

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	25BVA1101	Elements of Electrical and Electronics Engineering	3	--	--	3	3	CA1	10		40
									MSE	30		
									CA2	10		
									ESE	50	20	
2	PCC	25BVA1102	Computer System Characteristics and Capability	3	--	--	3	3	CA1	10		40
									MSE	30		
									CA2	10		
									ESE	50	20	
3	PCC	25BVA1103	Electronic Measurements & Instrumentation	3	--	--	3	3	CA1	10		40
									MSE	30		
									CA2	10		
									ESE	50	20	
4	PCC	25BVA1104	Basic Mechatronics	3	--	--	3	3	CA1	10		40
									MSE	30		
									CA2	10		
									ESE	50	20	
5	IKC	25BVA1105	Constitution of India	2	--	--	2	2	CA1	25		20
									MSE	--		
									CA2	25		
									ESE	--	--	
6	AEC	25BVA1106	Communication Skill	2	--	--	2	2	CA1	25		20
									CA2	25		
									ESE	--	--	
7	PCC	25BVA1101L	Elements of Electrical and Electronics Engineering Laboratory	--	--	2	2	1	CA1	25		40
									CA2	25		
									POE	50	20	
8	PCC	25BVA1102L	Computer System Characteristics and Capability Laboratory	--	--	2	2	1	CA1	25		40
									CA2	25		
									POE	50	20	
9	PCC	25BVA1103L	Electronic Measurements & Instrumentation Laboratory	--	--	2	2	1	CA1	25		40
									CA2	25		
									POE	50	20	
10	AEC	25BVA1107L	Workshop Practice	--	--	2	2	1	CA1	25		40
									CA2	25		
									POE	50	20	
11	OJT	25BVA1108	Electrical Technician (ELE/Q6301)	--	--	--	--	12	CA1	50		80
									CA2	50		
									POE	100	40	
			Total	16	--	08	24	32		1100		
Total Contact Hours – 24 Total Credits – 32												

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	25BVA1201	Analog & digital Electronics	3	--	--	3	3	CA1	10		40
									MSE	30		
									CA2	10		
									ESE	50	20	
2	PCC	25BVA1202	Sensor Technology	3	--	--	3	3	CA1	10		40
									MSE	30		
									CA2	10		
									ESE	50	20	
3	PCC	25BVA1203	Electrical drives & Control	3	--	--	3	3	CA1	10		40
									MSE	30		
									CA2	10		
									ESE	50	20	
4	PCC	25BVA1204	Control system and interfaces	3	--	--	3	3	CA1	10		40
									MSE	30		
									CA2	10		
									ESE	50	20	
5	AEC	25BVA1205	Development of Life Skill	2	--	--	2	2	CA1	25		20
									MSE	--		
									CA2	25		
									ESE	--	--	
6	PCC	25BVA1201L	Analog & Digital Electronics Laboratory	--	--	2	2	1	CA1	25		40
									CA2	25		
									POE	50	20	
7	PCC	25BVA1202L	Sensor Technology Laboratory	--	--	2	2	1	CA1	25		40
									CA2	25		
									POE	50	20	
8	PCC	25BVA1203L	Electrical drives & Control Laboratory	--	--	2	2	1	CA1	25		40
									CA2	25		
									POE	50	20	
9	PCC	25BVA1204L	Control system and interfaces Laboratory	--	--	2	2	1	CA1	25		40
									CA2	25		
									POE	50	20	
10	OJT	25BVA1206	QP- Data Networking and Cable Technician (ELE/Q4613)	--	--	--	--	12	CA1	50		80
									CA2	50		
									POE	100	40	
			Total	14	--	08	22	30		1050		
Total Contact Hours – 22 Total Credits – 30												

Title of the Course: Title of the Course: Elements of Electrical & Electronics Engineering Course Code: 25BVA1101	L	T	P	Credit
	3	--	--	3

Course Prerequisite: NIL

Course Description:

This course introduces the fundamental concepts of Electrical and Electronics Engineering to the students from all the branches of Engineering. It provides a strong foundation in basic electrical circuits, electrical machines, and electronic devices. The course begins with electrical circuit analysis, Ohm's law, Kirchhoff's laws, and introduces AC and DC systems. It further explores single- phase systems, transformers, and rotating machines like DC motors. The electronics part covers semiconductor devices such as diodes, transistors and electronic devices. After completion of the course, the students will be able to understand the basic principles, analysis, and applications of key electrical and electronic systems used in engineering and everyday life.

