DIPLOMA PROGRAMME IN POWER STATION ENGINEERING

1. SALIENT FEATURES

1) Name of the Programme : Diploma Programme in **Power Station Engineering**

2) Duration of the Programme : Three years (Six Semesters)

3) Entry Qualification : Matriculation or equivalent as prescribed by State Board of Technical Education, **Haryana**.

4) Intake : 40/60 (or as prescribed by the Board)

5) Pattern of the Programme : Semester Pattern

6) Ratio between theory and Practice : 45 : 55 (Approx.)

7) **Industrial Training:**

Six weeks of industrial training is included after IV semester during summer vacation. Internal assessment out of 50 marks and external assessment out of another 50 marks will be added in 5th semester. Total marks allotted to industrial training will be 100.

Distribution of Marks:

- Daily diary and reports of training - 50 Marks
- Viva Voce (External) - 50 Marks

8) Ecology and Environment:

As per Govt. of India directives, a subject on Environmental Education has been incorporated in the scheme.

9) Entrepreneurship Development:

A subject on Entrepreneurship Development and Management has been incorporated in the scheme.

10) Student Centred Activities:

A provision of 5-6 hrs per week has been made for organizing Student Centred Activities for overall personality development of students. Such activities will comprise of co–curricular activities like extension lectures, library studies, games, hobby clubs e.g. photography, painting, singing, seminars, declamation contests, educational field visits, N.C.C., NSS, Cultural Activities, Civil Defence/ Disaster Management activities etc**.**

2. EMPLOYMENT OPPORTUNITIES AND JOB/ACTIVITY PROFILE OF DIPLOMA HOLDERS IN POWER STATION ENGINEERING

(A) EMPLOYMENT OPPORTUNITIES

It is observed that employment in government/public sector undertakings are decreasing day by day. Keeping present scenario in view following employment opportunities are visualized in different sectors of employment for diploma holders in power station engineering

(1) Government Departments such as Electricity Board, MES, PWD, Railways, Air bases, Airports, Defence, Thermal, Hydro and Nuclear Power Stations and other Boards and Corporations

These diploma holder will be involved in following type of activities in above mentioned Government Departments:

- Assistance in planning and design of electrical generation, transmission, distribution and protection system including testing, quality control
- Estimating for electrical installation
- Construction, erection and commissioning of lines and Sub-stations
- Electrical Safety measures
- Operation and maintenance of lines and sub-stations/underground cables
- Tariffs and Calculations of bills for consumption of electricity
- Inventory Management
- Repair and maintenance of electrical machines/ power equipment
- Operation and maintenance of thermal, hydro and nuclear power stations

(2) Manufacturing Industry

The diploma holder in Power Station Engineering will be involved in following activities in mechanical manufacturing industry:

- Planning and execution for Electrical installation
- Diesel Generation and Diesel Generating Set Maintenance
- Distribution of Electrical Power
- Maintenance of Industrial Electrical System
- Repair and Maintenance of Electrical Machines and Equipment
- Repair and Maintenance of Electronic Control Circuitry
- Testing and Standardization for Quality Control

- Energy Conservation
- Energy Auditing
- Manufacturing non conventional energy devices

(3) Hospitals, Commercial Complexes, Service Sector Organizations like Hotels, Tourist-Resorts, high-rise buildings, Cinema/Theater Halls etc.

These diploma holders will be involved in following type of activities in above mentioned Service Sector Organizations:

- Layout of wiring circuit, planning and execution for Electrical Installation
- Standby or captive Power Generation and its Distribution
- Maintenance of Electrical and Electronic Equipment
- Preventive Maintenance of Communication System, Lifts, Air-Conditioning Plants and Water Supply System
- Inventory Management
- Estimation for electrical repair and maintenance work

(4) Self Employment

Following type of self employment opportunities are available to these diploma holders :

- Trading of Electrical Goods
- Establishing Repair and Maintenance Unit/ Centre
- Free Lancer for Repair and Maintenance of House-hold Electrical and Electronic Gadgets such as: Washing Machines, Geysers, Air Conditioners, Coolers and electrical installations etc.
- Electrical contractor
- Motor Winding Unit
- Auto-electrical Work
- Service sector

