



VISION 2020 DOCUMENT

National Institute of Technology Durgapur, INDIA

www.nitdgp.ac.in

January, 2013

1.0 PREAMBLE

1.1 Genesis

National Institute of Technology Durgapur was set up as Regional Engineering College (REC) in 1960 funded jointly by the Government of India and the Government of West Bengal and was registered under the Registrar of Societies Act. Initially the Chief Minister of West Bengal and subsequently the Minister of Higher Education, the Government of West Bengal was the Chairman of the Board of Governors. It was affiliated to the University of Burdwan. In REC system national integration was considered to be a part and parcel of education, with half the seat allocated to the students from the state while the rest reserved for the students from the other states, which ensured excellent interaction and camaraderie among the students from all corners of the country. The education system was holistic with equal importance being attached to academic as well as overall development of the students. REC Durgapur was converted to NIT Durgapur under the full administrative and financial control of the Ministry of Human Resource Development, Government of India with a “Deemed to be University” status in July 03, 2003. The NIT Act was implemented on August 15, 2007 and the Institute was declared an “Institute of National Importance” by the Government of India. The Statutes came in place on April 23, 2009.

1.2 Present Academic Programmes

The Institute offers 9 four-year B. Tech. programmes with a total annual intake of 824 Indian students (Table -1). In addition, students are admitted from different countries of the world as nominated by the Government of India. All eligible B. Tech. programmes were accredited by NBA of AICTE. NIT Durgapur also offers 16 M. Tech. programmes, MBA, MCA and M. Sc. in Physics, Chemistry and Mathematics with Computer Application (Table – 2 & Table – 3).

NIT Durgapur has completed the implementation of reservation for OBC students (27%) as per the norms set by the Government of India in all academic programmes.

Table - 1 Undergraduate Programmes

Departments		Degree Offered	Sanctioned Intake
1	Biotechnology	B. Tech.	92
2	Chemical Engineering	B. Tech.	62
3	Civil Engineering	B. Tech.	62
4	Computer Science & Engineering	B. Tech.	98
5	Electrical Engineering	B. Tech.	98
6	Electronics & Communication Engineering	B. Tech.	98
7	Information Technology	B. Tech.	92
8	Mechanical Engineering	B. Tech.	145
9	Metallurgical & Materials Engineering	B. Tech.	77
Total			824

Table - 2 M. Tech. programmes

Dept. / Specialization	Year of Starting	Full / Part time	Duration	Sanctioned intake
Biotechnology (Biotechnology)	2008	Full Time	2 years	20
Chemical Engineering (Chemical Engineering)	1968	Full Time	2 years	23
		Part Time	3 years	
Civil Engineering (Structural Engineering)	1971	Full Time	2 years	23
		Part time	3 years	
Chemistry (Corrosion Science & Technology)	1996	Full Time	2 years	23
		Part time	3 years	
Computer Application (Software Engineering)	2011	Full time	2 years	20
Computer Science & Engineering (Computer Science & Engineering)	2004	Full Time	2 years	23
Electrical Engineering (Industrial Electrical System)	1969	Full Time	2 years	23
		Part time	3 years	
Electronics & Communication Engg (Telecommunication Engg)	2005	Full Time	2 years	23
Electronics & Communication Engg (Microelectronics & VLSI)	2008	Full Time	2 years	23
Earth & Environmental Studies – Coordinating dept. (Environmental Science & Technology)	2008	Full Time	2 years	20
Information Technology (Information Security)	2008	Full Time	2 years	23
Mathematics (Operations Research)	1990	Full Time	2 Years	23
		Part time	3 years	
Mechanical Engineering (Design & Production Engineering)	1966	Full Time	2 years	23
		Part time	3 years	
Metallurgical & Materials Engineering (Industrial Metallurgy)	1966	Full Time	2 years	23
		Part time	3 years	
Metallurgical & Materials Engineering (Materials Engg)	1966	Full Time	2 years	23
		Part time	3 years	
Physics (Advanced Materials Science & Technology)	2006	Full Time	2 years	23
Total				359

Table - 3 Other post-graduate programmes

Dept. / Programme	Year of Starting	Duration	Sanctioned intake
Management Studies (MBA)	2004	2 Years	92
Computer Applications (MCA)	2000	3 Years	92
Physics (M. Sc. in Physics)	2009	2 Years	20
Chemistry (M. Sc. in Chemistry)	2009	2 Years	20
Mathematics (M. Sc. in Mathematics with Computer Applications)	2010	2 Years	20
Total			242

1.3 Research & Collaboration

1.3.1 Research Output:

Over the last few years the Institute has been rapidly changing from a predominantly teaching Institute to a research-project-teaching Institute. There has been a major transformation in the research ambience which is exhibited by a near explosion in the performance indicators (Table - 4).

