Vision
To be a centre of excellence for promoting education training and research in the field of Electrical Engineering.

Mission
1. To offer continuing education and training programs for the faculty and staff of the technical education system in the area of Electrical Engineering.

2. To develop need-based curricula for technical education programme in the field of Electrical Engineering.

3. To develop instructional material in the field of Electrical Engineering to enhance effectiveness of teachers-learning process.

4. To undertake research and development in the area of Electrical Engineering.

5. To provide extension and consultancy services to technical education system and industry in the area of Electrical Engineering.
Education is all about creating an environment of academic freedom, where bright minds meet, discover and learn. Electrical Engineering is a continuously evolving field with new innovative ideas emerging every other second. As technology has advanced, so have the challenges faced by the fresh engineers and technocrats.

Electrical Engineering is one discipline that naturally partners with other disciplines to open whole lot of new engineering avenues. Examples include Power Electronics - with Power and Electronics Engineering and Bio-medical Sciences - with Medicine. The Electrical Engineering Department at NITTTR, Chandigarh grooms teachers of Polytechnics and Engineering Colleges in this field using new-age information and computer-intensive technologies. It is one of the major departments, created since, the establishment of the institute.

### OBJECTIVES OF THE DEPARTMENT

- To conduct need-based short term training programmes in various areas of Electrical Engineering for teachers of Polytechnics and Engineering Colleges of all over India.

- To run Master degree programmes in Regular and Modular modes with specialization in Instrumentation & Control in order to upgrade the qualifications of the faculty of Polytechnics and

### FUTURE PLANS

The department is planning to take-up two DST sponsored projects as:

(i) Grid Connected Hybrid System consisting of Solar, Wind, Fuel Cell and High Power Storage Batteries

(ii) Energy Park

Proposals are being prepared at the department level which will be soon sent to DST through proper channel for final approval.
Engineering Colleges. Recently the nomenclature of the degree has been changed and the new name of the degree is M.E in Electrical Engineering (Instrumentation and Control).

- To undertake research projects by guiding research scholars in their ME and Ph.D theses.

- To undertake appropriate sponsored projects from various agencies for the enhancement of Technical Education in the country.

- To produce instructional materials, both print and non-print, for the benefit of teachers and students of technical institutions.

- To conduct tailor made training programmes for industry and other working professionals in various thrust areas of Electrical Engineering for upgrading their knowledge.

- To conduct in house training and Industry-Institute interaction programmes to upgrade the knowledge of internal faculty.

- To design, develop, review and modify curricula of various programmes in the current as well as in the emerging areas in order to fulfil identified needs.

- To develop relevant learning resources like text books, laboratory manuals, self-learning modules, multi-media packages, etc.

- To undertake research projects for expanding the horizons of the department in order to reflect changing technologies.

(vii) Virtual Instrumentation Laboratory

This laboratory is being developed recently and various equipments have been purchased such as NI ELVIS II with Circuit design bundle, Mechatronic Sensor board, Quanser Qnet DC motor control,

Quanser Qnet rotary inverted pendulum, Quanser Qnet HVAC trainer, free scale NI Elvis microcontroller prototype board, Vernier Gran Engineering Sensor kit, Vernier Bio-instrumentation sensor,
(v) Process Control Laboratory

This laboratory has facilities for experiments on Microprocessor and PC based process control including flow, level, temperature etc. along with the supporting software.

(vi) Computer Applications Laboratory

The computer applications laboratory has various software packages such as MATLAB, LabVIEW, PSCAD, LIVEWIRE, LADSIM etc. which are used for simulation, design and analysis of various electrical and electronic systems and their control.
LONG TERM TRAINING PROGRAMMES

ME PROGRAMME
The department has been very successfully offering Master of Engineering Course in Instrumentation and Control with a starting Intake of 12 students since 2005. The intake started increasing gradually and the present intake for the above programme has risen to 26. In addition, the department also conducts ME (Instrumentation & Control) Modular Programme with an intake of 40.

The programme educational objectives (PEOs) and Programme Outcomes (POs) of M.E. in Electrical Engineering (Instrumentation and Control) programme are:

Programme Educational Objectives (PEOs)

<table>
<thead>
<tr>
<th>PEO</th>
<th>Objective</th>
</tr>
</thead>
<tbody>
<tr>
<td>PEO1</td>
<td>To develop technical knowledge and skills in the area of Instrumentation and Control at Postgraduate level.</td>
</tr>
<tr>
<td>PEO2</td>
<td>To develop ability to undertake research and development in the areas of Instrumentation and Control.</td>
</tr>
<tr>
<td>PEO3</td>
<td>To develop generic skills such as creativity, problem solving, communication, teamwork, life long learning and leadership as well as professional ethics and values.</td>
</tr>
</tbody>
</table>

Programme Outcomes (POs)

(a) Ability to understand, apply, analyze, evaluate and synthesize existing and new knowledge related to Instrumentation and Control.

