Program	BACHELOR OF VOCATION (B.Voc.)	**Semester - 1**
Type of Course	-	
Prerequisite		
Rationale	-	
Effective From A.Y.	2024-25	

Teaching Scheme (Contact Hours)				Examination Scheme				
				Theory Marks		Practical Marks		Total Marks
Lecture	Tutorial	Lab	Credit	SEE T	IAT	SEE P	CCE	
3	1	-	4	50	-	-	20	70

***SEE** - Semester End Examination, **IAT** - Internal Assessment Test, **CCE** - Continues & Comprehensive Evaluation*

Course Content

T - Teaching Hours | **W** - Weightage

Sr.	Topics	T	W
1	**Complex Number** Basic Properties of Complex Numbers, Algebra of Complex Number, Modulus, Argument, Quadratic Equation	7	15
2	**Vector and Matrices** Vector, Dot Product, Scalar Multiplication, Basics of determinants, Matrices of order *m* x *n*, Row and Column transformation, Matrices operation – Addition, Subtraction, Multiplication, Inverse, Transpose, Solving system of linear equations.	8	20
3	**Boolean Algebra** Definition & Examples of Boolean Algebra, De-Morgan's Law, Truth Tables, Boolean Functions, Representation and minimization of Boolean Functions, Design example using Boolean algebra.	8	20
4	**Differentiation & Integration** Basic Differentiation Formulae, u v Rule, u/v Rule, Chain Rule. Basic Integration Formulae, Properties of Definite Integrals.	9	20
5	**First Order ODE** Order and Degree, Formation of a differential equations, Method of solving First order ordinary differential equations: Separable variable, linear differential equations.	10	25
	Total	42	100

Course Outcomes

At the end of this course, students will be able to:	
CO1	Use the concepts of complex numbers.
CO2	Perform matrix computation in a comprehensive manner and understand vector and algebra.
CO3	Implement fundamentals of Boolean algebra.
CO4	Find differentiation & integration of basic functions.
CO5	Form and solve first order ordinary differential equations

Program	BACHELOR OF VOCATION (B.Voc.)	**Semester - 1**
Type of Course	-	
Prerequisite	NA	
Rationale	Electronics is playing a key role in all engineering applications. Purpose of this subject is make students familiar with basic electronics concepts. Students will be able to operate electronic test and measurement equipment like multi-meter, CRO, DC power supply and function generator.	
Effective From A.Y.	2024-25	

Teaching Scheme (Contact Hours)				Examination Scheme				
				Theory Marks		Practical Marks		
Lecture	**Tutorial**	**Lab**	**Credit**	**SEE T**	**IAT**	**SEE P**	**CCE**	**Total Marks**
3	0	0	3	50	-	-	-	50

***SEE** - Semester End Examination, **IAT** - Internal Assessment Test, **CCE** - Continues & Comprehensive Evaluation*

Course Content

T - Teaching Hours | **W** - Weightage

Sr.	Topics	T	W
1	**Diode theory and applications** Basics of Conductor, Insulator & Semiconductor. Energy Band Diagram, Semiconductor properties and bonds in semiconductor. Intrinsic and extrinsic semiconductor materials: P type, N type semiconductors. P-N junction diode, Forward & Reverse Biasing. Forward & Reverse Characteristics. Applications - Diode as rectifier, half wave, full wave and bridge rectifier. Need of Filters, C, L, LC, π filters	7	20
2	**Special Purpose Diodes & Transistor :** Zener diode, Photo diode, Photo transistor, Light Emitting Diode, LDR, Photovoltaic Cell, Seven Segment LED display, LCD and Opto coupler.	8	15
3	**Transistor (BJT) and amplifiers** PNP and NPN transistors, Biasing of Transistors, Current gains α, β & γ. Relationship between α and β. Transistor configuration & Characteristics for CB, CE, CC. Load line and biasing methods of Transistor. Transistor as an amplifier: CE Amplifier. Transistor as a Switch: Working and application.	9	25
4	**Field effect transistors (FET) and its biasing** Junction field effect transistors (JFET), Comparison of BJT and FET, JFET characteristics, FET Biasing , MOSFETs (D-type and E-type MOSFET), MOSFET Characteristics. Applications of FET & MOSFET.	9	20
5	**Regulated Power supply** Difficulties with unregulated power supply. Shunt voltage regulator. Transistorized series voltage regulator (basic), 3-Terminal Fixed/variable voltage regulator IC:78xx, 79xx, LM317. Introduction of SMPS & UPS	9	20
	Total	**42**	**100**

Suggested Distribution Of Theory Marks Using Bloom's Taxonomy

Level	Remembrance	Understanding	Application	Analyze	Evaluate	Create
Weightage	30	40	20	10	0	0

NOTE : This specification table shall be treated as a general guideline for the students and the teachers. The actual distribution of marks in the question paper may vary slightly from above table.

