

ELECTRONICS ENGINEERING
(Specialisation In Power Electronics)
(For the State of Haryana)

1. SALIENT FEATURES OF THE PROGRAMME

- 1) Name of the Programme : Diploma Programme in **Electronics Engineering (specialization in Power Electronics)**
- 2) Duration of the Programme : Three years (6 semesters)
- 3) Entry Qualification : Matriculation or equivalent as prescribed by State Board of Technical Education, **Haryana**
- 4) Intake : 60
- 5) Pattern of the Programme : Semester Pattern
- 6) Ratio between theory and Practical : 50 : 50 (Approx)
- 6) **Industrial Training:**
 A minimum duration of four weeks of industrial training is included after 4th semester during summer vacation. An Internal assessment out of 50 marks and an external assessment out of another 50 marks have been added in 5th semester. Total marks allotted to industrial training will be 100. The distribution of Marks is as below:

➤ Daily diary and reports of training	-	50 Marks
➤ Viva Voce	-	50 Marks
- 7) **Ecology and Environment :**
 As per directives of Government of India directives, a subject on Environmental Education has been incorporated in the scheme.
- 8) **Entrepreneurship Development:**
 A subject on Entrepreneurship Development and Management has been incorporated in the scheme.
- 10) **Personality Development**
 A camp focusing on personality development of students has been incorporated in the fifth semester. There will be assessment under SCA.
- 11) **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 ACTIVITY PROFILE OF DIPLOMA HOLDERS IN ELECTRONICS ENGINEERING (SPL IN POWER ELECTRONICS)

An exercise, to have first hand information about employment opportunities and activity profile of diploma engineers in the field of electronics, was done by Curriculum Development Centre of National Institute of Technical Teachers' Training and Research, Chandigarh. The feedback from industries and other organizations has revealed that diploma holders in Electronics Engineering (Spl In Power Electronics) find employment in the following organizations:

(A) EMPLOYMENT OPPORTUNITIES

Various Departments/ organizations/boards and corporations

- 1) Power Stations, Electricity Boards, Corporations etc.
- 2) Tele-Communication Engineering and related Departments
- 3) AIR, Doordarshan
- 4) Overseas Communication
- 5) Radar and Wireless
- 6) Railways
- 7) Defence Services, Para-military Forces
- 8) Civil Aviation
- 9) Defence Research and Development Organizations
- 10) Airport Authority of India (Airports)
- 11) Research and Development Department
- 12) Maintenance Department.
- 13) Engineering Institutions

Industry

- 14) Public Sector Undertakings (like BHEL, BEL, HAL, etc)
- 15) Consumer Electronics Industry
- 16) Instrumentation and Control Industries
- 17) Medical Electronics Industry
- 18) Automation and Control Industry (viz bottling plant, cement plant, automobile units, escalators etc.

- 19) Inverters on-line and off-line UPS manufacturing Industries
- 20) Electric Traction
- 21) Aero space power supply
- 22) Automation Industries

Development/Testing Laboratories/Organizations

- 23) Electronics Service Centres
- 24) Hospitals
- 25) Educational Institutions (ITIs, Vocational Schools, Technical Institutions etc)
- 26) Sales and Services of Electronic Gadgets from Small Scale Industries
- 27) Lighting System Manufacturing(Dimmer Set etc.)

Self Employment

- Marketing and Sales (Distributors - whole sale and retailers)
- Service Sector(repair and Maintenance; job work)
- Preparing Simulated Models
- Manufacturing Unit (e.g.- Bulb manufacturing, Electronic choke manufacturing, circuit manufacturing units etc)
- Microcontroller based home/office Automation
- Security System

(B) JOB/ACTIVITY PROFILE

The diploma holders in Electronics Engineering (Spl In Power Electronics) generally get employed in manufacturing, assembly industries of manufacturing electronics equipment, power sector, automation industry, marketing and servicing organizations. Some of the activities they perform are listed below.

