THE INSTITUTE

National institute of Technical Teachers Training and Research, Chandigarh an ISO 9001-2015 certified institute, is one of the four national institutes established by the Government of India in 1967 for the growth and development of technical education in the country. The institute had the collaboration of the Royal Netherlands Government for a period of seven years in the initial stage. Presently, the outreach of the programmes and activities of the institute covers the entire gamut of technical education. It is now reckoned as a resource institute for the technical education system providing services to its client covering faculty/ staff of technical institutes, officials of directorates/ boards of technical education, central and state government departments, industry, students from technical institutes, community and trainees from overseas. The institute is an autonomous organization registered under the Societies Registration Act 1860. It is managed by a board of governors. Director is the executive head of the institute. The present director of the institute is Professor (Dr.) Shyam Sundar Patnaik. The institute is situated in a well- developed campus in sector 26, Chandigarh covering an area of over 16.94 acres. The institute also has residential campuses in sector 26, 29 and 42. The institute is about 5 km from Chandigarh Railway Station, 5 and 10 km from Inter-State Bus Terminus in Sector 17 and Sector 43 respectively. Chandigarh is also well connected by air.

PROGRAMMES AND ACTIVITIES

The Institute undertakes the following spectrum of activities

- Education and Training programmes.
- Curriculum development
- Instructional material development
- Research and development
- Extension Services
- Consultancy in technical education and Industries.

Areas

Keeping in tune with the various emerging needs of the country, the institute presently extends its services in the following areas as well:

- Media development including information resources, their acquisition, storage and retrieval.
- Entrepreneurship development.
- Industry-Institute interaction.
- Continuing education for working engineers/ technicians.
- Transfer of appropriate technology to rural areas.
- Integrating persons with disabilities with the mainstream of technical and vocational education.

The institute also offers consultancy services to international, national and state level organizations in above areas.

ABOUT THE DEPARTMENT

The department was established in 1967 along with the inception of the institute and has the faculty strength of two Professors, one Associate Professor and one Assistant Professor. The department conducts short- term courses in emerging areas of Applied Sciences - Applied Physics, Applied Chemistry, Applied Mathematics, etc. It has well equipped laboratories: Applied Physics, Laser and Fiber Optics, Optical Fiber Communication and Nanoscience and Nanotechnology. These laboratories have latest equipments like He-Ne and Semiconductor lasers, Bread boards, Fiber optics communication trainers, OFC system design and simulation softwares, Radiation detectors and counting systems, Ultrasonic detectors, Atomic Force Microscope (AFM), Spectrofluorophotometer (PLS), Virtual nanolab (VNL/ATK) software in addition to curricula based experiments in applied physics for graduate and post-graduate courses. The department has published text-books in applied physics and applied mathematics, undertook research studies and developed many teaching/learning modules in these subjects. Some video films have also been prepared on selected topics by the faculty of this department.

VISION

The vision of the department is to be a world class center of excellence in the field of applied science for training of teachers from technical institutions through an integrated package of research and development, education, training and extension services.

MISSION

- To provide professional education and Training to the Teachers of Applied Science and Engineering from Technical institutions for advancement of career and upgradation of knowledge and skills.
- To strive for continuous improvement in research in frontier areas of Applied Sciences.
- To actively support the growth and quality improvement in the field of Applied Sciences and Engineering through involvement in extension services and consultancy at National and International levels.
- To set up state of art laboratories in the field of emerging technologies such as Nanotechnologies, Photonics, Applied Physics and Applied Mathematics.

OBJECTIVES

- To impart quality training to teachers of Polytechnic and Engineering Colleges through Short Term Courses.
- To support teaching and research in all branches of Engineering and Applied Sciences to improve quality and qualifications of faculty of Polytechnics and Engineering Colleges.
- To provide guidance to faculty and other professionals to pursue their Masters and PhD work.
- To organize seminars and conferences to exchange the expertise and knowledge among academia, industry professionals and researchers.
- To conduct in-house training and Industry-Institute interaction for updating knowledge and skill of internal faculty.
- To undertake various research projects for development of Technical Education in the field of Applied Sciences.
- To provide consultancy in development of application specific laboratories in Applied Sciences.
- To impart industrial training to students of Polytechnic and Engineering Colleges.
- To collaborate with industry in various research projects.

