



# DIAT

Defence Institute Of Advanced Technology

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# ABOUT

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The Defence Institute of Advanced Technology, (DIAT) as it is known today, came into being as the Institute of Armament Studies in 1952.

In 1967, the Institute was renamed as "Institute of Armament Technology, (IAT)", which moved to its present location at Girinagar, Pune. From the relatively narrow scope of Armament Studies alone in the Fifties, the role of the Institute was considerably enlarged by the Defence R&D Council in 1964 and further in 1981.

On the basis of accreditation by the All India Council of Technical Education (AICTE), Pune University recognised eight courses for the award of ME degree in 1980. In the year 2000, the Institute acquired the status of a Deemed to be University. IAT has been renamed as DIAT

# **Department Of Aerospace Engineering**

The Department of Aerospace Engineering, formerly known as Faculty of Guided Missiles was established with a mission to impart knowledge to scientists and service officers to take up the challenges in design, development and use of Guided Missiles. Later scope was widened to Air Armaments & UAVs.

Vision of the Department: To be a centre of excellence for education, training and research in Aerospace Technologies.

Mission of the Department: To impart higher education and pursue research in the field of Aerospace

Engineering and Technology having a bearing on the defence requirements for the officers of the Ministry of Defence, Armed Forces, Public Sector Undertakings, other related organizations and general public.

## **Research Areas:**

- Flight Guidance and Control, Robust and Nonlinear Control
- Flight Dynamics and Trajectory Optimization
- Experimental Aerodynamics
- Aero-elasticity
- Flow Control
- UAV Design

Currently, the department offers M.Tech. in Aerospace Engineering with three specializations namely Guided Missiles, UAVs and Air Armaments. The details of the programmes are given below:

**M. Tech. in Aerospace Engineering (Guided Missiles)**

**M. Tech. in Aerospace Engineering (UAVs)**

**M.Tech. in Aerospace Engineering (Air Armaments)**



# **Department of Mechanical Engineering**

The Mechanical Engineering Department seeks to combine excellence in education and research with service to Defence. The goal of our academic programmes in mechanical engineering is to provide students with a balance of intellectual and practical experiences that enable them to address a variety of Defence needs. The Department is one of the largest departments.

The Department is known for research and projects in fluid dynamics, heat transfer, finite element methods, vibrational experimental stress analysis, vehicle dynamics and other areas. Experimental and computational facilities are being continuously upgraded.

The Department has established, over the years, a close interaction with the DRDO laboratories and industry. It has carried out a large number of consultancy and sponsored research projects, which have been successfully completed. A number of sponsored research projects are ongoing.

The Department has carried out significant curriculum development work in Mechanical Engineering. Apart from regular courses the department offers, on a continual basis, a wide variety of short-term intensive programmes for persons from DRDO laboratories, Armed Forces and industrial establishments. User-oriented M. Tech programmes in Armament/ Combat Vehicles and Marine Engineering have been formulated as per the needs of the Defence sector. The programmes offer a wide choice of specializations, elective and research areas. The department has laboratories in Mechanical System Design and Analysis lab, Vibration lab, Fluid & Thermal Engg lab and Manufacturing and Precision Engg etc.

**M. Tech. in Mechanical Engineering [Marine Engg]**

**M. Tech. in Mechanical Engineering  
(Armament and Combat Vehicles)**

**M. Tech. in Mechanical Engineering  
(Mechanical System Design)**

**M. Tech. in Automation and Robotics**

# Department of Computer Engineering and Mathematical Sciences

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The department of Computer Science and Engineering was established in 1987. The department of Computer Engineering offers M. Tech., M.Sc.(by Research) and Ph.D. programs for DRDO scientists, tri- services and GATE qualified students. Currently, there are 06 faculty members in the department. Five faculty members have PhD degrees and one is pursuing the PhD programs in DIAT. Currently, the department has 20 PhD research scholars and 47 M.Tech. students.

The thrust areas of the department are Cyber Security, Ethical Hacking, Information Warfare, Network Centric Warfare, Cryptography, Network Security, Information Security Management Systems, Digital Forensics, Malware Analysis, Multimedia Security, Wireless Security. The faculty are also actively working in the following domains: Computational Intelligence, Machine Learning, Artificial Intelligence, SAR Imaging, Data Mining, Trusted Computing, Secure Software Engineering, Cloud Security, Program Analysis, Malware Analysis, High Performance Computing, Soft Computing, Modeling and Simulation, Social Network Analysis etc.