They can also work as:

- Service and marketing engineer in the field of automation.
- Trainer of PLC and SCADA system.
- TSE (Technical Support Executive)

3. COMPETENCY PROFILE OF DIPLOMA HOLDER IN POWER STATION ENGINEERING

Keeping in view the employment scenario and requirement of four domains of learning viz. professional development domain, continued learning domain, human relations domain and personal development domain, a diploma holder in power station engineering should attain:

(1) knowledge and awareness of various types of electrical power generating plants/stations viz hydro, thermal, nuclear, wind etc

(2) knowledge, awareness and understanding of equipment used in different types of power plants/stations

(3) ability to read and interpret drawings related to electrical power system, motor control system using Programmable Logic Controllers (PLCs), Micro-Processor and Microcontroller based Process Control and protection systems, Electrical machines, equipment, wiring installations for light and power

(4) competency in selection of right kind and quality of materials and preparation of estimates for installation of control panels used in industry

(5) ability to use measuring instruments, tools and testing devices for varied field applications

(6) ability to prepare tender document as per given drawings (i.e to prepare tender for material to be purchased)

(7) understanding of constructional details, principle of working, characteristics and application of power station equipment, electrical machines, appliances and instruments

(8) understanding of salient features and working principles of generation, transmission, distribution, protection and utilization of electrical power in different sectors

(9) understanding of practices involved in erection, testing/installation and commissioning of electrical machines, equipment, control panels and systems

(10) competency in the design of control circuits for electrical machine control, control panels, wiring circuits etc.

(11) ability to carry out fault diagnosis and repair of electrical machines, wiring installations, equipment and control systems

(12) knowledge and awareness of:

- Power Tariff (Power Trade and Control)
- Indian Electricity rules, codes and Standards
- Electrical Safety and Shock prevention Measures
- Labour Management
- Team Working, Interpersonal Relations and Human Values
- Entrepreneurship Development (Self Employment)
- Concern for wastage
- Energy Management and Auditing

(13) understanding of safety practices such as earthing, fire and shock prevention measures adopted in industry and service sector

(14) understanding the principles of basic and digital electronics, microprocessors and micro-controller based systems and their applications in electrical control circuits

(15) ability to use Information Technology and computers for various applications in the field of electrical engineering

(16) knowledge of applied and engineering sciences for better comprehension of technologies used in electrical industry and service sector and to develop scientific temper, analytical skills and to facilitate continuing education

(17) competencies in general, manual and machining skills for supervising shop floor/ work site operations

(18) Ability to manage self for self development i.e. intellectually, physiologically, psychologically.

(19) Proficiency in oral and written communication, technical report preparation, managing relationship with juniors, pears and seniors for effective functioning in the world of work competency to communicate (oral and written) effectively in the professional life and develop self-learning habits

(20) Ability to collaborate, managing different tasks and to solve unstructured problems related to various functional areas of electrical engineering may it be prototype development, diagnostic and fault finding or repair and maintenance of plant and equipment

(21) understanding of basic principles of managing men, material and equipment and competency in organising men, material and machinery on shop floors techniques of achieving economy and quality

(22) awareness about the environment, use of non-conventional energy sources, external financial and technical support system, adopting energy conservation techniques

(23) Knowledge of latest trends in the field of instrumentation and various applications ie utilization of electric energy including Electric Traction