GOALS OF APPLIED SCIENCE

Staff Development Programmes

Staff Development Programmes for the teachers of Polytechnics and Engineering Colleges is a priority area of this Institute. In recognition of this, the Applied Science department of the institute is

- Conducting a variety of short-term courses in emerging areas of Science and Technology.
- Providing support for conduct of ICT based training programmes for teachers and other staff of Polytechnics and Engineering Colleges to enable them to acquire competencies relevant to their respective areas of work.
- Providing support to core departments in teaching of long-term M.E. courses.

Instructional Material Development

- Competency based self-learning modules.
- Print/ non print learning materials: text books /workbook /modules / lab manuals/ Video films.

Curriculum Development

- To provide assistance in revision of existing curricula.
- To provide assistance in development of curriculum in emerging technologies.

Research and Development

- To undertake research projects from Government and private funding agencies.
- Undertake new research projects on latest technologies.

Extension Services and Consultancy

- Conducting training programmes for Master Trainers under Skill Developments and Industries.
- Conduct in house training and industry – institute interaction.
- Student Training and Projects.

MAJOR ACTIVITIES OF THE DEPARTMENT

The department conducts Short Term Courses in science and interdisciplinary areas of emerging technologies. The major emphasis of these courses is to develop scientific temper, orientation and training of applied science teachers toward better understanding of technical and engineering education system as well as technical skills. The major training programmes undertaken by the department are:

- Optical Fiber Communication Technology
- Advances in Optical Fiber Communication Technology
- Nanotechnology: Developments and Applications
- OFC Systems: Design and Performance Evaluation
- Nanomaterials: Characterization and Applications
- Lasers and their Applications
- Advances in Laser Technology
- Nuclear Radiations and their Applications
- Fiber Optic Tests and Measurements
- Nuclear Energy and Power Options
- Laboratory Organization and Updating in Applied Physics
- Optical Fibers and their Applications
- Newer Experiments in Applied Physics
- Nuclear Techniques and Instrumentation
- Numerical Methods in Engineering
- Differential Equations with their Engineering Applications
- Advanced Operational Research
- Mathematical Programming Problems
- Optimization Techniques with Engineering Applications
- Integral Transforms with Applications
- Fuzzy Logic in Mathematical Programming Problems
- Mathematical Techniques is Solving Engineering Problems
- Applied Mathematics with Mathematica
- Trends in Fiber Optic Technology
- Laboratory Practices in Applied Physics
- Numerical Methods and Applied Statistics
- Energy Harvesting and Storage Materials and Devices
- Optimization with MATLAB
- Integral Transform with Engineering Applications
- Nuclear Power Technologies
- OFC Systems – Design and Analysis
- Advances in Nanotechnology
- Nanomaterials and Devices
- Nanomaterials, Sensors and Devices
- Quantum and Energy Materials: Potential and Applications

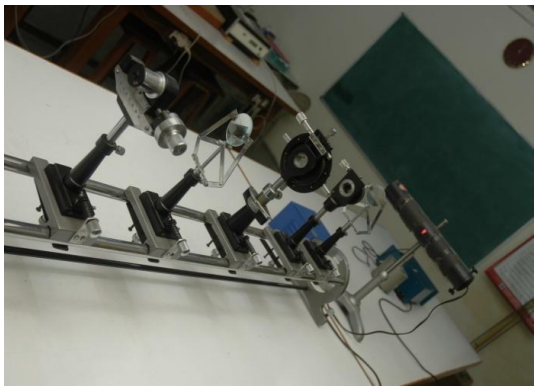
In addition, the department is active in development of instructional material both print and non-print, teaching aids, demonstration models, laboratory manuals and undertakes research studies to identify the corrective actions to be taken for improving the effectiveness of applied science subjects in technical education system.