Course Outcomes

At the end of this course, students will be able to:	
CO1	Analyse the general Purpose diode
CO2	Analyse the general Purpose diode.
CO3	Apply knowledge of transistor in amplifier circuits & Switch.
CO4	Analyse basic FET Circuits
CO5	Understand the working of Regulated Power Supply.

Reference Books

1.	**Electronic Devices and Circuits** By David A. Bell | Oxford University Press
2.	**Electronic Principles** By Albert Malvino & David | Tata McGraw-Hill
3.	**Electronic Devices and Circuit Theory** By R. L. Boylestad and L. Nashelsky | Pearson Education
4.	**Integrated Electronics** By Jaccob Millman, Chritos Halkias, Chetan D Parikh | Tata McGraw-Hill
5.	**Problems and Solutions in Basic Electronics** By Albert Malvino & David | McGraw Hill Education

Useful Links

1. http://nptel.ac.in/syllabus/117103063/
2. https://swayam.gov.in/course/3595-basic-electronics
3. eSIM available on FOSSEE website: https://fossee.in/

Program	BACHELOR OF VOCATION (B.Voc.)	**Semester - 1**
Type of Course	-	
Prerequisite	NA	
Rationale	The course "Fundamentals of Electrical Engineering-I" is to provide students with a solid foundation in the principles and concepts of electrical engineering.	
Effective From A.Y.	2024-25	

Teaching Scheme (Contact Hours)				Examination Scheme				
				Theory Marks		Practical Marks		
Lecture	Tutorial	Lab	Credit	SEE T	IAT	SEE P	CCE	Total Marks
3	0	0	3	50	-	-	-	50

***SEE** - Semester End Examination, **IAT** - Internal Assessment Test, **CCE** - Continues & Comprehensive Evaluation*

Course Content

T - Teaching Hours | **W** - Weightage

Sr.	Topics	T	W
1	**Introduction: Charge, Current, Potential, voltage, power, Energy** Electrical Resistance and its Unit, Ohms law: applications and limitations Specific Resistance and its unit. Parameters affecting the resistance, Effect of temperature on resistance and temperature coefficient, potential difference; EMF, Work, Power, Energy, Joul's Law, Series-Parallel Circuit.	10	20
2	**Electrical Circuits** Concept of Open circuit, Closed circuit, Short circuits, Definitions of node, branch, loop, mesh, Kirchhoff's Voltage and Current law (KVL and KCL), Mesh Analysis and Nodal Analysis of Networks, Principle of Duality.	8	20
3	**Network Theorem** Linear & Nonlinear circuit, Active and Passive Network, Super Position Theorem, Thevenin's Theorem, Norton's Theorem Maximum Power Transfer Theorem, Reciprocity Theorem, Star delta transformation.	10	25
4	**Electrostatic & Capacitors** Definitions of Electrostatic, types of capacitors, series, parallel combinations & related circuit calculations in brief charging & discharging of capacitor. Energy stored in capacitor.	6	15
5	**Electromagnetic Induction** Magnetic Circuit , Comparison Between Electric And Magnetic Circuits , Series/Parallel Magnetic Circuit Calculations , Magnetic Hysteresis, Hysteresis And Eddy Current Loss, Magnetic Materials, Electromagnetic induction, Statically And Dynamically Induced E.M.F.S in brief, Fleming's Right hand rule-Left hand rule, Coefficients Of Self And Mutual Inductances, Coefficient Of Coupling, Series/Parallel Combinations Of Inductances, Rise And Decay Of Current In Inductive Circuits , Force Experienced By Current Carrying Conductor Placed In Magnetic Field.	8	20
	Total	**42**	**100**

Suggested Distribution Of Theory Marks Using Bloom's Taxonomy

Level	Remembrance	Understanding	Application	Analyze	Evaluate	Create
Weightage	40	20	20	20	0	0

NOTE : This specification table shall be treated as a general guideline for the students and the teachers. The actual distribution of marks in the question paper may vary slightly from above table.

