptance sampling (i) I.S.O. 9000 (ii) KAIZEN.	**08**

2	**Work study:** Method study-Process chart, Flow process chart, Flow diagram, Man and Machine chart, gang process chart, Work Measurement-Time study, Tools used in time study, Performance rating, Allowance and use of time standard, Time and Motion Study. Principles of human motion economy, Micro-motion study, Memo motion study, Therbligs, left hand and right hand chart.	**08**
3	**CPM & PERT**: Introduction to CPM, language of CPM net work, Diagram map forCPM chart, arrow diagram method of CPM, Programme Evaluation Review Technique (PERT) Activity event net work (simple manual cases only). Project scheduling with CPM & PERT.	**08**
4	**Plant layout:** General plant location factors, Influence of location on plant layout, selection of plant site, Product layout, Process layout. Advantages and disadvantages of process layout and product layout, GENERAL: Standardization, sources of standard, value of standardization. Production Planning & Control-Introduction, concept of planning, scheduling routing & dispatching and follow up functions, Need for Production, Planning and Control.	**08**
5	**Material handling:** Material Handling & material handling equipment, factors in material handling problems, cost reduction through improved material handling, Reduction in time of material handling, Material handling equipment-Idea about lifting lowering devices, Transportation devices, combination devices, Maintenance of material handling equipment.	**08**

Textbooks			
Sr. No.	**Title**	**Author**	**Publisher**
1	Industrial Engineering & Management	O.P. Khanna	Dhanpat Rai Publications Pvt. Ltd. New Delhi 1980.
2	Industrial Engineering & Management	Banga,Sharma & Agarwal	Khanna Publishers

Title of the Course: Measurement Technique and Tools Course Code: 25BVT1104	L	T	P	Credit
	3	-	-	3

Course Prerequisite: This subject is typically basic arithmetic and familiarity with whole number operations and decimals. This allows students to understand the numerical values associated with measurements and perform calculations involved in measurement processes.

Course Description: Measurement Techniques and; Tools course provides foundational knowledge in the principles, methods, and instruments used for accurate and reliable measurements in various fields.

Course Objectives:

1. To provide the knowledge regarding fundamental concepts behind different measurement techniques and the underlying principles of various measuring instruments.
2. To provide the knowledge regarding the operation, construction, and applications of various measuring instruments, including both analog and digital devices.
3. To provide focus on specific measurement areas like electrical measurements, mechanical measurements, or temperature measurements, depending on the field of study. .
4. To explain the importance of accuracy and precision in measurements and introduce techniques for minimizing measurement errors.

Course Outcomes:

CO	After the completion of the course the student should be able to
CO1	Understand the meaning, scope, and importance of metrology in engineering, including measurement standards, types, limits, fits, and tolerances.
CO2	Select relevant comparator for measurement.
CO3	Understand surface finish parameters, including surface roughness, waviness, lay, and the methods used to measure and evaluate surface quality.
CO4	Use relevant instrument for measurement of different parameters of engineering components.
CO5	Perform inspection of geometrical errors such as straightness, flatness, squareness, parallelism, and circularity using precision instruments and understand the maintenance of measuring instruments.

CO-PO Mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	P011
CO1	3			3							
CO2	3	3	3	2	3						
CO3	2	3		3							3
CO4	3	1	3	1					2		
CO5	3		3					3			1

Assessment Scheme:
Two components of Continuous Assessment (CA-1, CA-2), Mid Semester Examination (MSE) and End Semester Examination (ESE) having 20%, 30% and 50% weightage respectively.

Assessment Component	Marks
CA1	10
MSE	30
CA2	10
ESE	50

CA1 and **CA2** are based on Assignment/ Surprise test/ Quiz/Seminar/Group discussions/presentation, etc.

MSE is based on 50% of course content.

ESE is based on 100% course content with 60-70% weightage for course content covered after MSE.

Course Contents:

Unit No.	Unit Title and Contents	Hours
1	**Introduction** Meaning and scope of metrology in field of engineering, standards and types of measurements (Line and Wave, length, Primary, Secondary and Tertiary measurement concept only). Limits, Fits and Tolerances, Interchangeability, precision and accuracy,Sources of error, Principles and Classifications of Measuring Instruments: (a) Principle of Mechanical Measuring Instruments: Lever method, Vernier method, screw and screw nut method, compound gearing and helical spring methods. (b) Principles of Optical Instruments: Reflection, Refraction, Interference, Polarisation,	**08**

