

NATIONAL INSTITUTE OF TECHNOLOGY SILCHAR
SILCHAR – 788010, ASSAM, INDIA
Admission into Ph.D. Programme for the session July to Dec 2021

No. Dean (RC)/105/2021/2

Date: 05-06-2021

Applications are invited for admission into **Ph.D programme** in the following departments with the area / specializations and admission group as mentioned in the table for the session July to Dec 2021.

| DEPARTMENT | SPECIALISATION | GROUP |
|-------------------------------|--|---------------------|
| Civil Engineering | <ul style="list-style-type: none"> ➤ Hydrology, Water Resources Engineering, Optimization methods. ➤ Sediment transport / River Mechanics. ➤ Environmental Engineering, Water & Wastewater Engineering. ➤ Shallow foundation, deep foundation, machine foundation, soil dynamics, soil stabilization. ➤ Surface Water Hydrology, Sediment Transport, Climate change, River Modeling. ➤ Dynamics of Soils and Foundations, Pile foundation and Ground Improvement Techniques. ➤ Soft computing techniques and applications to hydrology & hydraulics. ➤ Climate Change impact on water resources. ➤ Transportation Engineering. (Traffic Engineering) ➤ Pavement Engineering ➤ Geotechnical Engineering / Earthquake Engineering ➤ Vibro-acoustics, Structural Dynamics and vibration control, Active Structural Acoustic Control (ASAC) ➤ Environmental Engineering, Waste Management, Water and Wastewater Engineering ➤ Intelligent building infrastructure for building energy management ➤ Application of intelligent transportation for future Micro-gird | Group A and Group B |
| Mechanical Engineering | <p>Fluid Mechanics, Power Plant Engineering, Hydraulic Machines, CFD, Entrepreneurship Development, System Design, Non-Conventional Energy, Thermo-fluids, Mechanical System Design, Tribology, Mechanical Vibration, Composite materials, Smart Adhesives and their joining, Hybrid multiscale laminated composites Bio-composites Phase change materials and encapsulation technology, Functionalization Self-healing composite materials, Energy efficient building materials, Solar Thermal system, Heat Transfer, Energy storage, Nano-fuel, Robotics, Mechatronics, Mechanism, Tribology, Composite material, Lubrication, Surface Engineering, Welding, Corrosion, MEMS, Thin Films, Materials Science, Additive Manufacturing, Topology Optimization, Advanced manufacturing/ machining, Computational Mechanics of smart structures, Additive manufacturing, Experimentation of composite structures, Damage Mechanics.</p> | Group A and Group B |
| Electrical Engineering | <ul style="list-style-type: none"> ➤ Brainwaves analysis. ➤ Control systems, Image Processing ➤ VLSI and Image processing ➤ Power and Energy Systems, Renewable Energy Systems. ➤ Power Electronics Systems | Group A and Group B |