The department has successfully organized Two Weeks short term training course on Artificial Intelligence and Machine Learning for NTRO (National Technical Research Organization) in Oct 2019; NCECE 2016 (National Conference on Electronics and Computer Science – Theme: Defence Applications) Sponsored by BEL and NCSDAQC 2017(National Cyber Security Seminar, Debate and Quiz Contest) during July 2017 sponsored by DRDO. The Department has also conducted several workshops on Ethical Hacking, Cyber Security, Nine Algorithms, IT and Defence etc. The department had received NVIDIA academic research grant, 2018 for deep learning based research activities.

The department of Computer Engineering is associated with the data center activities to facilitate the email, WiFi, internet, web hosting, etc. to the DIAT campus. The establishment of National Knowledge Network facility, Virtual Classroom with Video Conferencing, campus-wide Wi-Fi connectivity, PHMC CCTV facility in DIAT are important initiatives of Computer Engineering department.

The M. Tech. degree in Computer Science and Engineering had started in the academic year 2009 and the two batches have passed out till June 2012. The department has started M.Tech. with specialization in Cyber Security since July 2011. The first batch passed out in June 2013. The department has started M.Tech. with specialization in Software Engineering and Intelligent Systems since July 2017. More than, 120 students have been graduated with M.Tech. degree from the department till now. The department has very good relations with industry, DRDO labs and other academic institutes, hence has a strong placement record. The aim of the Department was to provide training in depth knowledge of various modelling and simulation techniques and also mathematical topics to various courses conducted at DIAT. The present faculty strength of the Department is five and one visiting faculty. The Department is also actively engaged in handling the projects from various agencies. Since then the Department members have been actively involved in the research in different fields of applied mathematics such as ballistics, flight dynamics, hydro-dynamics, hydro-ballistics, Numerical Methods and Optimization, Statistics, Probability. Recently the Department has also developed expertise in the advanced Modelling and Simulation techniques like Neural Network, Fuzzy Logic and Genetic Algorithm, Parallel Computing, Cryptography and Machine Learning.

## **Research Areas:**

- Mathematical Modelling & Simulation
- Finite Element Analysis in Fluid Flow through Porous Media
- Computational Fluid Dynamics
- Partial Differential Equations & its Applications
- Numerical Methods for PDEs
- Finite Elements Method
- Boundary Element Method
- Domain Decomposition Method
- Boundary Layer Theory
- Numerical Parallel Algorithms and Parallel Computing.
- Bio-Mechanics
- Cryptography
- Image Processing

**M.Tech. in Computer Science and Engineering (Cyber Security)**

**M.Tech Computer Science & Engineering (Artificial Intelligence)**

**M. Tech in Data Science**

**M. Tech in Modelling and Simulation**

# Department Of Applied Chemistry

## About the department:

The Department of Applied Chemistry started in 1976 with the aim to impart education and training to DRDO work force in the area of high energy materials and propellants. Over the years Department has moved on to cater to the need of DRDO and civilian students in order to bring the DRDO achievements closer to our society. The Department's aim is to contribute to our understanding of the chemical world through excellence in observational, theoretical and experimental science and to extend quantitative and other appropriate methodologies to address problems in the fields of applied chemical science. In Applied Chemistry, we are endowed with faculties who are dedicated teachers and distinguished researchers that carry out cutting-edge research in all modern areas of Applied Chemistry, as well as in inter-disciplinary areas like nanoscience and technology, high energy materials, polymer science and technology etc.

The first PhD of DIAT (DU) was from the Department of Applied Chemistry and currently it is amongst the Departments guiding very high number of PhD scholars and research publications in DIAT. In addition to PhD, there are numbers of M. Tech. & M.Sc students carrying their PG education. We provide a vibrant and creative learning environment for our students and researchers. We also participate extensively in R&D for various DRDO labs and industries.

In recent times, the Department has made significant contributions towards revenue generation through grant-in-projects and customized courses.

## Description about the programmes:

To impart in-depth and intensive training in theory, testing and practice of chemical science especially in Nanoscience Technology, Chemical Science & Technology & High Energy Materials (HEM), Polymers and Composites to the young scientists of DRDO, other agencies of Ministry of Defence and fresh engineers / postgraduates.

The programme covers various disciplines like chemical science & engineering, High Energy materials, polymers and composites, chemistry of nano materials and their applications. The course is suitable for DRDO scientists, service officers and civilians.

## Objective

- To provide students with a strong technical education for meeting the modern requirements of chemical technological challenges
- To provide an ability to function on multidisciplinary teams
- Thorough grounding and/or awareness and proficiency towards process safety as it pertains to process and unit design.