Power Electronics Laboratory also has a microprocessor based energy manager, large number of measuring instruments, Solar PV Training and Research Kit and Cascade Multilevel inverter (H-Bridges) which can be interfaced with MATLAB using Dspace unit and Cyclone III FPGA development kit.

(iv) Instrumentation and Control Laboratory

The Laboratory has a set of training boards on Transducers, Process Control, Analog Motor Control, Digital Motor Control and PC based data acquisition system in addition to various sensors, transducers and measuring instruments.
(b) Ability to identify, formulate and solve engineering problems creatively and generate new knowledge etc.
© Ability to design a system component or process as per need and specifications.
(d) Ability to use modern engineering tools, software and equipment related to Instrumentation and Control.
(e) Ability to undertakes collaborate research in multidisciplinary areas for finding solutions to the problems.
(f) Ability to understand professional and research responsibilities and contemporary issues as well as the impact of engineering solutions on the society.
(g) Ability to communicate effectively.
(h) Ability to continuously update knowledge and skills as per the requirement.
(i) Ability to apply the principles of project planning and management, total quality management and technology management for managing the project in Instrumentation & Control and multidisciplinary areas.

SHORT TERM TRAINING PROGRAMMES
The department has also been very active in conducting the need based short term training programmes every year as per the institute Operational Plan. To mention a few are:

iii) Power Electronics Laboratory
In addition to number of training boards in Power Electronics, the laboratory is equipped with trainers on solid state motor control, three-phase triggering system, microprocessor based control systems, stepper motor control, thyristor based universal control kit, etc.
PRINT
To mention a few of the important materials, they are: text books in Electrical Machines, Electrical Engineering Material, Electrical Design and Drawing, Industrial Electronics and Control, Motor Control, Basic Electronics, Projects in Electrical and Electronics Engineering etc, laboratory manuals on Electrical Machines, Basic Electrical Microcontroller and its Interfacing etc. In addition there are several number of work books and student manuals.

NON PRINT
Apart from the print materials, the department has also produced about 30 video films on various topics pertaining to electrical engineering, 26 charts and several experimental kits on Power Electronics, Contactor Control devices and Electrical Machine Winding.

ii) PLC laboratory
The PLC laboratory is equipped with PLC based control system and Advanced PLC Trainer, other interfacing devices to train students how to program and upload ladder logic code. The lab is based primarily on the Allen Bradley family of Programmable Logic Controllers, which are widely used in factories and other settings.
A) FACULTY

(i) Dr. S. Chatterji
ME (Electrical), PhD.
Professor and Head
Email Address: chatterjis@yahoo.com
Ph.No. +91-172-2791552
Mobile No.: +91-9872301552

Membership of National / International Academic Bodies:
- Member, IEEE (USA)
- Fellow, IE (INDIA)
- Life Member, ISTE (INDIA)
- Life Member, NITTTR Alumni Association

Experience:
- Industry - 2 years
- Teaching - 39 years
- Total - 41 years


Research guidance:
- Masters: 115 + 100 (under process) - 225
- Ph.D.: Ph.D degree awarded - 04
- PhD scholars under supervision – 10 (1 are in the pipeline for final submission)

Instructional Material Development: Print

(a) Number of Text Books Published: 3
3. "Power Electronics-Learning by Doing", Co-authored with Dr. SK Bhattacharya, All India Council for Technical Education, New Delhi

FACILITIES AVAILABLE IN THE DEPARTMENT

i) Electrical Machines Laboratory

In addition to various conventional ac and dc machines, one set of universal machine is also available in the laboratory. A part of the Electrical Machines Laboratory is specifically developed for Contactor Control of Electric drives wherein various trainer boards have been developed for performing different exercises in this area.
(b) No of papers Published in:
- International Journals - 46
- National Journals - 15
- International Conferences - 48
- National Conferences - 55
- Patent (in Process) - 02
- Total - 166

(c) No of Lab Manuals: 6
1. Industrial Electronics and Control
2. Thyristor control
3. Electrical Machines I
4. Electrical Machines II
5. Electrical Machines (Hindi)
6. Manual on Applications of Microcontrollers

(d) No of workbooks and others: 2
- Electrical Machines I
- Electrical Machines II

(e) Reports: 15

Non Print
Video Films: 16
- Power Electronics Lab Practices: 15
- Nuclear Power Station Practices: 01

Experimental Setup and Kits: 18
- Power Electronics: 15
- Universal Training Kit: 1
- Design and development of micro-controller based three phase fullwave fully controlled rectifiers: 2

Projects Carried out: Development of an algorithm for point tracking of multiple modules of paralleled photovoltaic system, Digital simulation of a Hybrid Power Flow Controller, Design and Development of a DC Motor Performance Analyser,

(ii) Mrs. R. Jayanthi
- UDC
- ITI
- Experience: 28 Years
- Expertise: Hindi Typing