	Optical prisms,Lenses and Optical projectors. (c) Principles of Electrical measuring Instruments.	
2	**Comparators** General principles of constructions, balancing and graduation of measuring instruments, characteristics comparators, use of comparators, difference between comparators, limit gauges and measuring instruments. Classification of comparators, construction and working of dial indicator, mechanical comparator, mechanical optical, zeiss optotest, electro limit, electromechanical electronics, pneumaticcomparators, gauges, tool makers microscope.	**08**
3	**Metrology of Thread and Advance Metrology**: VARIOUS TYPES OF INSTRUMENTS USED FOR Measurement of Thread form: Thread form errors, Measurement of Minor, Major and Effective diameter (Three Wire Method), Flank angle, pitch, Floating Carriage Micrometer (Numerical), Advancements in Metrology: Introduction & applicationsof: Co-ordinate Measuring Machine, Universal Measuring Machine, Laser inMetrology, Automatic inspection system, Machine vision for online-offline inspection (i) (a) Physical Measurements such as-Length, distance, height,Thickness, Gaps, Curvature, Angle, Taper, Area, Undulations, Surface finish, Thread and Gear measurement (b) Liquid Level &Viscosity- Liquid level measuring methods and devices, Viscometer - Plate and cone Viscometer, Two float viscometer, Rheo viscometer. (ii) Mechanical Quantities: 1) Displacement. velocity, acceleration, space torque-Use of transducers and electronic count stroboscope, vibrating reeds and tachometers 2) Pressure and Vacuum - Idea of atmosphere pressure, Gauge pressure and vacuum - Use of instruments such as manometers and those use elastic elements such as diaphragm, capsule Bellows, Bourdon tube and various transducers thermo couple, vacuum gauges 3) Strain - Use of Strain gauge and load cells 4) Mechanical Power - Dynamometers - absorption and transmission type both. (Reference Only). TEMPERATURE MEASUREMENT: Various types other manometers, thermocouples, pyrometers (Radiation and optical type both).	**08**
4	**Introduction to Quality and Quality Tools**: Quality: Dimensions, Statements, Cost of quality & value of quality, Deming‟s cycles &	**08**

	14 Points, Juran Trilogy approach, Seven Quality Tools, Introduction to N Seven Tools, Quality Circle, Criteria for Quality Award (National & International).	
5	**Inspection Of Geometrical Errors:** Construction and working of auto collimator, checking of straightness, flatness, squareness and parallelism, circularity (By dial gauge and telerod). MAINTENANCE OF MEASURING INSTRUMENTS: Defects likely to occur in measuring instruments and their remedies. General maintenance of measuring instruments.	**08**

Textbooks / Learning Resources			
Sr. No.	**Title**	**Author**	**Publisher**
1	Engineering Metrology	R. K. Jain	Khanna Publications, New Delhi.
2	Measurement & Metrology	R. K. Rajput	S.K.Kataria & Sons, New Delhi.
3	Mechanical and Industrial Measurements	R. K. Jain	Khanna Publication, New Delhi

Title of the Course: Constitution of India Course Code: 25BVT1105	L	T	P	Credit
	2	-	-	2

Course Prerequisite: The students should be aware of human values.

Course Description: The Constitution of India is a foundational subject that introduces students to the supreme law of the land, outlining the framework, principles, and values of Indian democracy. It covers the history, philosophy, and structure of the Constitution, including fundamental rights, directive principles, and duties of citizens. Students learn about the roles of the legislature, executive, and judiciary, as well as the federal structure and distribution of powers. The course emphasizes the significance of constitutional values in promoting social justice, equality, and good governance, preparing students to engage with constitutional issues and contribute to the development of a just and equitable society.

Course Objectives: subject aims to provide this student with:

1. To familiarize students with the key elements of the Indian Constitution.
2. To create awareness about constitutional values and objectives.

Course Outcomes:

CO	After the completion of the course the student should be able to
CO1	Describe historical background of the Indian Constitution.
CO2	Identify fundamental rights and duties of Indian citizens.
CO3	Understand the working of Indian Democracy.
CO4	Describe the decentralization of power between central, state, and local self-government.
CO5	Describe historical background of the Indian Constitution.

CO-PO Mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	P011
CO1										3	
CO2							3		2	2	
CO3						2			2	1	
CO4							3			2	
CO5										3	

Assessment Scheme:
Two components of Continuous Assessment (CA-1, CA-2), Mid Semester Examination (MSE) and End Semester Examination (ESE) having 20%, 30% and 50% weightage respectively.