Course Outcomes

At the end of this course, students will be able to:	
CO1	Understand the basic concepts and principles of electrical engineering.
CO2	Apply fundamental Electrical theorem to solve Electrical Circuit.
CO3	Understand the fundamental principles of electrostatics, electric fields, and electric potential.
CO4	Understand the fundamental principles of electromagnetic induction, inductor and its response curve while DC excitation

Reference Books

1.	**Electrical Technology Vol-1** By B. L. Theraja | S. Chand & Co. Ltd.
2.	**Basic Electrical Engineering** By J. B. Gupta | S.K. Kataria & Sons

Useful Links

https://nptel.ac.in.

Program	BACHELOR OF VOCATION (B.Voc.)	**Semester - 1**
Type of Course	-	
Prerequisite	NA	
Rationale	Address global energy and environmental challenges, develop a strong understanding of renewable energy technologies, analyze the economic and environmental aspects of renewable energy systems & emphasize energy conservation and efficiency in renewable energy applications.	
Effective From A.Y.	2024-25	

Teaching Scheme (Contact Hours)				Examination Scheme				
				Theory Marks		Practical Marks		Total Marks
Lecture	Tutorial	Lab	Credit	SEE T	IAT	SEE P	CCE	
3	1	0	4	50	-	-	20	70

***SEE** - Semester End Examination, **IAT** - Internal Assessment Test, **CCE** - Continues & Comprehensive Evaluation*

Course Content

T - Teaching Hours | **W** - Weightage

Sr.	Topics	T	W
1	**Introduction to Renewable Energy** Definition and significance of renewable energy, Overview of global energy consumption and its environmental impacts, Renewable energy in the context of sustainable development.	4	10
2	**Solar Energy** Solar radiation and its measurement, Solar photovoltaic (PV) systems, Solar thermal systems, Solar energy applications and case studies.	10	25
3	**Wind Energy** Wind as a renewable energy source, Wind turbine technology and components, Wind energy conversion systems, Wind energy applications and case studies.	10	25
4	**Hydroelectric Energy** Hydropower generation and its history, Types of hydropower systems, Components of a hydropower plant, Small-scale hydroelectric systems and their applications.	4	10
5	**Biomass and Geothermal Energy** Introduction to biomass and geothermal energy as renewable sources, Types of biomass feedstock and geothermal resources Environmental and sustainability aspects.	4	10
6	**Emerging Trends and Future Prospects** Emerging renewable energy technologies (tidal, wave, solar, thermal, etc.), Innovations and research in the renewable energy sector, Global renewable energy trends and future projections.	10	20
	Total	42	100

Suggested Distribution Of Theory Marks Using Bloom's Taxonomy

Level	Remembrance	Understanding	Application	Analyze	Evaluate	Create
Weightage	30	30	20	20	0	0

NOTE : This specification table shall be treated as a general guideline for the students and the teachers. The actual distribution of marks in the question paper may vary slightly from above table.

Course Outcomes

At the end of this course, students will be able to:	
CO1	Understand the significance of renewable energy sources in addressing global energy and environmental challenges
CO2	Identify and describe different types of renewable energy technologies, including their working principles and applications.
CO3	Analyze the economic, social, and environmental aspects of renewable energy systems and evaluate their suitability for specific contexts.
CO4	Apply basic concepts of energy conservation and efficiency in the design and operation of renewable energy systems.