Course Objectives:

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

1. Understand Fundamental Electrical Concepts
2. Analyze A.C. Circuit Parameters and Power Concepts
3. Comprehend Working of Electrical Machines
4. Learn Semiconductor Devices and Applications
5. Apply Transistor Fundamentals in Circuit Design

Course Outcomes:

CO	After the completion of the course the student should be able to
CO1	Apply fundamental laws and theorems of DC circuits.
CO2	Measure and interpret key electrical parameters such as voltage, current, power, and power factor in single-phase AC circuits.
CO3	Analyze the performance characteristics of single-phase transformers and DC motors, including efficiency and voltage regulation.
CO4	Apply the working of semiconductor devices and use them in basic rectifier and regulator circuits.
CO5	Design and test simple amplifier circuits and understand the role of transistors in amplification applications.

CO-PO Mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	2	1				3			2		2
CO2	2	3			2				2		2
CO3	2	2	2	1	1	3		1	1	1	1
CO4	2	1				2	1	1	1		1
CO5	2						1			2	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	10
MSE	30
CA2	10
ESE	50

CA1 and **CA2** are based on Assignment/ Declared 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	Unit 1 D.C. Circuits Ideal and Practical Energy Sources, Line Regulation and Load Regulation, Source Transformation, Star-Delta Transformation, Application of Kirchhoff's Law, Capacitor: Types of Capacitors, Capacitance of Multiple Parallel Plate Capacitor, Energy stored in a Capacitor, Charging & Discharging of Capacitor & Time constant.	08
2	Unit 2 A.C. Circuits Generation of A.C. Voltage, Equation of A.C. Voltage, Average value, R.M.S. Value, Form Factor, Peak Factor, Phase & Phase Difference, Pure Resistive, Pure Inductive, Pure Capacitive and combination of R-L-C Circuits, Active -Reactive and Apparent	08

	power & Power Factor.	
3	Unit 3 Single Phase Transformer and DC Motor Principle, Construction, Classifications, EMF equation, voltage ratio, current ratio, working at No Load & with Load, Losses in Transformer, Efficiency and Voltage Regulation, Applications. DC Motor: Basic principle of any electric motor, Construction and Working of DC motor, Types of DC motors and their Speed-Torque characteristics with applications.	08
4	Unit 4 Semiconductors & Applications Semiconductors (p-type, n-type), pn junction diodes, pn junction as a circuit element, its characteristics, half wave, full wave and bridge type rectifier circuits, basic filter circuits, Diode as a voltage multiplier, clipper & clamper circuit. Zener diode as a voltage regulator. LED, its characteristics construction & applications.	08
5	Unit 5 Transistors & Applications: Introduction to transistors, Characteristics of transistors in different configurations. Concept of d.c. and a.c. load line and operating point selection. Various amplifiers configurations their h-parameter equivalent circuits, determination of voltage gain current gain, input resistance and output resistance & power gain. Concept of feedback in amplifiers, different oscillators circuits (without analysis).	08

Text Books			
Sr. No.	Title	Author	Publisher
1	Basic Electrical and Electronics Engineering	D.P. Kothari and I.J. Nagrath	McGraw Hill Education.
2	Principles of Electrical Engineering and Electronics	V.K. Mehta and Rohit Mehta	S. Chand Publications.
3	Electrical Technology Vol-II	B.L. Theraja	S. Chand

Reference Books			
Sr. No.	Title	Author	Publisher
1	Fundamentals of Electrical Engineering and Electronics	J.B.Gupta	Kataria & Sons
2	Electronic Devices and Circuits 4th edition	David A.Bell	PHI
3	Basic Electrical and Electronics Engineering	R Muthusubramanian, S.S Salivahanan	TMH
4	Basic Electrical and Electronics Engineering	S.K. Bhattacharya	Pearson Education
5	Basic Electrical and Electronics Engineering	Ritu Sahdev	Khanna Publishing House.