- 1) Reading, interpreting and preparing drawings and circuits in power electronics and related fields
- 2) Preparing estimates for different jobs of installation and maintenance
- 3) Selecting components and devices for simple applications
- 4) Testing the thyristorisd components and equipment
- 5) Supervising the fabrication and assembly work at sub-assembly and final assembly
- 6) Assisting the engineer in quality control of the product being assembled or manufactured
- 7) Assistance to the engineers/scientist doing research/development work by fabricating and testing different power electronic circuits
- 8) Assists in firing and maintenance of guided weapons and launching equipment
- 9) As a self employed person he has to use multifarious activities such as designing PCBs, procuring raw material and components, assemble, manufacture, repair and maintenance, testing and fault diagnosis, sale and service, marketing etc.

3. COMPETENCY PROFILE OF DIPLOMA HOLDERS IN ELECTRONICS ENGINEERING (SPL IN POWER ELECTRONICS)

Keeping in view the job opportunities, activity profile and various domains of learning, the diploma holders in Electronics Engineering (Spl. in Power Electronics) should have following competency profile in terms of knowledge and skills in the students:

- 1) Skills in reading and interpreting drawings pertaining to power electronic circuits, instruments, and equipment
- 2) Understanding of basic principles of electrical and electronics engineering
- 3) Understanding of electrical machines and equipment
- 4) Understanding of basic principles of digital electronics; communication engineering and systems; and industrial electronics
- 5) Knowledge of different electronic devices, components, materials and instruments used in manufacturing and testing of electronic products and power equipment
- 6) Skills in fabrication and testing of different types of electronic circuits and devices by making use of testing and measuring instruments
- 7) Skills in fabrication of PCBs and designing the layout of various instruments, chassis and equipment for wiring/circuit development
- 8) Knowledge of installation and maintenance of
 - PLC based design and drawing (wiring and control circuits)
 - Electronic Telephone Exchanges
 - Microprocessor based Process Control
 - Installation of Electrical Equipment, Control Panels and power electronics equipment
- 9) Knowledge and skills pertaining to installation and maintenance of industrial electronics equipment and system and process control instrumentation
- 10) Proficiency in using information technology tools for information storage, retrieval and dissemination, and making use of computer application software and Networking
- 11) Competency in solving simple problems related to various functional areas of electronics engineering may it be prototype development, diagnostic and fault finding or repair and maintenance of plant and equipment pertaining to:
 - Electronic measuring instruments
 - Electronic consumer goods
 - Communication Systems

- Microcontroller based Process Control
 - PLCs based Control of Drives and Equipment
- 12) Knowledge of microprocessors, microcontrollers and their applications in electronic system
 - 13) Understanding of various relevant standards for testing and quality control in electronics
 - 14) Knowledge of latest trends in the field of communication, industrial automation and instrumentation
 - 15) Knowledge of basic principles of management and entrepreneurship to manage men, material and machines optimally and efficiently, external financial and technical support system
 - 16) Use of non-conventional energy sources and adopting energy conservation techniques
 - 17) Knowledge of applied and engineering sciences for better comprehension of technologies used in electronics and related industry and service sector and to develop scientific temper, analytical skills and to facilitate continuing education
 - 18) Proficiency in oral and written communication, technical report writing, managing relationship with juniors, peers and seniors for effective functioning in the world of work
 - 19) Awareness and knowledge about ecology, environment and pollution control

4. DERIVING CURRICULUM AREAS FROM COMPETENCY PROFILE

Following curriculum areas have been derived from competency profile as identified in Section 3:

Sr. No.	Competency Profile	Curriculum Area/Subjects
1.	Skills in reading and interpreting drawings pertaining to electronic circuits, instruments and power equipment	<ul style="list-style-type: none"> - Engineering Drawing - Electronic Devices and Circuits
2.	Understanding of basic principles of Electrical and Electronics Engineering,	<ul style="list-style-type: none"> - Basic Electrical Engineering - Analog Electronics
3.	Understanding of electrical equipment and machines	<ul style="list-style-type: none"> - Electrical Machines - Electronic Devices and Circuits
4.	Understanding of basic principles of digital electronics; communication engineering and systems; audio video systems and industrial electronics	<ul style="list-style-type: none"> - Digital Electronics - Audio Video Systems - Principles of Communication Engineering
5.	Knowledge of different electronic devices, components, materials and instruments used in manufacturing and testing of electronic products and power equipment	<ul style="list-style-type: none"> - Electronic Components and Materials - Electronic Measurement and Instrumentation
6.	Skills in fabrication and testing of different types of electronic circuits and devices by making use of testing and measuring instruments	<ul style="list-style-type: none"> - Electronic Fabrication - Electronic Measurement and Instrumentation - Electronic Circuits and Devices
7.	Skills in fabrication of PCBs and designing the layout of various instruments, chassis and equipment for wiring/circuit development	<ul style="list-style-type: none"> - PCB Design and Electronic Fabrication - Electronic Workshop - Engineering Drawing - Workshop Practice