Useful Links

1. Open Energy Modelling Initiative (https://www.openmod-initiative.org/)
2. PVLIB-Python (https://pvlib-python.readthedocs.io/)
3. National Renewable Energy Laboratory (NREL) OpenEI (https://openei.org/)
4. National Programme on Technology Enhanced Learning: https://nptel.ac.in/courses

Program	BACHELOR OF VOCATION (B.Voc.)	**Semester - 1**
Type of Course	-	
Prerequisite	NA	
Rationale	Electronics is playing a key role in all engineering applications. Purpose of this subject is to make students familiar with basic electronics concepts. Students will be able to operate electronic test and measurement equipment like multi-meter, CRO, DC power supply and function generator.	
Effective From A.Y.	2024-25	

Teaching Scheme (Contact Hours)				Examination Scheme				
				Theory Marks		Practical Marks		
Lecture	**Tutorial**	**Lab**	**Credit**	**SEE T**	**IAT**	**SEE P**	**CCE**	**Total Marks**
0	0	2	1	-	-	30	20	50

***SEE** - Semester End Examination, **IAT** - Internal Assessment Test, **CCE** - Continues & Comprehensive Evaluation*

Course Outcomes

At the end of this course, students will be able to:	
CO1	Analyze the general Purpose diode.
CO2	Analyze the special Purpose diode.
CO3	Apply knowledge of transistor in amplifier circuits & Switch.
CO4	Analyze basic FET Circuits
CO5	Understand the working of Regulated Power Supply.

Reference Books

1.	**Electronic Devices and Circuits** By David A. Bell | Oxford University Press
2.	**Electronic Principles** By Albert Malvino & David | Tata McGraw-Hill
3.	**Electronic Devices and Circuit Theory** By Robert L. Boylestad & Louis Nashelsky | Pearson Publication
4.	**Integrated Electronics: Analog and Digital Circuits and Systems** By Millman Jacob Halkias Christos | Tata McGraw-Hill
5.	**Problems and Solutions in Basic Electronics** By Albert Malvino & David | McGraw Hill Education

List of Practical	
1.	To Study Electronic Symbols And Units.
2.	To Observe Waveforms On Oscilloscope, Measure Basic Parameters Amplitude And Frequency Of Sine Wave And Square Wave.
3.	Obtain V-I characteristics of semiconductor P-N Junction diode.
4.	Obtain V-I characteristics of Zener diode.
5.	To observe waveform at the output of half wave rectifier with and without filter.
6.	To observe waveform at the output of Full wave rectifier with and without filter.
7.	To Verify I/P & O/P Characteristic of CE Transistor Configuration.
8.	To Verify O/P & Transfer Characteristics of A Field Effect Transistor (FET).
9.	To Perform Voltage regulator using 78xx and 79xx.
10.	To make full wave rectifier circuit with filter.

Useful Links

1. http://nptel.ac.in/syllabus/117103063/
2. https://swayam.gov.in/course/3595-basic-electronics
3. eSIM available on FOSSEE website: https://fossee.in/

Program	BACHELOR OF VOCATION (B.Voc.)	**Semester - 1**
Type of Course	-	
Prerequisite	NA	
Rationale	NA	
Effective From A.Y.	2024-25	

Teaching Scheme (Contact Hours)				Examination Scheme				
				Theory Marks		Practical Marks		
Lecture	Tutorial	Lab	Credit	SEE T	IAT	SEE P	CCE	Total Marks
0	0	2	1	-	-	30	20	50

***SEE** - Semester End Examination, **IAT** - Internal Assessment Test, **CCE** - Continues & Comprehensive Evaluation*

Course Outcomes

At the end of this course, students will be able to:	
CO1	Understand the basic concepts of Electrical engineering.
CO2	Apply fundamental rules to solve Electrical Circuit
CO3	Apply fundamental Electrical theorem to solve Electrical Circuit

List of Practical

1.	**To study different Electrical and Electronic symbol**
2.	**To know various Electrical Equipment & Instruments and their Operations**
3.	**To verify the Ohm's Law**
4.	**To verify the laws of Resistance when connected in series**
5.	**To verify the laws of Resistance when connected in parallel**
6.	**Verification of Kirchoff's Current Law**
7.	**Verification of Kirchoff's Voltage Law**
8.	**To verify the Superposition theorem**
9.	**To verify the Thevenin's theorem**
10.	**To Verify the Norton's theorem**

Useful Links

1. www.nptel.ac.in
2. http://www.scilab.org/
3. http://www.vlab.co.in/

Program	BACHELOR OF TECHNOLOGY (B.Tech)	**Semester - 1**
Type of Course	Mandatory Non-Credit Course-Audit Course	
Prerequisite		
Rationale	-	
Effective From A.Y.	2024-25	