Assessment Component	Marks
CA1	25
MSE	-
CA2	25
ESE	-

CA1 and **CA2** are based on Assignment/ Surprise test/ Quiz/Seminar/Group discussions/presentation, etc.
MSE is based on 50% of course content.
ESE is based on 100% course content with 60-70% weightage for course content covered after MSE.

Course Contents:

Unit No.	Unit Title and Contents	Hours
1	**The Constitution – Introduction** The History of the Making of the Indian Constitution Preamble and the Basic Structure, and its interpretation Fundamental Rights and Duties and their interpretation State Policy Principles Citizenship.	**06**
2	**Union Government** Structure of the Indian Union President – Role and Power.	**06**
3	**Central Government**	**06**

	Prime Minister and Council of Ministers Lok Sabha and Rajya Sabha.	
4	**State Government** Governor – Role and Power Chief Minister and Council of Ministers.	**06**
5	**Local Administration** District Administration Municipal Corporation.	**06**

Textbooks / Learning Resources			
Sr. No.	**Title**	**Author**	**Publisher**
1	Ethics and Politics of the Indian Constitution	Rajeev Bhargava	Oxford University Press, New Delhi, 2008
2	The Constitution of India	B.L. Fadia Sahitya Bhawan	New edition (2017)
3	Introduction to the Constitution of India	D.D. Basu	Lexis Nexis; Twenty-Third, 2018 edition
4	Ethics and Politics of the Indian Constitution	Rajeev Bhargava	Oxford University Press, New Delhi,

Title of the Course: Communication Skills Course Code: 25BVT1106	L	T	P	Credit
	2	-	-	2

Course Prerequisite: English subject at HSC

Course Description: The course intends to make learners understand and develop various communication skills required in day-to-day life as well as in professional contexts. As domain knowledge and skills have become equally important in today's technology-driven world, the current course and the one being offered in the Third Year will provide the learners a great opportunity to strengthen their English communication and soft skills. Keeping in mind the current competence of the learners, the course aims to provide them with revision and ample practice in the skills essential for their professional life. It includes six modules that cover basic concepts and theory of communication, business communication, verbal aptitude (English grammar), language learning skills, letter writing, and comprehension. In addition to Listening, Speaking, Reading, and Writing (LSRW) the course sees Thinking as an essential language learning skill.

Course Objectives: subject aims to provide this student with:

1. To understand the fundamentals of communication theory and its relevance in a professional context.
2. To apply the listening and reading comprehension skills.
3. To summarize the techniques to improve spoken English and to provide the students with a platform for practicing these skills.
4. To prepare the students to write correct and effective business letters, official letters, and
5. covering letters with resume, and to participate in GD and face the interviews.

Course Outcomes:

CO	After the completion of the course the student should be able to
CO1	Demonstrate the communication process, methods of communication, and flow of Communication in a business context
CO2	Apply acquired LSRW skills in real-life situations and in a professional context
CO3	Compose effective business and cover letters using standard language, style, and structure
CO4	Apply the techniques for effective participation in GD and tips to face interviews successfully.

CO-PO Mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	P011
CO1							1		3		1
CO2							3		3		2
CO3									3		1
CO4							2		3		2
CO5									3		

Assessment Scheme:
Two components of Continuous Assessment (CA-1, CA-2), Mid Semester Examination (MSE) and End Semester Examination (ESE) having 20%, 30% and 50% weightage respectively.

Assessment Component	Marks
CA1	25
MSE	-
CA2	25
ESE	-

CA1 and **CA2** are based on Assignment/ Surprise test/ Quiz/Seminar/Group discussions/presentation, etc.
MSE is based on 50% of course content.
ESE is based on 100% course content with 60-70% weightage for course content covered after MSE.

Course Contents:

Unit No.	Unit Title and Contents	Hours
1	**Communication Theory** Communication basics: Importance, process, levels, forms, methods: verbal and non-verbal, Barriers and solutions, Flow/channels of business communication (Internal, External, Vertical, Horizontal, Diagonal, Grapevine), Problems and Solutions.	**07**
2	**Enhancing Language Learning Skills (LSRW)** Effective listening: Process and advantages of listening, poor listening habits, types of listening, strategies for effective listening, listening barriers	**07**

	Effective speaking: Importance of telephonic conversation, various oral business contexts/situations, group communication, Preparing effective public communications Effective reading: Importance, types, overcoming common obstacles, tips and strategies Effective Writing: Mastering English Essentials and Fundamentals, paragraph and essay writing techniques, diary/blog writing Art of précis writing, Techniques to comprehend and summarize a given technical, scientific, or industry-oriented text.Thinking is intricately with the LSRW skills.	
3	**Formal Business Correspondence** Principles, structure (elements), Layout (complete block, modified block, semi- block), Types (enquiry and replies, claim and adjustment).	**07**
4	**Employment Skills** Covering letter and resume, Group Discussion, Interviews (Online / Offline) Introduction to soft skills (Etiquettes, Team Work, Empathy, Problem Solving etc.)	**07**