Title of the Course: Computer systems characteristics & capability.	L	T	P	Credit
Course Code: 25BVA1102	3	--	--	3

Course Prerequisite: NIL

Course Description:

This course introduces the fundamental concepts of computer systems and their components, including data representation, hardware interfaces, memory architecture, and basic algorithm development. Students will gain foundational knowledge in input/output devices, memory classifications, flowcharting, and an introduction to programming environments. Through hands-on experiments, students will develop essential skills to understand and interact with computing systems effectively.

Course Objectives:

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

1. Understand the Fundamental Structure of Computer Systems.
2. Develop Skills in Data Representation and Number Systems.
3. Familiarize with Input and Output Devices.
4. Comprehend Memory and Storage Devices.
5. Introduce Algorithmic Thinking and Programming Environment.

Course Outcomes:

CO	After the completion of the course the student should be able to
CO1	Describe the characteristics, components, and classification of computer systems.
CO2	Demonstrate the understanding of data representation using different number systems and basic logic gates.
CO3	Identify various input and output devices and explain their working principles.
CO4	Explain the types of memory and storage devices used in computer systems.
CO5	Develop basic algorithms and flowcharts for simple problem-solving.

CO-PO Mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	3	2	2	1	2			2	1		1
CO2	3	3	2	2	2			2			
CO3	2	2	2	2	2	1	1	2	1	1	1
CO4	3	3	2	2	2	1		2			
CO5	3	2	3	3	2		1	1	2	1	2

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/ Declared 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	Computer System Characteristics and Capability Basic structure, ALU, memory, CPU, I/O devices. Development of computers. Classification of computers:(Micro, mini frame, supercomputer, pc, server, workstations).	08
2	Data Representation Within Computer BIT, BYTE, WORD, ASCII, EBCDIC, BCD Code. Introduction to Number system: Binary, Octal, Decimal and Hexadecimal. Conversion from one number system to another number system. Introduction to Basic Gates.	08
3	Input Devices and Output Devices Keyboard, Direct Entry: Card readers, scanning devices (BAR CODE, OMR, MICR), Voice input devices, Light pen, Mouse, Touch Screen,	08

	Digitizer, scanner. CRT, LCD/TFT, Dot matrix printer, Inkjet printer, Drum plotter, Flatbed plotter.	
4	Memory Devices RAM, ROM, PROM, EPROM, EEPROM. - Base memory, extended memory, expanded memory, Cache memory - Storage devices Tape, FDD, HDD, CDROM, Pen Drive.	08
5	Algorithm & Flowcharts, Introduction to Programming Environment Definition and properties, Principles of flowcharting, Flowcharting symbols, Converting algorithms to flowcharts, History of languages, high-level, Low level, Assembly languages etc, Compiler, Interpreters, Assemblers, Linkers, Loaders.	08

Text Books			
Sr. No.	Title	Author	Publisher
1	Computers And Commonsense	R. Hunt and Shell Y.	BPB Publications
2	Computer Fundamentals	Rajaraman	PHI Learning

Reference Books			
Sr. No.	Title	Author	Publisher
1	Fundamentals of Computer Systems	Ashok Arora	BPB Publications
2	Fundamentals of Computer Systems	Russell A Stultz	PHI Learning

Title of the Course: Electronic Measurement & Instrumentation	L	T	P	Credit
Course Code: 25BVA1103	3	--	--	3

Course Prerequisite: NIL

Course Description:

This course introduces the fundamental principles and practical aspects of measurement systems and instrumentation used in electrical, electronics, and automation industries. It covers static and dynamic characteristics of instruments, types of errors, and calibration techniques. Students will study analog and digital instruments, bridge circuits, oscilloscopes, and recording systems. Emphasis is placed on understanding and applying modern measurement tools in industrial environments, along with hands-on experience in instrument calibration, signal measurement, and data interpretation.

Course Objectives:

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

1. Understand the Fundamentals of Measurement and Instrumentation
2. Learn Principles and Applications of Analog Indicating Instruments
3. Analyze Bridge Circuits for Measurement
4. Gain Knowledge of Oscilloscopes and Their Applications
5. Explore Digital Instruments, Recording Systems, and Waveform Generators

Course Outcomes:

CO	After the completion of the course the student should be able to
CO1	Analyze the need for instrumentation and describe a general instrumentation system.
CO2	Analyze static and dynamic characteristics of instruments and their implications in measurement.
CO3	Evaluate types of errors, limiting errors, and their sources in measurement systems.
CO4	Apply statistical methods and probability to assess measurement accuracy.
CO5	Explain the concept of calibration, traceability, and prepare calibration charts.