Teaching Scheme (Contact Hours)				Examination Scheme				
				Theory Marks		Practical Marks		
Lecture	**Tutorial**	**Lab**	**Credit**	**SEE TH**	**IAT**	**SEE P**	**CCE**	**Total Marks**
-	-	-	0	-	1	-	-	1

***SEE** - Semester End Examination, **IAT** - Internal Assessment Test, **CCE** - Continues & Comprehensive Evaluation*

Program	BACHELOR OF VOCATION (B.Voc.)	**Semester - 1**
Type of Course	-	
Prerequisite	NA	
Rationale	NA	
Effective From A.Y.	2024-25	

Teaching Scheme (Contact Hours)				Examination Scheme				
				Theory Marks		Practical Marks		Total Marks
Lecture	Tutorial	Lab	Credit	SEE T	IAT	SEE P	CCE	
0	0	16	6	-	-	100	100	200

***SEE** - Semester End Examination, **IAT** - Internal Assessment Test, **CCE** - Continues & Comprehensive Evaluation*

Course Content

T - Teaching Hours | **W** - Weightage

Sr.	Topics	T	W
1	**Select and use hand, power tools and electrical devices relevant to construction electrical works:** Selection and use of hand and power tools for tightening electrical fixtures, electrical termination at power outlets, Selection of electrical devices such as starters, circuit breakers for installing them to circuits as per power rating , Selection of PPEs for general and electrical safety, Use of measuring instruments and hand/ power tools for measuring, cutting, bending, threading conduits/ cables, Use of wire stripping and joining tools to strip, joining/ splicing tools, Use of electrical devices to carry out basic inspections on electrical circuits like checking voltage, current flow, voltage drop, leakage through conductor etc. Maintain/ upkeep electrical tools, devices post using as per manufacturers guidelines.	**25**	**15**
2	**Install temporary lighting arrangement at construction sites** Demonstrate and understand the principles of resistance, Explain series and parallel circuits, Visual checking to be carried out to electrical fixtures and materials related to lighting units to ascertain their usability as per specified acceptance criteria, Reading of electrical wiring symbols for single and three phase circuits, specifications to obtain required information for a given electrical circuit, Reading of electrical and general safety norms and guidelines and its implementation in electrical works, Assessment of risk involved in installation of lighting arrangements and its accessories at construction sites, Selection of cables, lights and electrical fixtures depending upon electrical load requirement, Selection of PPEs for general and electrical safety, Use of hand and power tools to fix cables, light units and its accessories, Practice of cable laying using conduits, casings and its necessity at construction sites, Joining of cable in straight through joint method and use of PVC insulation tapes at broken insulation, joints as per applicability, Determination of live/ dead electrical circuits by using appropriate tools and devices, Determination of voltage, current at power outlets by using appropriate tools and devices, Method of tagging electrical cables, underground electrical conduits by standard method, Determination of power rating of electrical fixtures to be used for repairing to the electrical arrangement, Repairing of electrical lighting arrangements by undertaking tests, replacement of electrical fixtures/ materials, Methods of trace out short circuits, power interruptions/ continuity using appropriate electrical devices, Electrical principles like ohm s law, ampere s law, electromagnetic field and its effects	**60**	**30**
3	**Install LV electrical wiring at permanent structures**	**50**	**25**