Sr. No.	<u>Competency Profile</u>	<u>Curriculum Area/Subjects</u>
8.	Knowledge of installation and maintenance of <ul style="list-style-type: none"> - PLC based design and drawing(wiring and control circuits) - Electronic telephone exchanges - Microprocessor based Process Control - Installation of Electrical Equipment, Control Panels and power electronics equipment 	<ul style="list-style-type: none"> - Fault Diagnosis - Troubleshooting and maintenance of Electronic Equipment - Computer Applications - Communication Systems - Basic Control System
9.	Knowledge and skills pertaining to installation and maintenance of industrial electronics equipment and system and process control instrumentation	<ul style="list-style-type: none"> - Power Electronics - Electrical Machines - Micro Controllers and PLCs
10.	Knowledge and skills in using information technology tools for information storage, retrieval and dissemination, and making use of computer application software	<ul style="list-style-type: none"> - Basics of Information Technology - Computer Applications
11.	Competency in solving simple problems related to various functional areas of electronics engineering may it be prototype development, diagnostic and fault finding or repair and maintenance of plant and equipment pertaining to: <ul style="list-style-type: none"> - Electronic measuring instruments - Electronic consumer goods - communication systems - Microcontroller based process control - PLCs based control of drives and equipment 	<ul style="list-style-type: none"> - Fault Diagnosis and Trouble Shooting of Electronic - PLCs and Applications - Microcontrollers and Applications
13.	Knowledge of microprocessors and their applications in electronic system	<ul style="list-style-type: none"> - Microprocessors and Applications
14.	Understanding of various relevant standards for testing and quality control in electronics	<ul style="list-style-type: none"> - Fault Diagnosis and Trouble Shooting
15.	Knowledge of basic principles of management and entrepreneurship to manage men, material and machines optimally and efficiently	<ul style="list-style-type: none"> - Entrepreneurship Development and Management - Personality Development

Sr. No.	<u>Competency Profile</u>	<u>Curriculum Area/Subjects</u>
16.	Use of non-conventional energy sources and adopting energy conservation techniques	- Non- conventional Energy Sources
17.	knowledge of applied and engineering sciences for better comprehension of technologies used in electronics and related industry and service sector and to develop scientific temper, analytical skills and to facilitate continuing education	<ul style="list-style-type: none"> - Applied Physics - Applied Mathematics - Applied Chemistry
18	Proficiency in oral and written communication, technical report writing, managing relationship with juniors, peers and seniors for effective functioning in the world of work	<ul style="list-style-type: none"> - Communication Skills - Employability Skills - Project Work
19.	Awareness and knowledge about ecology, environment and pollution control	- Environmental Education

5. ABSTRACT OF CURRICULUM AREAS/SUBJECTS

a) Basic Sciences and Humanities

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

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
9. General Workshop Practice I & II
10. Basics of Information Technology

d) Applied Courses in Engineering/Technology

11. Basic Electrical Engineering
12. Analog Electronics I & II
13. Digital Electronics I & II
14. Principles of Communication Engineering
15. Electrical Machines
16. Electronic Instruments and Measurement
17. Electronic Design and Fabrication Technique
18. Computer Programming and Applications
19. Network, Filters and Transmission Lines
20. Communication Systems
21. Instrumentation
22. Microprocessors and Peripheral Devices
23. Power Electronics I & II
24. Microcontrollers and Applications

25. Trouble Shooting of Power Electronic Equipment
26. Optical Fibre Communication
27. High Voltage DC Transmission
28. Basic Control System
29. PLCs and Applications
30. Major Project Work

In addition,

- a) ***Industrial Training after 4th semester and***
- b) ***Personality Development Camp will be organized in 5th Semester.***