4. DERIVING CURRICULUM AREAS/SUBJECTS DERIVED FROM COMPETENCY PROFILE

Sr. No.	Competency Profile	Curriculum Areas / Subjects
1.	knowledge and awareness of various types of electrical power generating plants viz hydro, thermal, nuclear, wind etc	- Various Electrical Power Generating Stations
2.	knowledge, awareness and understanding of equipment used in different types of power plants	- Equipment and machinery used in different power plant and sub-stations
3	ability to read and interpret drawings related to Electrical Power System, motor control system using Programmable Logic Controllers (PLCs), Micro-Processor and Microcontroller based Process Control and protection systems, Electrical machines, equipment, wiring installations for light and power	- Basic Graphic and Drawing Skills - Drawings of Electrical Machines, Equipment, Installation and Control System - PLCs and Microcontrollers
4.	Competency in selection of right kind and quality of materials and preparation of estimates for installation of control panels used in industry	- Electrical and Electronics Engg, Materials - Electrical Engineering Drawing - Electrical Estimation and Costing
5.	Ability to use measuring instruments, tools and testing devices for varied field applications	- Electrical and Electronic Instruments and Measurements - Instrumentation
6.	ability to prepare tender document as per given drawings(i.e to prepare tender for material to be purchased)	- Electrical Estimation and Costing - Engineering Drawing - AutoCAD
7.	Understanding of constructional details, principle of working, characteristics and application of electrical machines, equipment, appliances and instruments	- Electrical Machines - Utilization of Electrical Energy
8.	Understanding of salient features and working principles of generation, transmission, distribution, protection and utilization of electrical power in different sectors	- Transmission and Distribution of Electrical Power - Generation and Protection of Electrical Power
9.	Understanding of practices involved in erection/installation and commissioning of electrical machines, equipment, control panels and systems	- Erection, Commissioning and Operation of Electrical Machines and - Installations of electrical Equipment and Control Panel etc

Sr. No.	Competency Profile	Curriculum Areas
10.	Competency in the design of control circuits for electrical machine control, control panels, wiring circuits etc.	- Design and Drawing of wiring and Control circuits - Electrical Workshop Practice
11.	Ability to carry out fault diagnosis and repair of electrical machines, wiring installations, equipment and control systems	- Testing, repair and maintenance of Electrical Machines and other Installations and Control System
12.	Knowledge and awareness of: - Power Tariff (Power Trade and Control) - Indian Electricity rules, codes and Standards - Safety and Shock prevention Measures - Labour Management - Team Working, Interpersonal Relations and Human Values - Entrepreneurship Dev. (Self Employment) - Concern for wastage	- Electrical Safety Measures - Basics of Management - Project Work - Industrial Training - Generic Skills Development - Entrepreneurship Development - Generic Skills Development
13.	Understanding of safety practices such as earthing, fire and shock prevention measures adopted in industry and service sector	- Electrical Workshop Practice
14.	Understanding the principles of basic and digital electronics, microprocessors and micro-controller based systems and their applications in electrical control circuits	- Basic Electronics - Digital Electronics and applications - Programmable Logic Controllers (PLCs) and Microcontrollers - Microprocessor based Process Control
15.	Ability to use Information Technology and computers for various applications in the field of electrical engineering	- Basics of Information Technology - Computer Programming and Applications
16.	Knowledge of applied and engineering sciences for better comprehension of technologies used in electrical industry and service sector and to develop scientific temper, analytical skills and to facilitate continuing education	- Applied Physics - Applied Chemistry - Applied Mathematics - Workshop Practice (Electrical and Mechanical)
17.	Competencies in general, manual and machining skills for supervising shop floor/ work site operations	- Workshop Practice - Electrical Workshop Practice - Industrial Training
18	Ability to manage self for self development i.e. intellectually, physiologically, psychologically.	- Employability Skills

Sr. No.	Competency Profile	Curriculum Areas(Subjects)
19.	Proficiency in oral and written communication, technical report preparation, managing relationship with juniors, pears and seniors for effective functioning in the world of work competency to communicate (oral and written) effectively in the professional life and develop self-learning habits	- Communication Techniques/ Skills - Project Work - Exposure to World of Work - Entrepreneurship Development and Management - Employability Skill - Personality Development
20..	Ability to collaborate, managing different tasks and to solve unstructured problems related to various functional areas of electrical engineering may it be prototype development, diagnostic and fault finding or repair and maintenance of plant and equipment	- Repair and Maintenance of Electrical Installations - Electrical Engineering Drawing, - Estimation and Costing in Electrical Engineering - Employability Skills
21.	Understanding of basic principles of managing men, material and equipment and techniques of achieving economy and quality, labour laws, Intellectual Property Rights(IPR)	- Entrepreneurship Development and Management
22	Awareness about the environment, use of non-conventional energy sources, external financial and technical support system, adopting energy conservation techniques	- Environmental and Entrepreneurial Awareness - Sources of Electrical Energy and Management
23	Knowledge of latest trends in the field of instrumentation and various applications ie utilization of electric energy including Electric Traction	- Instrumentation - Optical Fibre Communication - Electric Traction