Table – 4

Output Indicator	2005-06	2011-12
Publication & acceptance of papers in peer-reviewed journals	21	334
Papers published in conference proceedings	44	356
Review of manuscripts in journals and books by faculty members	5	168
Sponsored research projects	3	48
PhD research scholars registered	63	211
PhD awarded	2	24

NIT Durgapur is a QIP centre for conducting PhD and M. Tech. programmes. The Ministry of Steel, Government of India instituted a Professor Chair in department of Metallurgical and Materials Engineering and offered 5 scholarships to undergraduate students to pursue research in ferrous metallurgy. A distinguished visiting Professor has been sponsored by AICTE in the same department and an Emeritus Fellow has been appointed by UGC in Department of Physics.

1.3.2 Collaboration:

NIT Durgapur has started collaborative programmes with CERN, Geneva including students' internship. It also signed MOU with Caledonian College of Engineering, Muscat, Oman, affiliated to Glasgow Caledonian College of Engineering and started a collaborative research and faculty exchange programme. Collaborative research is also in progress with 25

universities/institutes all over the world. NIT Durgapur was selected as the WB Regional Centre of Excellence of Indo-US Collaboration for Engineering Education (IUCEE) and FOSS Resource Centre was set up in collaboration with IOTA.

In the last three years 99 students have presented papers in international conferences abroad and undertaken summer internship in premier universities and institutes, including MIT, CERN Geneva, University of Michigan Dearborn, ETH Zurich, NUS Singapore, universities of Germany under DAAD, etc.

1.3.3 Externally funded Projects:

More than 50 sponsored projects worth more around Rs 12 crores are being handled by the Institute presently. Departments of Civil Engineering, Chemical Engineering, Electrical Engineering, Metallurgical and Materials Engineering, Electronics & Communication Engineering and Computer Science Engineering are sponsored by DST, Government of India under FIST programme. Sixteen faculty members are working on *DST-SERC Fast Track Projects for Young Scientists*. Department of Information Technology is executing the “*Information Security Education and Awareness Project*”, sponsored by the Ministry of Information Technology, Government of India. “*Special Manpower Development Project - II*”, sponsored by the Ministry of Electronics and Information Technology for developing manpower for VLSI, is in progress in departments of Electronics and Communication Engineering and Computer Science and Engineering. The other projects are sponsored by DST, UGC, DBT, Swedish Research Council, Naval Research Board, etc.

NIT Durgapur successfully participated in Technical Education Quality Improvement Programme - I (TEQIP-I), a project sponsored by the World Bank, as a lead institute setting up 20 new laboratories and modernizing 49 existing laboratories. Impact Assessment Survey of TEQIP-I placed NIT Durgapur at the top among the Centrally Funded Institutions and 8th among 127 participating institutions. The Institute is also participating in TEQIP (Phase II).

1.3.4 Mentoring Other Institutes:

National Institute of Technology Durgapur has also mentored two newly established centrally-funded institutions; National Institute of Technology Arunachal Pradesh and Ghani Khan Choudhury Institute of Engineering & Technology (GKCIET), Malda, West Bengal.

1.4 Vision 2020 of NIT Durgapur – background activities and documents

At the outset, a detailed SWOT analysis was carried out in all departments and centrally involving all the stakeholders including faculty, staff, students and alumni and the SWOT analysis of the Institute was prepared using all inputs from the departments. Based on the SWOT analysis and the presentation of Dr. Bikash Sinha, Chairman, Board of Governors, National Institute of Technology Durgapur “**Vision 2020 - NITs of India**” during the 5th meeting of the NIT Council held in New Delhi on September 14, 2012 and the inputs from various departments, the Vision document has been prepared.