## M. Tech in Nano Science and Technology



# Department Of Technology Management

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Brief Description: Good training to DRDO, defence services and defence industries in Technology Management including Project Management would provide a good long-term solution in overcoming the time and cost overruns in various defence projects and programs.

To imbibe the Technology Management capabilities amongst Tri-Service Officers, DRDO scientists, and DPSU engineers who can complete the projects in time bound and efficient manner.

- The program is innovatively designed for handling real-world problems and case studies of the Ministry of Defence.
- Self-application orientation learning is given higher priority rather than classroom teaching.
- Training the students in various aspects and exposing them to practical issues in time, cost, and schedule management

The curriculum has been designed in a fashion to amalgamate the technology, strategy, and management aspects. After the completion of the course, the officers posted at higher appointments, get an opportunity to involve themselves with the formulation of strategic decisions for their organisation.

The faculty members from IISc, IITs, DRDO, and DIAT endeavour to impart all the practical aspects with relevant case studies and updated examples. This has enabled the senior officers of the tri-services, especially IAF to utilize the knowledge gained at DIAT, directly in the sphere of work of policy-making at the top level of management.

## Research Areas:

- Quality Management
- Project Management
- Logistics and Supply Chain Management
- Operations Management
- Production Planning and Control
- Industrial Engineering
- Performance Management System, Project Management
- Strategic Management
- Technology Management
- Human Resource Management
- Behavioural Science and Stress Management

The department has collaboration with DRDO Laboratories ITM, ARDE, DRDL, HEMRL, R&DE(Engrs)

## M. Tech in Technology Management



# Department Of Electronics Engineering

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The Department of Electronics Engineering was established in the year 1972 with the mission to train personnel as per Defence needs by providing state of the art research facilities. The department has steadily grown from offering short-term training courses to M.Tech, MS (By Research), and Ph.D. programmes.

Vision of the Department: To be a center of excellence of international repute to provide high-quality education, research, and training in the area of Radar and Communications, Signal Processing and Communications, Defence Electronics Systems, VLSI, and Embedded Systems to promote innovation and entrepreneurship skills amongst the students to strengthen national security and self-reliance.

Mission of the Department: To establish state-of-art research facilities to train the personnel as per the Defence needs, especially in Electronics and Communication fields, and produce qualified quality human resources for the Defence requirements.

## Research Areas:

- Electromagnetics/Antenna systems
- RF and Microwave Technology
- Radar Technology and Radar Signal Processing
- EMI/EMC/NEMP
- Free Space Optical Communication
- HPM/EW systems
- FPGA based design systems
- Satellite Communications
- RFID
- VLSI
- Wireless Power Transfer

The Department currently offers M.Tech., in Electronics and Communication Engineering with an intake of 75 students distributed in the specializations of:

**M.Tech in Electronics & Communication Engineering  
(Signal Processing and Communication)**

**M.Tech in Electronics & Communication Engineering  
(Radar and Communication).**

**M.Tech in Electronics & Communication Engineering  
(Defence Electronics Systems)**

**M. Tech in Electronics & Communication Engineering  
(VLSI and Embedded Systems).**

# School of Quantam Technology

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Quantum technology is an emerging field of physics and engineering, which relies on the principles of quantum physics. It is about creating practical applications—such as quantum computing, quantum sensors, quantum cryptography, quantum simulation, quantum metrology and quantum imaging—based on properties of quantum mechanics, especially quantum entanglement, quantum superposition and quantum tunneling. The idea of starting a quantum technology program is keeping in mind the need for high-quality human resources for India. It will be one of the world's leading academic organizations engaged in quantum technologies

## Research Areas:

- Quantum Key Distribution & Quantum Communication in free space & optical fibres
- Quantum Simulation
- Quantum Accelerator Development with FPGA
- Quantum Imaging
- Entangled Photon Source
- Cold atom physics for Quantum sensing and metrology

The Department currently offers

**M.Tech in Quantum Computing  
(Quantum Communication & Sensing)**

## Department Of Metallurgical Materials Engineering

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The Department of Metallurgical and Materials Engineering aims to develop a core competence in teaching and research in the areas of materials engineering and its applications to Defence technologies and products. Being in Defence University, the Department offers M.Tech and Ph.

D. programs on materials engineering and engaged in conducting various short term courses to DRDO and Defence Officers. The main focus of our research is to investigate the structure- property-performance relationship of various materials for Defence applications. This programme is open for civilian GATE qualified candidates, DRDO Scientists/Officers, Officers from Tri-services, Industries and PSU. This program is also open to friendly foreign countries.