Textbooks /Learning Resources			
Sr. No.	**Title**	**Author**	**Publisher**
1	Developing Communication Skills	Krishna Mohan Meera Banerji	Macmillan Publishers India Ltd.
2	Communication Skills for Engineers and Scientists	Sangeeta Sharma Binod Mishra	PHI Learning Private Limited.
3	Professional Communication Skills	Er. A.K.Jain Dr.Pravin S.R. Bhatia Dr. A.M.Shaikh	S.Chand
4	Personality Development and Soft skills	Barun K.Mitra	Oxford University Press

Title of the Course: Machine Tool Technology Laboratory Course Code: 25BVT1101L	L	T	P	Credit
	0	-	2	1

Course Prerequisite: Student should have both theoretical and practical foundations that prepare students to safely and effectively work with machine tools.

Course Description: This hands-on laboratory course introduces students to the fundamental principles and practical skills required for operating machine tools in a modern manufacturing environment. Students will gain experience with manual machining processes including turning, milling, drilling, grinding, and basic CNC operations. The lab emphasizes precision measurement, blueprint interpretation, proper setup and operation of machine tools, and adherence to safety protocols.

Course Objectives: subject aims to provide this student with:

1. Demonstrate safe and proper use of machine tools including lathes, milling machines, drill presses, and grinders.
2. Select appropriate cutting tools and machining parameters (speed, feed, depth of cut) for different materials and operations.
3. Set up and operate manual machine tools to perform turning, milling, drilling, and grinding operations.
4. Use precision measuring instruments such as micrometers, calipers, dial indicators, and gauges to inspect parts.
5. Identify and apply proper work holding and tooling techniques to ensure accuracy and safety.
6. Demonstrate teamwork and communication skills during lab projects and problem-solving activities.

Course Outcomes:

CO	After the completion of the course the student should be able to
CO1	Demonstrate knowledge of machine tool safety protocols and apply them consistently in the lab environment.
CO2	Set up and operate manual machine tools such as lathes, milling machines, drill presses, and grinders for various machining tasks.
CO3	Select appropriate cutting tools, speeds, feeds, and machining parameters for different materials and operations.
CO4	Apply proper work holding and tool setup techniques to achieve dimensional accuracy and surface finish requirements.
CO5	Maintain a clean, safe, and organized lab environment adhering to industry safety standards.

CO-PO Mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	P011
CO1	3			3							
CO2	3	3	3	2	3						
CO3	2	3		3							3
CO4	3	1	3	1					2		
CO5	3		3					3			1

Assessment Scheme:

Three components of 'CA1, CA2 and OE having 25%, 25% and 50% weightage respectively.

Assessment Component	Marks
CA1	25
MSE	--
CA2	25
OE	50

CA1 and **CA2** are based on Assignment/Declared test/Quiz/Seminar/Group discussions/presentation, etc.

OE is based on 100% course content.

Course Contents:

Unit No.	Unit Title and Contents	Hours
1	**MACHINE SHOP** a. Square thread cutting (internal and external) - 2 jobs b. Multi-start thread cutting - 1 job c. Eccentric Turning - 1 job Making utility job - Planner, Shaper, Slotter - 1 job Group work on milling machine involving up & down milling in: a. Gang milling - 1 job b. Spur gear cutting - 1 job c. Helical gear cutting - 1 job	**06 per job**
2	**FITTING SHOP** 1. To make a cut and cup tool - 1 job	**06 per job**

	2. To make blank and pierce tool - 1 job 3. To make a male and female fitting jobs - 1 job 4. To grind a lathe/shaper/planer tool - 1 job 5. To make different types of keys - 3 jobs 6. To make complete gauge - 2 jobs	
Minimum 4 jobs should be prepared from each of above group		

Textbooks			
Sr. No.	**Title**	**Author**	**Publisher**
1	R.K. Jain	Production technology	Khanna Publishers, 2001
2	P.C. Sharma	Production technology (Manufacturing Processes)	S Chand & company ,2013,New Delhi
3	O.P. Khanna	Production technology	Dhanpat Rai publication, New Delhi,2010

Useful Links:	
1	https://nptel.ac.in/courses/112/106/112106119/
2	https://www.geeksforgeeks.org/tool-grinding-process/
3	https://www.learnmechanical.com/shaping-machine-working-principle/

Title of the Course: General Mechanical Engineering-I Laboratory. Course Code: 25BVT1102L	L	T	P	Credit
	0	-	2	1

Course Prerequisite:

1. Students should have an Understanding of fundamental thermodynamic concepts such as heat, work, energy balance, and properties of steam and gases.
2. Students should have a basic understanding of fluid flow concepts, pressure, temperature relationships, and flow through nozzles.
3. Competence in basic calculations, data analysis, and interpreting experimental results.