CO-PO Mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	3	2	2	1	1	1	1				1
CO2	3	2	2	2	2	1				1	1
CO3	3	3	2	2	1	1		2			1
CO4	2	3	3	3	1	1					1
CO5	2	2	2	2	2	2			1		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/ Declared test/ Quiz/Seminar/Group discussions/presentation, etc.

MSE is based on 50% of course content (first three units).

ESE is based on 100% course content with 60-70% weightage for course content (last three units) covered after MSE.

Course Contents:

Unit No.	Unit Title and Contents	Hours
1	Fundamentals of measurement Need of Instrumentation, General Instrumentation System, Static and Dynamic characteristics of instruments, input & output impedance, loading effects of series and shunt connected instruments, Fundamentals of measurements, Types of Errors, Statistical Analysis, Probability of Errors, Limiting Errors, Calibration of instruments, calibration report & certification, traceability and traceability chart.	08
2	Analog Indicating Instruments DC galvanometer, PMMC and Moving Iron instruments, voltmeters, ammeters, ohmmeters and extension of range of instruments, AC	08

	indicating instruments: EDM type instruments, EDM Wattmeter (single phase) and errors present, 1 Φ induction type energy meter, Potential and current transformers, DC Potentiometers, standardization, applications of DC potentiometer.	
3	Bridge Circuits DC bridges: Wheatstone bridge and Kelvin bridge design, bridge sensitivity, errors in bridge circuits, null type and deflection type bridges, current sensitive and voltage sensitive bridges, applications of DC bridges AC bridges: Quality factor (Q) and dissipation factor(D), General equations for bridge balance, detectors for AC bridges, Maxwell bridge, Hay bridge, Schering bridge, Wien bridge, applications of AC bridges.	08
4	Oscilloscope Introduction, General purpose oscilloscope Block Diagram, Cathode Ray Tube, Vertical Deflection System, Horizontal Deflection System, deflection sensitivity, front panel controls, Delay Line, Oscilloscope Probes, Dual trace CRO, ALT and CHOP modes, measurement of electrical parameters like voltage, current, frequency, phase, Z modulation, Digital Storage oscilloscope, sampling rate and bandwidth, roll mode, applications like pre trigger, post-trigger, zoom and restart.	08
5	Digital Instruments, Recording Instruments and Waveform Generation Introduction to digital instruments, Advantages of Digital instruments over Analog instruments, Block diagram, principle of operation, Accuracy of measurement: Digital Multimeter, Kilo Watt Hour meter, Digital Tachometer, Ultrasonic Distance meter, Digital Thermometer, Digital pH meter, Digital capacitance meter, Classification of recorders, Principle and working of strip chart and X-Y recorders, single and multi- channel recorders, driving systems for pen and chart, applications of recorders, Waveform generation methods, Function generator.	08

Text Books:			
Sr. No.	Title	Author	Publisher
1	Electrical and Electronics Measurements and Instruments	Sawhney A. K.	Dhanpat Rai
2	Electronic Instrumentation and Measurement Techniques	W. D. Cooper & A. D. Helfrick	PHI
3	Electronic Instrumentation	Kalsi H. S.	TMH, 2nd or 3rd e/d

Title of the Course: Basic Mechatronics Course Code: 25BVA1104	L	T	P	Credit
	3	--	--	3

Course Prerequisite: NIL

Course Description:

This course introduces the fundamentals of Mechatronics, integrating mechanical, electrical, and computer systems. Students will learn about sensors, actuators, microcontrollers, and system integration. The emphasis is on basic principles, applications, and hands-on understanding of modern automated systems.

Course Objectives:

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

1. Understand the Fundamentals of Mechatronics
2. Develop Knowledge of Sensors and Transducers
3. Comprehend Actuator Technologies
4. Introduce Microcontrollers and Interfacing Techniques
5. Apply Mechatronics in System Design

Course Outcomes:

CO	After the completion of the course the student should be able to
CO1	Explain basic concepts and components of Mechatronics systems.
CO2	Identify and describe different types of sensors.
CO3	Explain working and application of actuators.
CO4	Describe basics of microcontroller and interfacing.
CO5	Apply integration of components to create simple Mechatronic systems.

