



GUJARAT TECHNOLOGICAL UNIVERSITY
Syllabus for Bachelor of Vocation (B.Voc.), 4th Semester
Branch: Solar & Renewable Energy
Subject Name: Construction Technician Wind Power Plant
Subject Code: 1140708

Type of course: Elective

Prerequisite: None.

Rationale: Construction Technician (Electrical) -Wind Power Plant is expected to inspect, diagnose, troubleshoot and repair electrical & instrumentation systems of wind power plant. This program is aimed at training candidates for the job of a “Construction Technician (Electrical) - Wind Power Plant”, in the “Green Jobs”

Teaching Scheme and Examination Scheme:

Teaching Scheme			Credits	Examination Marks				Total Marks
L	T	P		Theory Marks		Practical		
			C	ESE (E)	PA(M)	ESE (V)	PA (I)	
0	0	15	15	0	0	100	100	200

L- Lectures; P- Practical; OJT- On Job Training; C- Credit; ESE- End Semester Examination; PA- Progressive Assessment

Course Content:

Sr. No.	Topic	No. of hours	% Weightage
01	<p>Introduction to Wind Power Sector: Identify different types of Wind technology and overview of Wind power sector in India. Understand the various market research reports and industrial magazines present in the market. Identify the different types of wind power plant, its components and working principles. Understand basics of electrical concepts like voltage, current, power, energy, etc. Explain the benefits of wind energy over conventional sources of energy. Describe the typical specifications, functioning, operating principle, maintenance requirements, warranties, and safe operating & handling procedures of different Wind power plant components like Blades, towers, motors, monitoring system and other components</p>	24	12
02	<p>Carry out installation of Electrical components of wind power plant : Select the appropriate PPE (Personal Protective Equipment) to carry out the specific activity. Identify the relevant technical drawings and schematic drawing. Prepare site for erection of electrical components. Assist seniors at site in materials planning and handling. Conduct route survey for each WTG base point. Arrange all tools, tackles, equipment and associated components. Carry out the erection of the tower shells as per standard operating procedures. Carry out torqueing of the joints to ensure optimum tightness. Carry out the correct placement of the nacelle assembly at the top of the tower shell. Carry out the proper alignment of the nacelle assembly with the centre of tower foundation. Modern wind turbine technologies, Fixed and Variable speed wind</p>	52	26



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	turbines, Induction Generators, Doubly-Fed Induction Generators and their characteristics, Permanent Magnet Synchronous Generators, Power electronics converter, Generator Converter configurations, Converter Control. Carry out alignment of turbine hub gearbox assembly with the turbine generator gearbox assembly. Install anemometer as per schematic drawing.		
03	<p>Perform testing and commissioning of Electrical components of wind power plant :</p> <p>Select The Appropriate PPE (Personal Protective Equipment) To Carry Out The Specific Activity. Assess The Work Area And Prepare For Carrying Out Testing And Commissioning. Identify Required Approvals And Permit To Work (PTW) From The Concerned Authority. Arrange For The Relevant Tools For Carrying Out The Testing And Commissioning Of WTG. Visually Inspect Each Electrical Equipment. Carry Out Visual Inspection Of WTG To Ensure Absence Of Damage, Defects Or Any Signs Of Deterioration. Check And Ensure Tightness And Torqueing Of All Joints In The Wind Turbine Tower As Per Design Specifications. Check And Ensure The Turbine Hub As Per Design Specifications. Check And Ensure The Alignment Of WTG With Shell Foundation As Per Design Specification. Carry Out The Greasing And Lubrication Of WTG Gear Box As Per Design. Carry Out The Calibration Of All Relevant Control And Monitoring Equipment As Per Design Specifications And Ensure Their Proper Functioning. Assist In The Commissioning Of WTG As Per Standard Operating. Procedures. Record And Document All Readings As Per Relevant Industry Standards.</p>	52	26
04	<p>Perform basic health and safety practices at power project site (Ground and Height):</p> <p>Select the relevant protective clothing/equipment for specific tasks and work. State the name and location of relevant documents and people responsible for health and safety in the project site. Identify possible causes of risk at project site and their mitigation measures. Identify and follow warning signs on site. Establish safe working procedures at the project site. Ensure safe working practices when working at heights, confined areas and trenches. Identify methods of accident prevention in the work environment. Follow safe operating procedures for lifting, carrying and transporting heavy objects & tools. Inspect the project site on a regular basis for any signs of spillage. Ensure safe storage of flammable materials and machine lubricating oil. Apply good housekeeping practices at all times by removal/disposal of waste products. Inform relevant authorities about any abnormal situation/behaviour of any equipment/system promptly. Competent, the user/ individual must be able to: Exhibit the use of various appropriate fire extinguishers on different types of fires correctly. Demonstrate rescue techniques applied during fire hazard. Administer appropriate first aid to victims were required e.g. in case of bleeding, burns, choking, electric shock, poisoning etc. Respond promptly and appropriately to an</p>	54	27



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	accident situation or medical emergency in real or simulated environments. Participate in emergency procedures: raising alarm, safe/efficient, evacuation, correct means of escape, correct assembly point, roll call and correct return to work. Report the accident to the relevant authority in the prescribed format.		
05	Work effectively with others: Accurately pass on information to the authorized persons who require it and within agreed timescale and confirm its receipt. Assist others in performing tasks in a positive manner where required and possible. Consult and assist others to maximize effectiveness and efficiency in carrying out tasks. Display appropriate communication etiquette while working. Display active listening skills while interacting with others at work. Demonstrate responsible and disciplined behaviours at the workplace. Escalate grievances and problems to appropriate authority as per procedure to resolve them and avoid conflict. Identify the need for common grounds with clients, team members, etc. and negotiate in an effective manner to achieve the same. Consider and respect the opinions, creativity, values, beliefs and perspectives of others. Ensure collaboration and group participation to achieve common goals. Promote a friendly, co-operative environment that is conducive to employee's sense of belonging. Facilitate an understanding and appreciation of the differences among team members.	18	09
	Total	200	100

Reference Books:

1. T. Ackermann, "Wind Power in Power Systems", John Wiley and Sons Ltd., 2005.
2. G. M. Masters, "Renewable and Efficient Electric Power Systems", John Wiley and Sons, 2004.
3. Phi Learning, "Wind Power Technology", by Joshua Earnest and Sthuthi Rachel, 2019

Course Outcome:

After learning the course the students should be able to:

Sr. No.	CO Statement	Marks Weightage%
CO-1	Carry out the installation of Electrical Components of wind power plants.	26%
CO-2	Perform testing and commissioning of electrical components of wind power plants	26%
CO-3	Perform basic health and safety practices at project site	27%
CO-4	Work effectively with others.	21%

List of Open Source Software/learning website:

1. <https://nptel.ac.in>
2. <http://web.mit.edu/renewable-iap09>
3. <https://www.digimat.in/index.html>