Course Description: This laboratory course is designed to provide hands-on experience with fundamental concepts in thermodynamics, fluid mechanics, heat transfer, and internal combustion engines. Students will perform experiments to measure calorific values of fuels, determine steam quality and dryness fraction, analyze steam saturation behavior, and study nozzle flow characteristics. The course also covers performance testing of SI and CI engines, investigation of ignition and fuel systems, and evaluation of boiler efficiency and heat transfer in condensation.

Course Objectives: subject aims to provide this student with:

1. To provide practical understanding of thermodynamic properties and processes through experiments involving fuels, steam, and energy measurements.
2. To enable students to determine key parameters such as calorific value, dryness fraction, and steam quality using standard calorimeters and boiler setups.
3. To familiarize students with the performance testing of internal combustion engines, including measurement of power, torque, efficiency, and engine component analysis.
4. To cultivate the ability to conduct experiments safely and accurately, analyze data, and interpret results.

Course Outcomes:

CO	After the completion of the course the student should be able to
CO1	Measure and analyze the calorific value of fuels and understand their energy content for thermochemical applications.
CO2	Determine the dryness fraction of steam using separating and throttling calorimeters and interpret steam quality in thermodynamic cycles.
CO3	Investigate steam saturation properties, pressure-temperature relationships, and nozzle flow characteristics including critical pressure ratio and choking.
CO4	Conduct performance tests on SI and CI engines to evaluate parameters such as power output, torque, efficiency, and fuel consumption.
CO5	Safely operate laboratory equipment, accurately record experimental data, and apply theoretical knowledge to practical problem-solving in thermodynamics and engine performance.

CO-PO Mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	P011
CO1	3			3							
CO2	2	3	2	2	3						
CO3	2	2		3							3
CO4	3	1	3	1					2		
CO5	3		3					3			1

Assessment Scheme:

Three components of 'CA1, CA2 and OE having 25%, 25% and 50% weightage respectively.

Assessment Component	Marks
CA1	25
MSE	--
CA2	25
OE	50

CA1 and **CA2** are based on Assignment/Declared test/Quiz/Seminar/Group discussions/presentation, etc.

OE is based on 100% course content.

Course Contents:

Unit No.	Unit Title and Contents	Hours
1	Measure the calorific (heating) value of fuels—key for energy content and thermochemical analysis.	**02**
2	Determine dryness fraction using separating and throttling calorimeters in steam cycles.	**02**
3	Investigate pressure–temperature saturation behavior of steam in equilibrium.	**02**
4	Study nozzle thrust & flow, determine critical pressure ratio and choking using convergent/divergent nozzles.	**02**
5	Measure temperature before/after mixing to apply energy balance in a closed system.	**02**
6	Illustrate limits of the second law and information thermodynamics.	**02**
7	Measure P–T relationship for saturated steam, reinforcing	**02**

	enthalpy/temp concepts.	
8	Load & performance tests on single or multi-cylinder S.I. (petrol) or C.I. (diesel) engines to record performance curves (Power, Torque, Efficiency vs. Speed).	**02**
9	Study ignition systems in SI engines and fuel systems, including cut-section models.	**02**
10	Determine calorific value using bomb calorimeter, and find flash/fire points of fuels/lubricants.	**02**
11	Performance tests on reciprocating/compressor blowers, and analyze engine cooling systems.	**02**
12	Determine dryness fraction (steam quality) using a boiler, throttle valve, and calorimeter setup.	**02**
13	Measure quantity of steam generated, boiler pressure, fuel & water flow rates, and calculate thermal efficiency via energy balance.	**02**
14	Use a transparent cylinder with condensers of different surface treatments to compare heat transfer coefficients and condensation efficiency.	**02**
Minimum 8 Practical Should be Conducted		

Textbooks			
Sr. No.	**Title**	**Author**	**Publisher**
1	R.K. Rajput	Thermal Engineering	Laxmi Publications
2	V. Ganesan	I.C. Engines	Mc Graw Hill
3	Domkundwar & Arora	Thermal Engineering	Dhanpat Rai & Co.