(iii) Mr. Bhag Singh
- Lab Attendant
- Matric
- Experience: 31 Years

C) REGULAR RESEARCH SCHOLARS REGISTERED IN PUNJAB UNIVERSITY, CHANDIGARH

(i) Mr. M.S. Narkhede,
- Title: Modeling, Multi objective optimization and Analysis of a Virtual Power Plant
- Supervisor: Dr S Chatterji

(ii) Mr. D.S. Karanjkar
- Title: Analytical Design of Fractional Order Controller Based dc-dc Converter for Maximum Power Point Tracking in Solar Photo-Voltaic System
- Supervisor: Dr S Chatterji

(iii) Mr. Ram Murath Singh
- Title: Performance Analysis of a Surface EMG based control scheme of an Exoskeleton Robot
- Supervisor: Dr S Chatterji

B) SUPPORTING STAFFS
   a) Technical Staff
(i) Mr. Hans Raj Sharma  
Senior Technical Assistant  
BE, Industrial Engineering & Management  
Experience: 36 Years  
Expertise: Electrical maintenance, Installation and distribution, Basic electronics  
No of papers Published in:  
National Conference – 1
(ii) Mr. Vinod Kumar Sharma  
Senior Technical Assistant  
ME, Electrical Engineering  
Experience:  
Industry - 3.5 years  
Teaching - 24 years  
Total - 27.5 years  
Expertise: Electrical Machines, Electrical Engineering Laboratory Experiments  
No of papers Published in:  
International Journals – 2
b) Non – Technical Staff
(i) Mrs. Malkeet Kaur  
Personal Assistant  
Experience: 30 Years  
Expertise: Stenography
Membership of National / International Academic Bodies:

- Life Member, NITTTR Alumni Association

Experience:

- Industry: 2 Years
- Teaching: 28 Years
- Total: 30 Years

Area of Specialization: ANN & Fuzzy Logic Applications, Digital Signal Processing, Measurement Instrumentation and Data Acquisition, Virtual Instrumentation

Research guidance:

- Masters: 60

Instructional Material Development:

Print

(a) Number of Books Published: 1

- Electrical Technology for Engineering Services Examinations, co-authored with Dr. S.K. Bhattacharya. TMH Publishing Company, New Delhi

(b) No of papers Published in:

- International Journals: 18
- National Journals: 4
- International Conferences: 11
- National Conferences: 11
- Total: 44

Projects Carried out:
- Design and development of a real time simulation of boost converter
- Design and development of microcontroller based multi-starter for squirrel cage induction motor
- Developing a real time simulation of MPPT based PV array fed cascade multilevel inverter
(c) No of Lab Manuals: 6

(i) Teaching Learning Package on Contactor Control Circuits, A Continuing Education Module, ISTE publication, Co-authored with Dr. S. K. Bhattacharya

(ii) Teaching Learning Package on Reading and Interpreting Engineering Drawing (For Electrical Engineer Technician and Technician Engineers), A Continuing Education Module, ISTE publication, Co-authored with Dr. S. K. Bhattacharya

(iii) A Monograph on Units and Dimensions, TTTI, Chandigarh, Co-authored with Dr. S. K. Bhattacharya

(iv) Installation Trouble-shooting and Preventive Maintenance of Motors, Transformers and Batteries, TTTI, Chandigarh, Co-authored with Dr. S. K. Bhattacharya

(v) Digital Signal Processing, Course Material.

(vi) Programming in C, Course Material.

Projects Carried out: Design and Development of a PC based monitoring system for a three-phase induction motor; Study and Implementation of Digital Signal Processing Tools; Study and Implementation of various DSP transforms; Digital simulation of a three-phase full-wave fully controlled rectifier; Design and development of Neuro-Fuzzy Controllers; Simulation of different FACTS Controllers using MATLAB/SIMULINK, Several consultancy and IRG projects carried out at the institute level which in turn generated funds to the tune of several lacs; Designed and developed the following Instructional material viz., Contactor Control Circuits; Reading and Interpreting Engineering Drawing; A monograph on Units and Dimensions; Installation Trouble-shooting and Preventive Maintenance of Motors, Transformers and Batteries; Signal Processing; Programming in C; MATLAB Programming; Introduction to LabVIEW.

(iii) Ms. Ritula Thakur

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Mobile No.: +91-9888520284

Membership of National / International Academic Bodies:
Life Member, ISTE
Life Member, Institution of Engineers
Life Member, IETE
Life Member, NITTTR Alumni Association
Life Member– IEEE

Experience:
Industry - Nil
Teaching - 10 years
Total - 10 years


Research guidance:
Masters: 25

Instructional Material Development:
Print

No of papers Published in:
- International Journals - 14
- National Journals - 01
- International Conferences - 05
- National Conferences - 17
Total - 37

No of Lab Manuals: 01
Manual on Applications of Microcontrollers Co-authored with Dr. S. Chatterji

Projects Carried out: Temperature measurement using microcontrollers; Stepper motor control using microcontroller, Data Acquisition Using Embedded Processor in FPGA, Designed and developed Instructional manual on Microcontrollers and their Applications.