Course Content

T - Teaching Hours | **W** - Weightage

Sr.	Topics	T	W
	Visual checking to be carried out to electrical fixtures and materials related to domestic wiring such as conduits, raceways, wires to ascertain their usability as per specified acceptance Criteria. Use of measuring instruments and cutting tools such as measuring tapes, markers, cutters to cut and bend conduits ,Use of hand and power tools for cutting drilling works for proper fixing of conduits and raceways, Laying electrical wires through conduits and raceways, Selection and use general and electrical safety gears Practice electrical tests like voltage drop, continuity of current flow and resistance in insulations, Practice handling and storing electrical fixtures and materials used for domestic wiring, practice of placing electrical earthing pipes and plates in to the ground, Select and use PPEs as per electrical work requirement.		
4	**Assemble, install and maintain temporary LV electrical panels (distribution boards) at construction site** Visual checking to be carried out to electrical fixtures and materials such as cabinet/ frame, switches, sockets, circuit breakers, wires to be used for assembling temporary panel/ distribution board (DB) to ascertain their usability as per specified acceptance criteria, Selection and use of general and electrical safety gears, Determining power rating of fixtures to be used in panel/ DB, Installing electrical fixtures such as switches, sockets etc. to the panel/ DB as per their provision, Carry out connection electrical fixtures by wires within the panel/DB, Selection of cable- single/three phase for connecting the panel to the main power source. Practice of electrical earthing of panel/DB, Connecting panel/ DB to main power source Method of termination at power source, Practice of electrical tests to be carried out to inspect proper function of panel/DB using appropriate devices. Repairing and replacement of faulty parts with respect to technical specification and power rating of the same, Preparation of reports, documents regarding repairing/ maintenance at specified formats	40	15
5	**Work effectively in a team to deliver desired results at the Workplace** The skills will be developed and practiced while carrying out following trade related activities in a predictable and familiar working condition, Selection of materials, tools or devices for defined purpose under, Handling electrical material, fixtures and device. Carrying out conduit laying and cable laying, Carrying out assembling of temporary panel/ distribution board, Undertaking electrical tests by using measuring devices, Selection and handing over of desired/ appropriate tools/ materials while assisting trade senior	8	5
6	**Plan and organize work to meet expected outcomes** The skills will be developed and practiced while carrying out following trade related activities in a predictable and familiar working condition, Selection of materials, tools or devices for defined purpose in an optimum manner, Handling electrical tools, Material, fixtures and device, Prioritize all works/ activities. Planning conduit laying and cable laying as per scope, Carrying out assembling of temporary panel/ distribution board, Optimum use of resources while performing task, Adherence to stipulated timelines for completion of electrical, activities/ tasks.	8	5
7	**Work according to personal health, safety and environment protocol at construction site** The skills will be developed and practiced while carrying out following trade related activities in a predictable and familiar working condition., Selection of PPEs and use them appropriately as per working need of electrical operations, handling, storing, stacking and shifting of electrical fixtures, light units, tools and devices. Selection of PPEs and use them appropriately as per working need of cutting conduit, drilling in walls, termination at the main power source, Analysis of hazards involved to electrical circuits/ connections by external effects and taking necessary steps or informing to seniors, Identification of locations, situations/circumstances, malpractices which can be hazardous for general or electrical works. Selection of fire extinguisher based on classification of fire, standard practice of storing & stacking firefighting equipment/ materials at work locations, Disposal of waste materials as per their nature and effects on weather	9	5
	Total	**200**	**100**

Suggested Distribution Of Theory Marks Using Bloom's Taxonomy

Level	Remembrance	Understanding	Application	Analyze	Evaluate	Create
Weightage	30	30	20	20	0	0

NOTE : This specification table shall be treated as a general guideline for the students and the teachers. The actual distribution of marks in the question paper may vary slightly from above table.

Course Outcomes

At the end of this course, students will be able to:	
CO1	Proficiently select, use, and maintain hand tools, power tools and electrical devices required for construction electrical works, ensuring safety and adherence to manufacturers' guidelines.
CO2	Demonstrate competency in installing, inspecting, and maintaining temporary lighting arrangements at construction sites, following industry standards and safety protocols.
CO3	Apply electrical principles and interpret electrical wiring symbols to effectively install and repair low voltage (LV) electrical wiring in permanent structures, ensuring compliance with safety norms and guidelines..
CO4	Work collaboratively in a team, demonstrating effective communication, organization, and adherence to personal health, safety, and environmental protocols at construction sites, contributing to the successful completion of electrical tasks.

Reference Books

1.	**Electrical Wiring Residential** By Ray C. Mullin and Phil Simmons | Cengage Learning
2.	**Electricity for the Trades** By Frank Petruzella | McGraw-Hill Education
3.	**Ugly's Electrical References** By George V. Hart | Jones & Bartlett Learning
4.	**Electrical Systems Based on the 2020 NEC** By P. Hartwell and F. Holzman | Delmar Cengage Learning
5.	**Practical Electrical Wiring: Residential, Farm, Commercial, and Industrial** By Frederic P.Hartwell | McGraw-Hill Education

Program	BACHELOR OF VOCATION (B.Voc.)	**Semester - 1**
Type of Course	-	
Prerequisite		
Rationale	NA	
Effective From A.Y.	2024-25	