2.0 VISION & MISSION STATEMENTS

Vision:

To impart quality technical education and focus on research and innovation to cater to the need of the country

Mission:

1. To impart quality technical and scientific education and produce engineers, technologists, scientists and citizens who will contribute meaningfully to the growth and development of the country and excel in various disciplines of knowledge
2. To initiate the students to research-oriented teaching-learning environment in the Institute with a focus on excellence and innovation

3.0 OBJECTIVES

1. To choose a fully inclusive growth path, carrying all the students, the faculty members and the staff with it
2. To focus on excellence and innovation
3. To attribute greater emphasis on post graduate education and research
4. To focus on inter-disciplinary research
5. To encourage the faculty to take up more sponsored projects and consultancy and increase internal resource generation
6. To become a major player in the endeavour to make India a most favoured destination for international students and global research
7. To collaborate with premier universities and organizations across the globe on research
8. To initiate undergraduate students to research very early in pursuance of the “*catch them young*” policy
9. To restructure the academic departments and to set up schools and centres to offer interdisciplinary post graduate and doctoral programmes
10. To reorient/ restructure the academic programmes in keeping with the developments and market forces
11. To revise the curricula and syllabi regularly
12. To initiate greater interaction with industries in the areas of collaborative projects and programmes, exchange of resource persons and training of students
13. To remain committed to responsibilities towards providing services to community, to make the people aware of crucial socio-technical and socio-economic problems and offer technical solutions in rural, urban and agricultural sectors

4.0 ACTION PLAN

4.1 Research

4.1.1 **To intensify research** – Demand-driven research activities will be taken up in different thrust areas and required infrastructure will be set up to support such activities. Intake of Institute full-time research scholars will be increased as they play a vital role in sustaining research activities in an institution. Moreover, they will cater to the urgent requirement of faculty in the technical education sector. Freshly recruited young faculty members shall be provided with seed money for good quality research project proposals by the Institute. Funding from TEQIP-II, plan grant and different sponsoring agencies will be utilized for the enhancement of research activities. A sponsored research cell will be established.

The Institute will focus on the a few research areas where it would like to excel and lead the country, like Environment, Energy, Biotechnology, Corrosion, Structure, Water Resource Engineering, Power Systems, High Voltage Engineering, Microelectronics, Microwave, Machine Design, Thermal Engineering, Materials, Nanotechnology, Software Engineering, etc.

4.1.2 **To initiate students to research early** – All students, including undergraduate students will be encouraged to get engaged in research early. The students shall be financially supported for international research internship and for presenting papers in national and international conferences. They will also be associated with collaborative research projects.

4.2 Collaboration

4.2.1 **Collaboration with academic institutions** – Collaborations with various premier academic and research institutions in India and abroad will be enhanced. It will encompass faculty and students' exchange programmes, joint academic programmes and research. Joint research proposals shall be submitted to funding agencies.

4.2.2 **Inter-NIT research groups** – A special focus shall be placed on forming inter-NIT research groups in multi-disciplinary thematic areas. Joint projects, doctoral and post graduate research shall be carried out to reap synergistic benefits.

4.2.3 **Enhanced interaction with industries** – Collaborative research programmes, participation of experts from industries in academic decision-making, invited lectures, training programmes for industry personnel will be enhanced. Internship in industries shall be encouraged. Testing and consultancy by the faculty and staff members will be intensified. An Industry-Institute-Interaction cell will be established.

4.3 Teaching & Training

4.3.1 To strengthen existing B. Tech. programmes – The UG laboratories will be expanded and augmented. Teaching-learning process will be further modernized with teaching aids and learning resources. Online students' feedback system on the performance of the faculty should be introduced.

4.3.2 To strengthen existing PG Programmes – 16 existing M. Tech. Programmes will be strengthened by modernizing the PG laboratories. In TEQIP (Phase II) 36 PG laboratories will be modernized in different departments. More new laboratories will be set up. Further strengthening will be made from plan grants.

4.3.3 To start new academic programmes in emerging areas - 25 new academic programmes will be introduced. Skilled postgraduates will be produced in areas having market demand.

4.3.4 Revision of curricula and syllabi – The curricula and syllabi will be revised regularly in keeping with technological advances. External experts from industries and academia will be consulted in the endeavour.

4.3.5 Flexibility in academic programmes – More multi-disciplinary academic programmes will be encouraged.

4.3.6 Academic support to weak students – Finishing Schools, remedial teaching and special training on soft skill will be conducted for the weaker students.