CO-PO Mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	3	2	2	2	1	1		2	1		1
CO2	3	2	2	2	2	1		2			
CO3	3	2	2	3	2	1		2			
CO4	3	3	3	3	3	1	1	3	1		2
CO5	3	2	3	3	3	2	2	3	2	1	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	10
MSE	30
CA2	10
ESE	50

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

MSE is based on 50% of course content (first three units).

ESE is based on 100% course content with 60-70% weightage for course content (last three units) covered after MSE.

Course Contents:

Unit No.	Unit Title and Contents	Hours
1	Introduction to Mechatronics Definition and scope of Mechatronics, Elements of Mechatronic systems (sensors, actuators, and controllers), Advantages and real-world examples, System modeling overview (brief).	08
2	Sensors and Transducers Introduction to sensors, types: Temperature, Pressure, Proximity, Light, Position sensors, Working principles and applications, signal conditioning (basics).	08

3	Actuators Electrical Actuators: DC motors, Stepper motors, Servo motors, Pneumatic and Hydraulic actuators (basic introduction), Characteristics and selection criteria.	08
4	Microcontrollers and Interfacing Introduction to microcontrollers (focus on Arduino / 8051 / PIC – overview only anyone), Basic architecture and pin diagram, Interfacing sensors and actuators, Simple programming logic (like turning on LED, motor).	08
5	Mechatronics System Design System design process, Case studies: Automatic washing machine, Pick and place robot, Temperature control system, Integration of components (block diagrams), Overview of PLCs (very basic).	08

Textbooks			
Sr. No.	Title	Author	Publisher
1	Mechatronics	W. Bolton	Pearson Education
2	Introduction to Mechatronics and Measurement Systems	David G. Alciatore & Michael B. Hstand	McGraw-Hill
3	Mechatronics: Principles and Applications	Godfrey C. Onwubolu	Elsevier

Title of the Course: Course: Constitution of India Course Code: 25BVA1105	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:

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

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	PO11
CO1										3	
CO2							3		2	2	
CO3						2			2	1	
CO4							3			2	
CO5										3	

Assessment Scheme:

Two components of **In-Semester Evaluation (ISE)** are, CA1 and CA2, 50% weightage each respectively.

Assessment Component	Marks
CA1	25
MSE	--
CA2	25
ESE	--

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

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 Prime Minister and Council of Ministers, Lok Sabha and Rajya Sabha.	06
4	State Government Governor – Role and Power, Chief Minister and Council of Ministers.	06

5	Local Administration District Administration, Municipal Corporation.	06
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Textbooks			
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, 2008

Useful Links:	
1	https://www.constitution.org/cons/india/const.html
2	http://www.legislative.gov.in/constitution-of-india
3	https://www.sci.gov.in/constitution

Title of the Course: Communication Skills Course Code: 25BVA1106	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:

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 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	PO11
CO1							1		3		1
CO2							3		3		2
CO3									3		1
CO4							2		3		2

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 the Assignment/ Surprise test/ Quiz/Seminar/Group discussions / presentation, etc.

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 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,	07

	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			
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

Useful Links:	
1	https://www.bbc.co.uk/learningenglish
2	https://www.grammarly.com/blog/handbook/
3	https://learnenglish.britishcouncil.org/grammar
4	https://www.bbc.co.uk/learningenglish

Title of the Course: Elements of Electrical & Electronics Engineering Laboratory Course Code: 25BVA1101L	L	T	P	Credit
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Course Prerequisite: NIL

Course Description:

This course introduces the fundamental concepts of Electrical and Electronics Engineering to the students from all the branches of Engineering. It provides a strong foundation in basic electrical circuits, electrical machines, and electronic devices. The course begins with electrical circuit analysis, Ohm's law, Kirchhoff's laws, and introduces AC and DC systems. It further explores single-phase systems, transformers, and rotating machines like DC motors. The electronics part covers semiconductor devices such as diodes, transistors and electronic devices. After completion of the course, the students will be able to understand the basic principles, analysis, and applications of key electrical and electronic systems used in engineering and everyday life.