5. ABSTRACT OF CURRICULUM AREAS/SUBJECTS

a) Basic Sciences and Humanities

1. Communication Skills – I & II
2. Employability Skills – I & II
3. Environmental Education
4. Entrepreneurship Development and Management

b) Applied Sciences

5. Applied Mathematics –I& II
6. Applied Physics I & II
7. Applied Chemistry I & II

c) Basic Courses in Engineering/Technology

8. Engineering Drawing - I & II
9. General Workshop Practice - I & II
10. Basics of Information Technology

d) Applied Courses in Engineering/Technology

11. Fundamentals of Electrical Engineering
12. Electronics-I
13. Electrical and Electronics Engineering Materials
14. Electrical Measurements and Measuring Instruments
15. Electronics-II
16. Electrical Machines I&II
17. Electrical Workshop Practice
18. Estimating and Costing in Electrical Engineering
19. Electrical Engineering Design and Drawing
20. Electrical Power Stations
21. Energy Sources and Management of Electrical Energy
22. Computer Programming and Applications
23. Industrial Electronics and Control of Drives
24. Digital Electronics and Microprocessors
25. Electrical Power-II
26. Minor Project Work

27. Energy Management
28. Transmission and Distribution of Electrical Power
29. Electrical Protection
30. PLCs and Microcontrollers
31. Major Project Work

6. HORIZONTAL AND VERTICAL ORGANISATION OF THE SUBJECTS

Sr. No.	Subject	Distribution of time in various semesters					
		I	II	III	IV	V	VI
1.	Communication Skills	5	5	-	-	-	-
2.	Applied Mathematics	5	5	-	-	-	-
3.	Applied Physics	6	6	-	-	-	-
4.	Applied Chemistry	5	5	-	-	-	-
5.	Basics of Information Technology	4	-	-	-	-	-
6.	Engineering Drawing	6	6	-	-	-	-
7.	General Workshop Practice	6	6	-	-	-	-
8.	Electrical and Electronics Engineering Materials	-	-	4	-	-	-
9.	Fundamentals of Electrical Engineering	-	6	-	-	-	-
10.	Electronics	-	-	6	7	-	-
11.	Electrical Engineering Design and Drawing	-	-	6	6	-	-
12.	Computer Programming and Applications	-	-	6	-	-	-
13.	Electrical Workshop Practice	-	-	6	-	-	-
14.	Electrical Machines	-	-	-	7	7	-
15.	Electrical Measurements and Measuring Instruments	-	-	6	-	-	-
16.	Instrumentation	-	-	-	6	-	-
17.	Estimating and Costing in Electrical Engineering	-	-	-	4	-	-
18.	Energy Sources and Management of Electrical Energy	-	-	-	4	-	-
19.	Employability Skills	-	-	-	-	2	2
20.	Electrical Power Station	-	-	-	-	5	-
21.	Industrial Electronics and Control of Drives	-	-	-	-	7	-
22.	Digital Electronics and Microprocessors	-	-	-	-	8	
23.	Environmental Education	-	-	-	-	3	-
24.	Minor Project Work	-	-	-	-	3	-
25.	Energy Management	-	-	-	-	-	4
26.	PLCs and Microcontrollers	-	-	-	-	-	8
27.	Transmission and Distribution of Electrical Power	-	-	-	-	-	5
28.	Electrical Protection	-	-	-	-	-	5
29.	Entrepreneurship Development and Management	-	-	-	-	-	3
30.	Project Work	-	-	-	-	-	8
31.	Student Centered Activities	3	1	6	6	5	5
	Total	**40**	**40**	**40**	**40**	**40**	**40**