Useful Links:	
1	https://nptel.ac.in/courses/112/105/112105050/
2	https://www.youtube.com/watch?v=aJHOK8RZ2BM
3	https://nptel.ac.in/courses/112/105/112105126/
4	https://nptel.ac.in/courses/112/105/112105123/

Title of the Course: Measurement Technique and Tools Laboratory. Course Code: 25BVT1103L	L	T	P	Credit
	0	-	2	1

Course Prerequisite:

1. Understanding of measurement concepts such as accuracy, precision, errors, tolerance, limits, and fits.
2. Basic knowledge of mechanical instruments.

Course Description: This lab course is designed to provide hands-on experience in the use of precision measuring instruments and metrological tools essential for quality control in engineering manufacturing and inspection processes. Students will perform a variety of measurements involving linear dimensions, angles, threads, tapers, surface geometry, and complex profiles such as gears and screw threads.

Course Objectives: subject aims to provide this student with:

1. Introduce to precision measurement tools and instruments.
2. Develop practical skills in using metrological devices.
3. Promote understanding of inspection techniques and standards required for manufacturing and quality assurance applications.
4. Encourage analytical thinking in interpreting measurements, tolerances, and fits, and in identifying sources of measurement errors.

Course Outcomes:

CO	After the completion of the course the student should be able to
CO1	Measure linear and angular dimensions of mechanical components using instruments
CO2	Operate and apply optical and mechanical comparators to compare dimensions and detect deviations in components.
CO3	Perform geometrical inspections to evaluate features such as flatness, squareness, straightness, taper, and thread forms using autocollimators,taper gauges, and thread measuring tools.
CO4	Analyze and interpret measurements of gears, screw threads, and surface profiles using advanced tools such as toolmaker's microscope and polar planimeter.
CO5	Demonstrate the correct use of special gauges (feeler, fillet, wire, radius) and apply them to real-world inspection tasks in line with industrial standards.

CO-PO Mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	P011
CO1	3			3							
CO2	2	3	2	2	3				3		
CO3	2	2		3					1		3
CO4	3	1	3	1					2		
CO5	3		3					3			1

Assessment Scheme:

Three components of 'CA1, CA2 and OE having 25%, 25% and 50% weightage respectively.

Assessment Component	Marks
CA1	25
MSE	--
CA2	25
OE	50

CA1 and **CA2** are based on Assignment/Declared test/Quiz/Seminar/Group discussions/presentation, etc.

OE is based on 100% course content.

Course Contents:

Unit No.	Unit Title and Contents	Hours
1	Measurement of angle with the help of sine bar/ Vernier Bevel protractor.	**02**
2	Study and sketch of various types of optical projectors.	**02**
3	Study and sketch of various types of comparators and use them for comparing length of given piece.	**02**
4	To measure the diameter of a hole with the help of precision balls.	**04**
5	To measure external and internal taper with the help of taper gauges, precision rollers.	**04**
6	To test the squareness of a component with auto-collimator.	**04**
7	To measure the pitch, angle and form of thread of a screw.	**04**
8	To measure the geometry of a gear having involute profile.	**02**
9	To measure the straightness of the edge of a component with the	**04**

	help of auto- collimator.	
10	To measure the length, breadth, thickness, depth, height with micrometre.	**02**
11	To measure the length, breadth, thickness, depth, height, with height gauge and Vernier calipers.	**02**
12	Calibration of Vernier calipers/micrometers.	**02**
13	Calibration of height gauge/depth gauge.	**02**
14	Study of a tool maker's microscope.	**02**
15	Checking of accuracy of snap gauge with slop gauge.	**02**
16	Checking of accuracy of a plug gauge with micrometer.	**02**
17	Measurement of areas by polar planimeter.	**02**
18	Use of feeler, wire, radius and fillet gauges measurement of standard parameters.	**02**
Minimum 10 Practical Should be Conducted		

Textbooks			
Sr. No.	**Title**	**Author**	**Publisher**
1	R.K. Jain	Engineering metrology	Khanna Publications, New Delhi.
2	N.V.Raghavendra & L.Krushnamurthy	Engineering metrology & measurements	Oxford university press
3	R.K. Jain	Engineering metrology	Khanna Publications, New Delhi.

Useful Links:	
1	https://nptel.ac.in/courses/112105167
2	https://nptel.ac.in/courses/112105126

Title of the Course: Industrial Engineering Laboratory. Course Code: 25BVT1104L	L	T	P	Credit
	0	-	2	1

Course Prerequisite:

1. Knowledge of productivity & efficiency.
2. Knowledge of supply chain fundamentals.
3. Knowing the importance of team work.