Course Objectives:

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

1. Understand Fundamental Electrical Concepts
2. Analyse A.C. Circuit Parameters and Power Concepts
3. Comprehend Working of Electrical Machines
4. Learn Semiconductor Devices and Applications
5. Apply Transistor Fundamentals in Circuit Design

Course Outcomes:

CO	After the completion of the course the student should be able to
CO1	Apply fundamental laws and theorems of DC circuits.
CO2	Measure and interpret key electrical parameters such as voltage, current, power, and power factor in single-phase AC circuits.
CO3	Analyze the performance characteristics of single-phase transformers and DC motors, including efficiency and voltage regulation.
CO4	Explain the working of semiconductor devices and use them in basic rectifier and regulator circuits.
CO5	Design and test simple amplifier circuits and understand the role of transistors in amplification applications.

CO-PO Mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	2	1				3			2		2
CO2	2	3			2				2		2
CO3	2	2	2	1	1	3		1	1	1	1
CO4	2	1				2	1	1	1		1
CO5	2						1			2	3

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	Verification of Kirchhoff's Voltage Law (KVL) and Kirchhoff's Current Law (KCL).	02
2	Source Transformation: Voltage to Current Source and Vice Versa.	02
3	Star-Delta and Delta-Star Transformation.	02
4	Measurement of RMS, Average, Peak Value, Form Factor & Peak Factor of AC Waveforms.	02
5	Study of DC Motor Construction and Working.	02
6	Study of single-phase transformer Construction and Working.	02

7	Characteristics of PN Junction Diode and Zener Diode.	02
8	Half-Wave and Full-Wave Rectifier with and without Filter.	02
9	Study of Zener diode as voltage regulator.	02
10	Study the input-output characteristics of transistor.	02

Textbooks			
Sr. No.	Title	Author	Publisher
1	Basic Electrical and Electronics Engineering	D.P. Kothari and I.J. Nagrath	McGraw Hill Education.
2	Principles of Electrical Engineering and Electronics	V.K. Mehta and Rohit Mehta	S. Chand Publications.
3	Electrical Technology Vol-II	B.L. Theraja	S. Chand

Reference Books			
Sr. No.	Title	Author	Publisher
1	Fundamentals of Electrical Engineering and Electronics	J.B.Gupta	Kataria & Sons
2	Electronic Devices and Circuits 4th edition	David A.Bell	PHI
3	Basic Electrical and Electronics Engineering	R Muthusubramanian, S.S Salivahanan	TMH
4	Basic Electrical and Electronics Engineering	S.K. Bhattacharya	Pearson Education
5	Basic Electrical and Electronics Engineering	Ritu Sahdev	Khanna Publishing House.

Title of the Course: Computer systems characteristics & capability Laboratory.	L	T	P	Credit
Course Code: 25BVA1102L	--	--	2	1

Course Prerequisite: NIL

Course Description:

This course introduces the fundamental concepts of computer systems and their components, including data representation, hardware interfaces, memory architecture, and basic algorithm development. Students will gain foundational knowledge in input/output devices, memory classifications, flowcharting, and an introduction to programming environments. Through hands-on experiments, students will develop essential skills to understand and interact with computing systems effectively.

Course Objectives:

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

1. Understand the Fundamental Structure of Computer Systems
2. Develop Skills in Data Representation and Number Systems
3. Familiarize with Input and Output Devices
4. Comprehend Memory and Storage Devices
5. Introduce Algorithmic Thinking and Programming Environment

Course Outcomes:

CO	After the completion of the course the student should be able to
CO1	Describe the characteristics, components, and classification of computer systems.
CO2	Demonstrate the understanding of data representation using different number systems and basic logic gates.
CO3	Identify various input and output devices and explain their working principles.
CO4	Explain the types of memory and storage devices used in computer systems.
CO5	Develop basic algorithms and flowcharts for simple problem-solving.