4.3.7 Faculty and staff development programme – The faculty members will be encouraged to participate for refresher courses, training programmes and collaborative research programmes to premier institutions in India and abroad. They will also undertake pedagogical training. The staff members will also be trained in different areas. The entire training programme will be based on an exhaustive training need analysis carried out by the departments.

4.3.8 Continuing Education programme – More such programmes for the faculty members and staff of academic institutions and industry personnel will be organized regularly. A Continuing Education cell will be set up.

4.3.9 Institutional Management capacity enhancement – Responsible officials like Deans and Heads will be exposed to modern management techniques so that these tools may be used in education management.

4.4 Infrastructure Development

4.4.1 To strengthen central academic facilities – Various central academic facilities like computer centre, library, workshop, central instrumentation

facility, etc. will be modernized. More text books shall be issued to the students.

- 4.4.2 **Institute Automation** – A comprehensive Institute Automation system will be set up to integrate all the activities of the Institute, to speed up the decision-making process and to move towards a paperless and transparent administration.
- 4.4.3 **Campus Expansion** – The present campus is now grossly inadequate in view of the recent and future expansion of the institute. It has become absolutely necessary to acquire additional land around the present campus for expansion. In case it is not available, land may be explored in and around Durgapur to set up a second campus.
- 4.4.4 **Expansion and improvement of Infrastructure** – Infrastructure needs urgent expansion to cope with rapidly increasing strength of students and faculty. Though additional facilities are being set up, it needs much more. Construction of more students' hostels, faculty quarters, and academic blocks housing classrooms, laboratories, faculty rooms and other supporting infrastructure is needed urgently. The entire Institute campus should be made wi-fi enabled. The infrastructure for health service should be expanded and improved. Departmental libraries should be strengthened. Audio system should be installed in large classrooms. Adequate facilities shall be provided to the staff members. The acute shortage of basic amenities like power and water must be overcome from additional sources.
- 4.4.5 **Students' Amenities** – Auditorium, Open Air Theater, Swimming Pool and additional playgrounds will be set up. The existing facilities of indoor games and other sports and gymnasium will be expanded.

5.0 ACTION PLAN OF THE DEPARTMENTS

5.1 Department of Biotechnology

1. To set up Instrumentation Facility, Radioactivity, Microbiology (P2 enabled), Cell Culture (P2 enabled) laboratories, Microscopy Facility, Plant Growth Room, Green house and Animal House
2. Modernization of existing laboratories
3. To introduce new academic courses such as “metabolic engineering”, “Bio-nanotechnology”, “RNAi and MiRNA technologies”, “Cognitive Science”, “Molecular Plant-Microbe Interaction”, “Plant Disease Resistance”, “Advanced Molecular Biology and rDNA Technology”, etc.
4. To start integrated MSc/ MTech-PhD program
5. To set up a “Project Cell” to run the ongoing projects in the department
6. To set up “Centre for Bioprocess Development” and “Centre for Life Sciences”

5.2 Department of Chemical Engineering

1. Modernization of Environment & Membrane Technology Laboratory, Chemical and Biochemical Reaction Engineering Laboratory, Combustion Engineering Laboratory, Multiphase flow laboratory, Environment & Membrane Technology Laboratory, Environmental Biotechnology Laboratory, Pressure Swing Adsorption (PSA) Laboratory, Advanced Separation Laboratory
2. To pursue research in Environmental Engineering, Energy, Chemical & Biochemical Reaction Engineering, Advanced Separation Processes & Membrane Technology, Multi-phase Flow, Process Modelling, Simulation & Optimization, Process Control, Heat Transfer, Computation Fluid Dynamics

5.3 Department of Chemistry

1. Setting up an “Integrated centre for Corrosion science and Technology” with state of the art facilities for developing and testing organic and inorganic paints and coating system
2. Setting up a full-fledged research centre for water testing and purification based on nanomaterial and plant materials
3. Introduction of a new M. Tech. Program in “Polymer Science and Technology”
4. Augmentation the existing facility with picosecond time resolved laser spectroscopic and fluorescence microscopic system and to develop a research facility on “Photochemistry and Photobiology”
5. To strengthen the computational facility to boost up the present research activities in the department in the field of protein dynamics, the role of conserved water molecules towards it and related potential applications

6. Augmentation of existing facilities towards research in organic and inorganic synthesis and kinetics
7. Organizing short term courses and training program in various fields like “Environmental pollution: Monitoring and Control”, “Corrosion testing and control”, “Use of various analytical systems, e.g. FT-IR, GC, Cyclic voltammetry, Fluorimeter, Spectrophotometer etc.”, “Hands on training in computational chemistry”
8. To give exposure to PG students of the department on various emerging areas in Chemistry by organizing seminars regularly.