FACILITIES AVAILABLE IN THE DEPARTMENT

The department has advanced facilities to conduct various courses in the emerging areas of applied sciences. Some of these are:

Applied Physics Laboratory

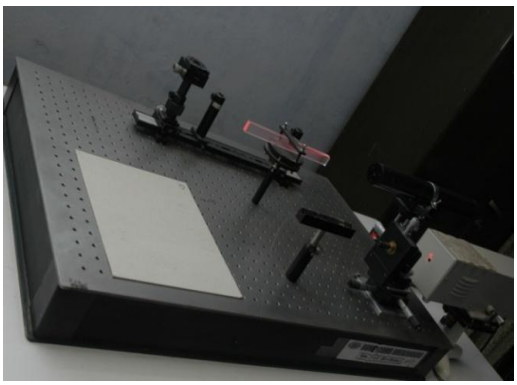
- Well established applied physics and radiation physics laboratory for graduate and post-graduate curriculum based experiments.
- Nuclear radiation detection, counting and analysis systems; GM and NaI(Tl) based, Radiation survey meters etc.




Laser and Fiber Optics Laboratory

The Laser and Fiber Optics laboratory is fully equipped for experimentation in the area of Lasers, OFC and Optoelectronics to conduct M.E. project/thesis work in Electronics and Communication Engineering and Optical Instrumentation.

- He-Ne and semiconductor lasers, power meters, optical benches and advanced laser experimental set ups for study of laser beam characteristics, basic optical characteristics and effects of electric and magnetic fields of laser beams.



- Optical fiber characterization and communication trainers, optical sources, optical detectors, passive optical components, fiber splicing and connector installation tool kits, OTDR, Fusion Splicing machine and fiber reels etc.
- Optical waveguiding fundamentals educators, Critical angles and Fresnel coefficients measurements, step index and graded index waveguides, mode field and effective index measurement set ups etc.
- Digital OFC links and BER Analysis systems.
- Optical Networks Analysis System (ONAS) and ED-NET.

- WDM/DWDM Systems and in-line component characterization.
- Optical Amplifier; EDFA and ASE filter.

- Light Runner – Interactive Fiber Optics Trainer.
- Photonics Design Softwares: OptSim and ModeSys, OptiSystem , OptiGrating and OptiFiber

Nanomaterials Characterization Laboratory

- Synthesis of nanoparticles ; Sol-gel method
- Atomic Force Microscope (AFM-Workshop) for Nanosize characterization- Vibrating and Non-vibrating Mode – (Advance-Tech, USA).
- Spectroflourophotometer (PLS) for optical properties of materials (Shimadzu).

Applied Computational and Simulation Laboratory

1. Material Explorer and Virtual NanoLab (VNL/ATK) -10 user license for nano-scale modeling and simulation softwares.
2. MATHEMATICA 11.xx – 05 user license for Mathematical Computational
3. LINGO 18.0 – 05 user license.
4. MATLAB– Institute license

Faculty and Staff

Name	Highest Qualification	Research Areas	
Dr. Pankaj Sharma (Professor and Head)	Ph.D.	Chalcogenide Glasses, Thin Films, Nanomaterials, Ferrites	
Dr. B. C. Choudhary (Professor)	Ph.D.	Applied Physics, Nuclear Radiations, Fiber Optics, Laser Technology, Nanophotonics	
Dr. Ashok Kumar (Associate Professor)	Ph.D.	Physics of nanomaterials and thin films, Nanotechnology enabled energy devices, Energy harvesting, Energy storage	
Dr. K. C. Lachhwani (Assistant Professor)	Ph.D.	Operation Research, Mathematical Programming	
Sh. Parveen Chand (Junior Secretariat Assistant)	Matric	Junior Secretariat Assistant	
Sh. Sukh Ram (Lab Attendant)	Middle	Lab Attendant