Teaching Scheme (Contact Hours)				Examination Scheme				
				Theory Marks		Practical Marks		Total Marks
Lecture	Tutorial	Lab	Credit	SEE T	IAT	SEE P	CCE	
0	0	16	6	-	-	100	100	200

***SEE** - Semester End Examination, **IAT** - Internal Assessment Test, **CCE** - Continues & Comprehensive Evaluation*

Course Content

T - Teaching Hours | **W** - Weightage

Sr.	Topics	T	W
1	**Introduction to Solar Photo Voltaic Modules.** Introduction to basics of Solar Photo Voltaic Modules , Understand the role of Solar PV Installer and job opportunities, Acquire basic skills of communication, Acquire basic reading capabilities to enable reading of signs, notices and/or cautions at site Identification and rectification of problem/ causes of minor/major problems or replaces faulty modules, Communicate the problems identified and educate on possible reasons.Understand the DO's and Don'ts of material handling	60	40
2	**Basics of Solar Photovoltaic systems** Understand the movement of the sun and its effect on the performance, Understand terminology used in solar industry, Understand and acquire know-how many different Types, sizes and specifications of modules available, Read and Interpret the manufacturing data specification sheets, Select the right footing/foundation as per site location including suitability of roof condition or suitability of soil.	40	25
3	**Site Survey for Solar PV modules** Understand how to observe Sun path diagram and shading analysis; Understand and assess the site conditions for safe installation of Solar PV system; Identify the load to be connected to the Solar PV system Read and Interpret the Single Line Diagram,Layout Diagrams,Civil/Mechanical and Electrical Drawings.	15	5
4	**Health and safety** Explain the im portance of personal protective equipment (PPE) required for Cutting and Welding ,State the causes for accidents,Identify job site hazardous work and state possible causes of risk or accident at the workplace, the importance of "5S" at the workplace Identify the personal protective equipment used for the specific purpose, Identify the hazards associated with photovoltaic installations, Identify work safety procedures and instructions for working at height, Understand Occupational health & Safety standards and regulations for installation of Solar PV system.	35	10
5	**Emergencies, rescue and first aid procedure** Administer first aid in case of bleeding, burns, choking, electrical shock, poisoning, etc., Use of CPR process, Bandage wounds,Explain stages of crisis and crisis management, Prepare an incident report	20	10
6	**Work effectively with others**	30	10

Course Content

T - Teaching Hours | **W** - Weightage

Sr.	Topics	T	W
	Explain the importance of team work and team dynamics, State 4Cs of working in a team, Explain types of communication, Apply effective communication, technique, Demonstrate active listening skills, Demonstrate good customer services kills, Explain the, importance of ethical, behaviour in your day-to-day work, State the importance of discipline in life and apply the same at workplace.		
	Total	**200**	**100**

Suggested Distribution Of Theory Marks Using Bloom's Taxonomy

Level	Remembrance	Understanding	Application	Analyze	Evaluate	Create
Weightage	30	20	40	10	0	0

NOTE : This specification table shall be treated as a general guideline for the students and the teachers. The actual distribution of marks in the question paper may vary slightly from above table.

Course Outcomes

At the end of this course, students will be able to:	
CO1	Understanding of functioning of major equipments of Solar PV Modules.
CO2	Installation of Solar PV Modules, Its Service and Maintenance
CO3	Identification and rectification of problem/ causes of minor/major problems.
CO4	Basic health and safety practices at the workplace and identify risks and hazards at workplace, use of PPE, and apply good housekeeping practices, etc.
CO5	Work effectively and communicate with others and demonstrate good ethical practices and discipline.

Reference Books

1.	**Electrical Wiring Residential** By Ray C. Mullin and Phil Simmons | Cengage Learning
2.	**Electricity for the Trades** By Frank Petruzella | McGraw-Hill Education
3.	**Ugly's Electrical References** By George V. Hart | Jones & Bartlett Learning
4.	**Electrical Systems Based on the 2020 NEC** By P. Hartwell and F. Holzman | Delmar Cengage Learning
5.	**Practical Electrical Wiring: Residential, Farm, Commercial, and Industrial** By Frederic P.Hartwell | McGraw-Hill Education

Course Outcome

After Learning the Program the students shall be able to:
NA