5.4 Department of Civil Engineering

1. To introduce a new M. Tech. programme in Geotechnical Engineering and one M. Tech. programme in Environmental and Water Resources Engineering
2. To upgrade all Laboratories with a clear shift in emphasis from macro to micro level analysis
3. To set up formal Soil-Mechanics Laboratory
4. To develop basic infrastructure for modern experimental investigations in Concrete and Structures Laboratories and also augment the non-destructive test (NDT) equipment
5. The Highway Engineering Laboratory to be renovated and developed as Highway and Traffic Engineering Laboratory
6. To augment the Environmental Engineering Laboratory and upgradation of the existing GIS set up
7. Software support to be strengthened in Computation Laboratory
8. Surveying Laboratory to be converted to Total Station and GPS based Surveying Laboratory

5.5 Department of Computer Applications

1. To modernize Computer Laboratory and Project Laboratory
2. To set up new Networking Laboratory and Information Security Laboratory
3. To start M. Tech Course in Computer Applications
4. To pursue research in Cloud Computing, Computer Networking, Design and Architecture of software systems, Information Security, System Security, Mobile Computing, Database Management Systems

5.6 Department of Computer Science & Engineering

1. To modernize the general Computer Programming Laboratory and Advanced Project Laboratory
2. To set up Machine Intelligence laboratory, Networking laboratory, Open Source System laboratory

5.7 Department of Electrical Engineering

1. Modernization of existing laboratories: Control Systems Laboratory, Electrical Machines Laboratory, Microprocessor and Microcontroller Laboratory, Measurement and Instrumentation Laboratory, High Voltage Laboratory, Power Electronics Laboratory, Computational Laboratory, Circuits and Networks Laboratory, Power Systems Relay Laboratory, Power Systems Research Laboratory
2. To set up new Research Laboratories: Insulation Research Laboratory, Soft Computing & Optimization Laboratory, MAGLEV Laboratory, Non-conventional Energy Laboratory, Smart Grid Laboratory, Robust Control Laboratory, Condition Monitoring Laboratory
3. To set up new Academic laboratories: Advanced Power Electronics laboratory, Advanced Electrical Machine Drives laboratory, Embedded Systems laboratory, High Power Laboratory, Advanced Power System Laboratory, Power Systems Simulation Laboratory
4. To pursue research in High Voltage Engineering, ICT and its application in Education and utilities, Magnetic Field near power lines, Digital e learning and e Governance; Electromagnetic Levitation, Active Magnetic Bearing, Switch-mode converters and Inverters, controller design, soft-computing techniques, Power Electronics & Machine Drives; Analysis and Control of induction generators; Power System, Control System, Renewable Energy, Planning to develop smart grid for automatic power flow control, monitor with SCADA facilities; Nonconventional Energy Sources, Electrical Machine Drives and Power Electronics; Analysis and Synthesis of Robust and Periodic Controller, Application of Periodic Control in Single and Double inverted Pendulum, Application of Robust Control in Switch-mode Power converters, Robust Control in Process Instrumentation, Digital Robust Control of Electric Drives; Soft Computing and Optimization; Condition Monitoring of Electrical Equipment; Planning and Operation of Power Systems using DGs, FACTS etc. and Soft computing
5. To introduce two new M. Tech. programmes in (i) Power Systems and (ii) Power Electronics and Machine Drives

5.8 Department of Electronics & Communication Engineering

1. To modernize the existing laboratories: Microwave laboratory, Antenna laboratory, Satellite communication lab, Communication Engg. Lab, VLSI Lab, MEMS lab, Electronics Circuit Lab
2. To set up new laboratories/ centre: Nanoelectronics Center, Optical Communication laboratory, Satellite communication laboratory, Digital Image processing laboratory
3. To start new M. Tech. programmes in Microwave and Antenna
4. To pursue research in Microelectronics & VLSI, Nanotechnology and MEMS, Digital Image Processing, Wireless and Mobile Communication, Microwave & Telecommunication Engineering