CO-PO Mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	3	2	2	1	2			2	1		1
CO2	3	3	2	2	2			2			
CO3	2	2	2	2	2	1	1	2	1	1	1
CO4	3	3	2	2	2	1		2			
CO5	3	2	3	3	2		1	1	2	1	2

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	Identify and label components of a basic computer system (CPU, memory, ALU, I/O devices).	02
2	Conversion between number systems (Binary ↔ Decimal, Hex ↔ Binary, Octal ↔ Decimal)	02
3	Hands-on practice using logic gate simulator (AND, OR, NOT, NAND, NOR XOR).	02
4	Demonstration and usage of input devices (keyboard, barcode scanner, OMR, light pen, microphone).	02
5	Demonstration of output devices (LCD, dot matrix printer, plotters).	02
6	Comparative study of RAM and ROM types (with actual hardware or simulation).	02

7	Study and operation of various storage devices (HDD, SSD, USB drives, CD- ROM).	02
8	Draw flowcharts for simple real-world problems (e.g., finding largest of three numbers)	02
9	Write an algorithm for a basic arithmetic operation (addition, subtraction, factorial).	02
10	Demonstrate working of a compiler, interpreter, and assembler using a basic code snippet.	02

Textbooks			
Sr. No.	Title	Author	Publisher
1	Computers And Commonsense	R. Hunt and Shell Y.	BPB Publications
2	Computer Fundamentals	Rajaraman	PHI Learning

Reference books			
Sr. No.	Title of Book	Name of Author	Publisher
1	Fundamentals of Computer Systems	Ashok Arora	BPB Publications
2	Fundamentals of Computer Systems	Russell A Stultz	PHI Learning

Title of the Course: Electronic Measurement & Instrumentation Laboratory. Course Code: 25BVA1103L	L	T	P	Credit
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Course Prerequisite: NIL

Course Description:

This course introduces the fundamental principles and practical aspects of measurement systems and instrumentation used in electrical, electronics, and automation industries. It covers static and dynamic characteristics of instruments, types of errors, and calibration techniques. Students will study analog and digital instruments, bridge circuits, oscilloscopes, and recording systems. Emphasis is placed on understanding and applying modern measurement tools in industrial environments, along with hands-on experience in instrument calibration, signal measurement, and data interpretation.

Course Objectives:

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

1. Understand the Fundamentals of Measurement and Instrumentation
2. Learn Principles and Applications of Analog Indicating Instruments
3. Analyze Bridge Circuits for Measurement
4. Gain Knowledge of Oscilloscopes and Their Applications
5. Explore Digital Instruments, Recording Systems, and Waveform Generators

Course Outcomes:

CO	After the completion of the course the student should be able to
CO1	Explain the need for instrumentation and describe a general instrumentation system.
CO2	Analyze static and dynamic characteristics of instruments and their implications in measurement.
CO3	Evaluate types of errors, limiting errors, and their sources in measurement systems.
CO4	Apply statistical methods and probability to assess measurement accuracy.
CO5	Explain the concept of calibration, traceability, and prepare calibration charts.

CO-PO Mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	3	2	2	1	1	1	1				1
CO2	3	2	2	2	2	1				1	1
CO3	3	3	2	2	1	1		2			1
CO4	2	3	3	3	1	1					1
CO5	2	2	2	2	2	2			1		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.	List of Experiments	Hours
1	Measurement of Resistance Using Wheatstone Bridge.	02
2	Calibration of a Voltmeter Using a Standard Source.	02
3	Study and Use of PMMC and MI Instruments.	02
4	Measurement of Voltage Using DC Potentiometer.	02
5	Measurement of Inductance Using Maxwell's Bridge.	02
6	Operation and Measurement Using Cathode Ray Oscilloscope (CRO)	02
7	Study of Digital Multimeter (DMM).	02

8	Measurement of Power Using Single Phase Energy Meter.	02
9	Function Generator Operation and Waveform Observation.	02
10	Ultrasonic Distance Measurement Using Digital Sensor.	02

Textbooks			
Sr. No.	Title	Author	Publisher
1	Electrical and Electronics Measurements and Instruments	Sawhney A. K.	Dhanpat Rai
2	Electronic Instrumentation and Measurement Techniques	W. D. Cooper & A. D. Helfrick	PHI
3	Electronic Instrumentation	Kalsi H. S.	TMH, 2nd or 3rd e/d

Title of the Course: Workshop Practices. Course Code: 25BVA1107L	L	T	P	Credit
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Course Prerequisite: NIL

Course Description:

This course introduces first-year engineering students to basic workshop practices and hands-on manufacturing techniques used in industry. Students will gain practical knowledge and skills in various trades such as fitting, carpentry, welding, sheet metal, plumbing, and basic electrical work. The objective is to provide foundational exposure to engineering materials, tools, safety protocols, and fabrication methods, enabling students to understand production processes and build technical competence in manual operations.