At present, the Department is equipped with characterization facilities such as:

- High Resolution Transmission electron microscope (TEM) with STEM, Lorentz, HAADF and EDAX facilities
- Field emission scanning electron microscope (FESEM) with EDS
- Small angle x-ray scattering (SAXS)
- Wear and friction measurement equipment
- Micro-Hardness Tester
- Brinell and Rockwell Hardness Tester
- Automatic grinding and polishing machines
- Optical polarizable microscope with image analyzer
- Surface Area Analyzer
- Impedance Analyzer and Electrochemical workstation
- Piezometer
- Corona Poling Unit
- UV-Visible Spectroscopy
- Contact Angle measurement unit
- CH-Analyzer
- Ball Milling
- PPMS

and many materials synthesis facilities also available in the Department such as

- Spray Pyrolysis set-up
- High-Temperature Furnace
- Centrifuge
- Autoclave
- Vacuum Oven
- Orbital Shaker
- Twin screw extruder
- Plastography
- Two roll mill
- Hydraulic press
- Electro spinning unit
- Homogenizer
- Sonicator

The Department currently offers program in

**M. Tech. in Materials Science and Chemical Technology**

**M. Tech in Materials Engineering**

**Master of Science in Materials Science**

# Department Of Applied Physics

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The Department came into existence as Faculty of Applied Physics in 1952 and was renamed as Department of Applied Physics in 1979. The department aims to train students for their career in academia as well as in industry in the frontier areas of Science & Technology. All the M. Tech. Programmes are balance of courses in fundamental science and technology helping students to pursue career opportunities in Academics, Research & Industry as per their interest.

## Research Areas:

- Semiconductor Lasers
- Quantum Cascade Lasers
- Ultrafast Fiber Lasers
- THz TDS and Imaging
- Free space and Underwater Optical Communication
- E-Nose for disease diagnosis
- Nano-bio sensors
- Intrusion detection
- Sensors for machine/structural health monitoring
- 2D materials
- EMI shielding and stealth materials
- Micro fluids
- Solar photovoltaics
- Materials for sensors
- Materials for healthcare
- Fiber optics sensors and Optical sensors
- Metamaterial sensors
- Metal oxide sensors
- Frequency based sensors

The Department currently offers three M. Tech. with an intake of upto 50 students in the specializations of

**M. Tech. in Laser & Electro-Optics**

**M. Tech. in Sensors Technology**

**M. Tech. in Optical Communication & Photonics**



# Products And Technologies



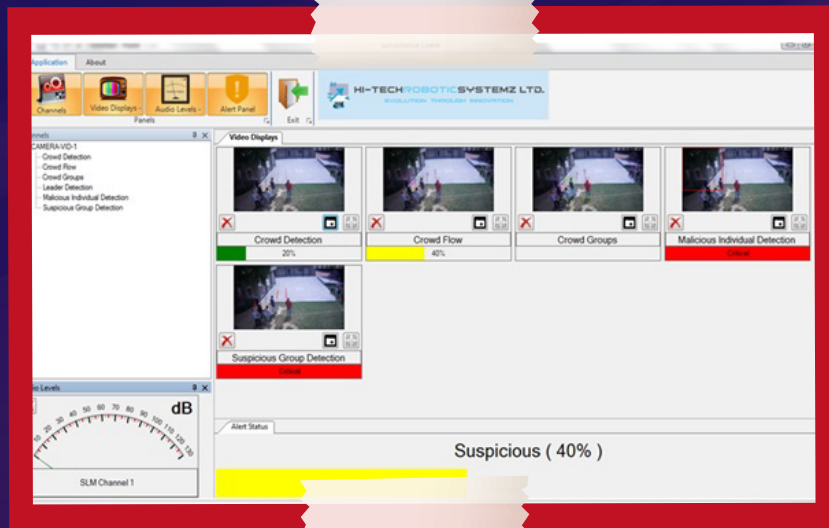
ANANYA "Universal coating material to combat microbial infection and COVID-19"



Aushada Tara "anti-microbial body suit which comprises of superhydrophobic, breathing, anti-microbial, comfort feeling properties"

Pavitrapati Mask "Ayurvedic based Biodegradable Face Mask"





DRISHTI "Intelligent Video based Human Activity Detection"



V-shwas" Face Mask "Face mask variant based on Polypropylene "

Healthy Air "Herbal based immunity boosting room freshener"





Atulya "Microwave steriliser to disintegrate novel Coronavirus"



Vibsim I.I "Active Anti-vibration Mount System for Heavy Machineries payload"



Ashraya "Medical Bed Isolation System to Contain Covid-19 infections"



# DIAT

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