5.9 Department of Earth & Environmental Studies

1. To strengthen existing courses offered to B. Tech. programmes
2. To start new Integrated M.Sc. Programme in Applied Geology / Earth Science
3. To strengthen existing M. Tech. Programme

5.10 Department of Humanities & Social Sciences

1. To establish “Tagore International Centre for Development Studies (TICDS)” should be established on his 150th Birth Anniversary.
2. To start two academic programmes, a Master of Business Economics (from 2013-14) and a new multi-disciplinary programme on “Rural Development” (from 2015-16) under the aegis of the centre
3. To set up “Vivekananda Centre for Monitoring Human Values and Ethics” on his 150th Birth Anniversary for organizing seminars/workshops on human values and ethics for students.
4. To institute (a) Tagore Chair Professor for Rural Development; (b) Vivekananda Chair Professor for Human Values to invite speakers from India/abroad to deliver lectures on relevant areas.
5. To set up new research laboratory
6. Modernization of the Language Laboratory and Computer Laboratory

5.11 Department of Information Technology

1. Modernization of existing laboratories
2. To set up Medical Imaging and Informatics Research Laboratory, Communication Networks Research laboratory, Distributed Multi-Agent System Research Laboratory, Knowledge based systems Research Laboratory, Bioinformatics Research Laboratory

5.12 Department of Management Studies

1. To set up a Business School (School of Management)
2. To introduce three year part-time MBA for executives
3. To offer dual degree (B. Tech & MBA) programme
4. To introduce new M. Tech programme in “Industrial Management”
5. To set up new laboratories Financial Trading Laboratory, Marketing Research Lab, Business Communication Lab
6. To run the management and executive development programme both in India and abroad; to work together to provide joint academic programme with the prospect of awarding dual degree

5.13 Department of Mathematics

1. To start five year integrated M. Sc program in Mathematics
2. To pursue research in Algebra and Finite Field Theory, Analysis, Combinatorics and Graph Theory, Topology, Functional Analysis, Statistical Analysis, Operations Research and Optimization, Supply Chain Management, Nonlinear Dynamics, Coding and Design Theory, Soft Computing, E-commerce
3. To set up Programming Laboratory, Numerical and Statistical Analysis Laboratory, Advanced optimization Laboratory

5.14 Department of Mechanical Engineering

1. Modernization of existing laboratories: Thermodynamics and heat transfer laboratory, Automobile and IC Engine Laboratory, Manufacturing science Laboratory, Fluid Mechanics Laboratory, Robotics Laboratory, Machine Dynamics Laboratory, Metrology Laboratory, CAD-CAM laboratory,
2. To set up new Laboratories: Mechanics Laboratory, Engineering Graphics centre
3. To start new M Tech Programs in (i) Machine Design, (ii) Manufacturing Technology, (iii) Thermal Engineering, (iv) Fluid Engineering.
4. To start new inter-disciplinary schools: (i) School of Energy studies, (ii) School of Mechatronics
5. To introduce Dual degree programs for B Tech and M Tech in Mechanical Engineering
6. At least one third of allotted B Tech (Mech) students should be converted for dual degree
7. To introduce integrated program in M Tech and PhD program
8. To introduce MS/M Tech program by research

5.15 Department of Metallurgical & Materials Engineering

1. Modernization of Instron, X Ray Diffractometer
2. To pursue research on Characterization & pre-reduction of electric furnace dust, Corrosion/fatigue environmental assisted cracking of Al alloys and stainless steels & their weldments, Development of cast micro alloyed steels, Development of nanoceramic oxide dispersed Al alloy composites, Development of TiC reinforced Al base metal matrix composites with & without a second reinforcement, Modification of Al-Si alloys microstructure by semi solid heat treatment, Salt induced hot corrosion of Ni based super alloys

5.16 Department of Physics

1. To start M. Tech in Nanoscience & Nanotechnology and B. Tech. in Applied Physics and Integrated M. Sc. programme

2. To set up new laboratories: Nanotechnology laboratory, Materials Science Laboratory, Nuclear Physics laboratory, Thin film laboratory, Optoelectronics laboratory.
3. To pursue research in Materials Science, Nanoscience & Technology, and Low temperature characterization, Thin Film Technology, Lasers, Liquid Crystals, Electronics and Theoretical High Energy Physics