Course Objectives:

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

1. Understand General Workshop Tools and Safety Practices
2. Develop Basic Hand Working Skills
3. Gain Competency in Measuring and Gauging
4. Acquire Practical Experience in Manufacturing Processes
5. Familiarize with CNC Machines and Modern Workshop Practices

Course Outcomes:

CO	After the completion of the course the student should be able to
CO1	Identify and properly use basic hand tools, measuring instruments, and workshop equipment relevant to different trades.
CO2	Demonstrate hands-on skills in carpentry, fitting, welding, and sheet metal fabrication with an understanding of safety protocols.
CO3	Interpret technical drawings and apply them to perform basic operations in the workshop.
CO4	Explain the properties and appropriate selection of engineering materials for various fabrication tasks.
CO5	Work effectively as a team member to complete assigned workshop tasks while demonstrating time management and problem-solving skills.

CO-PO Mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	3	2	2	2	3	1	1	1	1		
CO2	3	2	2	3	3	2	2	1	1	1	
CO3	2	3	3	3	2	1	1		2		
CO4	3	2	2	2	2	2		2			
CO5	1	2		2	2	1	3		2	1	2

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.	List of Experiments	Hours
1	General use and safety Considerations: PPE Kits, Bench Tools, Machinist's Hammers, Screw Drivers, Punches, Chisels, Scrapers, Scribes, Files, Pliers and Cutters, Wrenches, Hacksaw, Bench Vise, , Hand drill, Taps and Dies, Hand Shears, Rules, Tapes and Squares, Soldering Iron, Rivets	02
2	Hand Working Operations: Sawing, Filing, Threading, Scribing, Shearing, Soldering, Riveting	02

3	Measuring and Gauging: Introduction, Semi – Precision Tools – Calipers, depth Gauge, Feeler Gauge, Precision Tools – Micrometers, Vernier Calipers, Vernier Height Gauge, Telescopic Gauge, Hole Gauge, Bevel Protractor, Dial Indicator, Gauge Blocks and Surface Plate	02
4	One Job on Drilling	02
5	One Job on Foundry	02
6	One Job on Sheet Metal	02
7	One Job on MIGMAG Welding	02
8	One Job On SMAW	02
9	One job on CNC Milling Machine	02
10	One job on CNC Lathe Machine	02

Title of the Course: Electrical Technician (ELE/Q6301)	L	T	P	Credit
Course Code: 25BVA1108	--	--	--	12

Course Prerequisite: Basic I.T. Skills, Communication skills.

Course Description:

This course offers students, the opportunity to explore and develop their careers through professional practice. The structured plan of education impacts student work readiness through several professional development skill-building activities, including goal setting; analysis and reflection; feedback from employer; informational interviewing and briefing their experience.

Course Objectives:

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

1. To provide practical exposure to the students.
2. To bridge the gap between theory and practical.
3. To foster professional development.
4. To provides hands-on experience and practices.
5. To prepare students for employability.

Course Outcomes:

CO	After the completion of the course the student should be able to
CO1	Apply theoretical knowledge while working practically
CO2	Acquire industry-specific skills
CO3	Enhance problem-solving and critical thinking skill
CO4	Develop a deeper understanding of the industry
CO5	Gain industry insights and networking opportunities

CO-PO Mapping:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	3		3	2							
CO2			3		3			3			3
CO3		3	3	3							
CO4	3		3			3		3			
CO5							3		3		3

Assessment Scheme:

Two components of In- Semester Evaluation (ISE), CA1 and CA2 having weightage of 25% each, Practical Examination at the end of semester will carry 50% weightage.

Assessment Component	Marks
CA1	50
MSE	--
CA2	50
OE	100

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

OE is based on the practical examination carried out at the end of the semester.

Useful Links:

1	https://www.sscnasscom.com/qp-qpservices
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