Course Description: This course introduces students to the principles and practices of industrial engineering techniques used to improve productivity, streamline manufacturing processes, and ensure quality control.

Course Objectives: subject aims to provide this student with:

1. Introduce students to method study techniques for analyzing and improving the motions involved in manufacturing and service operations.
2. Develop skills in work measurement to accurately determine operation times using stopwatch time study and performance rating methods.
3. Familiarize students with supply chain mapping for both traditional and online product distribution systems.
4. Strengthen problem-solving and analytical abilities to identify, evaluate, and implement process improvements in industrial and service contexts.

Course Outcomes:

CO	After the completion of the course the student should be able to
CO1	Apply method study principles to break down & analyze motions involved in machining & other operations.
CO2	Prepare process plans and operation sequence charts for manufacturing mechanical components such as nuts, bolts, washers, V-blocks, and riveted joints.
CO3	Develop and interpret supply chain diagrams for both traditional and online distribution systems.
CO4	Apply quality improvement tools such as quality circles to identify and solve workplace problems.
CO5	Construct and interpret statistical quality control charts (p-chart and c-chart) and graphical representations (histogram, frequency polygon) to analyze process data.

CO-PO Mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO 9	PO10	P011
CO1	3			3							
CO2	2	3	2	2	3				3		
CO3	2	2		3					1		3
CO4	3	1	3	1					2		
CO5	3		3					3			1

Assessment Scheme:

Three components of 'CA1, CA2 and OE having 25%, 25% and 50% weightage respectively.

Assessment Component	Marks
CA1	25
MSE	--
CA2	25
OE	50

CA1 and **CA2** are based on Assignment/Declared test/Quiz/Seminar/Group discussions/presentation, etc.

OE is based on 100% course content.

Course Contents:

Unit No.	Unit Title and Contents	Hours
1	Apply method study approach to analyze the motions involved in machining operation of the given job.	**02**
2	Apply work measurement technique to analyze the time components involved machining operation of given job using stop watch.	**02**
3	Calculate standard time for all the operations involved in step turning process	**02**
4	Prepare motion chart of given activity using standard symbols of therbligs (max 18).	**02**
5	Prepare supply chain chart in day-to-day situation like supply of Cold drink/tooth paste/any grocery item	**04**
6	Prepare supply chain management chart for online purchase of goods/products	**04**
7	Prepare detailed process plan for manufacturing of Hexagonal	**04**

	Nut/Hexagonal headed bolt/Stud/Wing Nut/Plain Washer	
8	Prepare chart of Sequence of operation for manufacturing of simple job like manufacturing of hexagonal nut & bolt/ Manufacturing of V-Block on shaper machine	**04**
9	Prepare Chart of sequence of operation for Single or Double riveted lap joint/Single riveted butt joint (single strap)	**04**
10	Redesign the given simple lever(s) like gear shifting lever/brake/clutch lever/foot lever for best ergonomic aspect	**02**
11	Prepare and analyse steps to solve the given problem in institute/industry using quality circle concept	**02**
12	Draw the frequency histogram, frequency polygon for the samples and calculate mean, mode and median for same.	**02**
13	Draw and interpret the control charts (P-chart and C chart) for given data.	**02**
Minimum 06 Practical Should be Conducted		

Textbooks

Sr. No.	Title	Author	Publisher
1	Ralph M. Barnes	Motion and Time Study	John wiley & sons
2	K. Besterfield	Quality control	Pearson Education
3	O.P. Khanna	Industrial Engineering & Management	Dhanpat Rai Publications Pvt. Ltd. New Delhi 1980.

Useful Links:

1	https://nptel.ac.in/courses/112/107/112107238
2	https://nptel.ac.in/courses/112/105/112105127
3	https://nptel.ac.in/courses/110/106/110106046

Title of the Course: Metal Arc Welding / MIG MAG or GMAW Welder / Assistant TIG Welder/ CNC Setter Cum Operator (CSC/Q0120)/ CNC Operator – VMC (CSC/Q0116) Course Code: 25BVT1107	L	T	P	Credit
	0	0	0	12

Course Prerequisite:

1. Basic knowledge of Engineering Materials and their mechanical properties.
2. Understanding of fundamentals of manufacturing processes.

Course Description: Metal Arc Welding course offers students, the opportunity to operate welding equipment ,produce defect free welds & demonstrate an understanding of welding codes,standards & documentation requirements in line with industry expectations.students will learn about the classification and selection of electrodes,current and polarity requirements ,arc initiation & control methods.

Course Objectives: subject aims to provide this student with:

1. To impart fundamental knowledge of the principles, equipment, and consumables used in metal arc welding.
2. To train students in operating welding equipment safely and performing various welding techniques on ferrous metals.
3. To enable learners to identify, analyze and rectify common welding defects through inspection & testing methods.
4. To develop the ability to select appropriate electrodes,welding parameters.
5. To prepare students for industrial welding tasks in manufacturing,fabrication & maintenance by developing both technical and procedural competencies.

Course Outcomes:

CO	After the completion of the course the student should be able to
CO1	Explain the principles of metal arc welding, including arc generation, heat input, polarity, and electrode selection.
CO2	Demonstrate correct setup and operation of metal arc welding equipment, ensuring compliance with safety procedures.
CO3	Perform fillet, butt, and groove welds on ferrous metals using appropriate welding parameters and positions.
CO4	Identify, analyze, and rectify common welding defects using visual inspection and basic non-destructive testing (NDT) methods.
CO5	Interpret welding symbols, codes, and standards to prepare accurate welding procedure specifications (WPS).

CO-PO Mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	P011
CO1	3			3							
CO2	2	3	2	2	3				3		
CO3	2	2		3					1		3
CO4	3	1	3	1					2		
CO5	3		3					3			1

Assessment Scheme:

Three components of 'CA1, CA2 and OE having 25%, 25% and 50% weightage respectively.

Assessment Component	Marks
CA1	25
MSE	-
CA2	25
OE	50

CA1 and **CA2** are based on Assignment/Declared test/Quiz/Seminar/Group discussions/presentation, etc.

OE is based on 100% course content.

Select any one of the qualifier pack

Subject Name: Metal Arc Welding (CSC/Q0204)	
Course Code : **25BVT1206**	Semester: **I**
Weekly Skilling Hours: PR: **08** Tut: **00**	
	Scheme of Marking PR: **120,** IA: **80,** Total: 200
Credit:**12**	**Choose any one from specified Group GTM2 of Qualification Packs other than that selected in GTM1.**
Syllabus for this qualifier Pack is available on http://www.cgsc.in/pdf/MMAW%20L3.pdf	

Subject Name: MIG MAG or GMAW Welder (CSC/Q0209)	
Course Code **: 25BVT1206**	Semester: **I**
Weekly Skilling Hours: PR: **08** Tut: **00**	
	Scheme of Marking PR: **120,** IA: **80,** Total: **200**
Credit:**12**	**Choose any one from specified Group GTM2 of Qualification Packs other than that selected in GTM1.**
Syllabus for this qualifier Pack is available on http://www.cgsc.in/pdf/MIG_MAG%20or%20GMAW%20Welder.p df	

Subject Name: Assistant TIG Welder (CSC/Q0212)	
Course Code : **: 25BVT1206**	Semester: **I**
Weekly Skilling Hours: PR: **08** Tut: **00**	
	Scheme of Marking PR: **120,** IA: **80,** Total: **200**
Credit:**12**	**Choose any one from specified Group GTM2 of Qualification Packs other than that selected in GTM1.**
Syllabus for this qualifier Pack is available on http://www.cgsc.in/pdf/Assisstant%20Tungsten%20Inert%20Gas%20Welder%20(Fi nal).pdf	

Subject Name: CNC Setter Cum Operator (CSC/Q0120)	
Course Code : **: 25BVT1206**	Semester: **I**
Weekly Skilling Hours: PR: **08** Tut: **00**	
	Scheme of Marking PR: **120,** IA: **80,** Total: **200**
Credit:**12**	**Choose any one from specified Group GTM2 of Qualification Packs other than that selected in GTM1.**
Syllabus for this qualifier Pack is available on http://www.cgsc.in/pdf/CNC%20Setter%20cum%20operator%20- %20Turning.pdf	

Subject Name: CNC Operator – VMC (CSC/Q0116)	
Course Code : **: 25BVT1206**	Semester: **I**
Weekly Skilling Hours: PR: **08** Tut: **00**	
	Scheme of Marking PR: **120,** IA: **80,** Total: **200**

Credit:**12**	**Choose any one from specified Group GTM1 of Qualification Packs other than that selected in GTM1.**
Syllabus for this qualifier Pack is available on http://www.cgsc.in/pdf/CGSC%20CNC%20Operator%20-%20Vertical%20Machining%20Centre.pdf	