| DEPARTMENT | SPECIALISATION | GROUP |
|--|---|---------------------|
| | <ul style="list-style-type: none"> ➤ Biomedical Engineering, Socio-Psychological System theory. ➤ Control engineering. ➤ Biomedical Engineering and Signal Processing, Instrumentation, VLSI and image processing. ➤ Image processing. ➤ High Voltage Engineering and Testing | |
| Electronics and Communication Engineering | <ul style="list-style-type: none"> ➤ Communication Systems: Wireless Communication, Cognitive Radio Networks, UAV based Communication and networking in C-RAN, Resource Allocation in 5G, Energy Harvesting protocols, Network Slicing, Caching and Splitting of network function in 5G, Satellite Communications, Wireless Sensor Networks, Communication Systems, Millimeter Wave Communications, Digital Communication, Information Theory and Coding, Signals and System, Satellite Communication, Mobile Communication and Wireless Networks, Underwater Networks, Free Space Optical Communications and Green Communications, Massive / Cooperative MIMO, NOMA, Power Line Communications, Smart Grid, IoT, Artificial Intelligence, Convex Optimization, 5G Networks, Next Generation Wireless Networks, UAV-assisted Networks, 5G Communication Techniques, Cooperative Communications), Soft Computing Techniques, Smart Grid Communications, Energy efficient, NOMA, MIMO-OFDM Communications, IoT, Efficient scheduling of wireless resources, and various aspects of all other recent forms of communications, Physical Layer Security, Cooperative Communications, 5G Techniques, Optical Fibre Communication. ➤ Signal Processing: Signal processing, Speech Processing, Image and Video Processing, Bio-medical Signal and Image Processing, Machine Learning, Soft Computing Techniques, Communication Engineering and the other areas related to Signal Processing, Multimedia authentication, Computer Vision, Medical Imaging, Neuroimaging, Pattern Recognition, Optimization Techniques, Signal Processing for Communication. ➤ RF System Design: RF Energy Harvesting Systems, Dielectric Resonators and Applications, EBG and FSS Structures, Antennas for 5G Communications, Computational Intelligence Applications in Microwave and Millimeter Wave Engineering, Antenna Design, Metamaterial, WBAN, Flexible Antennas, Antenna Array Optimization, Resonators for RF Applications, Metamaterial-Inspired Structures for Antenna Application, Soft Computing Techniques in WSNs, Wearable antenna, MIMO antenna, Metamaterial antenna, Machine Learning for Microwave & mm-Wave Devices, Microwave Imaging, RADAR Signal Processing, Metamaterials for mm-wave Structures, Active and Passive Microwave Devices, Microwave Imaging, Smart Antenna Systems, Cyber Security. ➤ Micro/Nanoelectronics: Semiconductor device and Modelling, MOS physics and modeling, Semiconductor Devices for RF & mm-wave applications, Micro/Nanoelectronics: Compact Modeling of | Group A and Group B |

| DEPARTMENT | SPECIALISATION | GROUP |
|--|--|---------------------|
| | <p>HEMT; Nanotechnology: III-V Nanowire LED; Energy Harvesting: Perovskite Solar Photovoltaics; Renewable Energy, Li-Ion Battery, High-K based CMOS Logic and Non-Volatile Memory Devices (Charge Trap Flash Memories, Ferroelectric RAM and Resistive RAM), Negative Capacitance Transistors, 2D Materials, High mobility Group-IV Ge/GeSn based epitaxial devices, Organic Electronic Devices and Photodetectors; deposition techniques, Thin Films and device Characterizations.</p> <p>➤ VLSI Design: Digital VLSI design, Analog VLSI design, Analog and Mixed Style VLSI Design, Algorithms to VLSI Architectures, VLSI Testing and verification, Synthesis of Nanoparticle and Application of Nanotechnology, MEMS/NEMS, Bio-MEMS, Optical MEMS, MEMS Sensors, MEMS Energy Harvesting, Optimizations, VLSI Interconnects, Stretchable electronics, Photonic Integrated Circuits, Optoelectronic Devices, Biosensors. Power electronics, Embedded Systems.</p> <p>➤ MEMS Analysis</p> | |
| Computer Science and Engineering | <ul style="list-style-type: none"> ➤ Artificial Intelligence ➤ Robotics ➤ Machine Learning ➤ Data Science ➤ Natural Language Processing ➤ Deep Learning ➤ Cyber Security ➤ Healthcare informatics ➤ Speech processing ➤ Image/Video processing ➤ Information Retrieval ➤ Renewable Energy Prediction using Machine Learning for Electricity Market ➤ Robotics | Group A and Group B |
| Electronics and Instrumentation Engineering | <ul style="list-style-type: none"> ➤ Transdermal Drug delivery, Medical Electronic devices, Energy storage devices. ➤ Biomedical signal processing, machine learning algorithms, artificial intelligence, intelligent instrumentation for health monitoring. ➤ Signal processing, Condition monitoring and fault analysis using advanced signal processing techniques, Biomedical signal processing, Application of machine learning and artificial intelligence, Intelligent instrumentation ➤ Data and analytics in Control and Optimization of Process. ➤ Control systems; Renewable Energy system; Energy storage (battery, supercapacitor, fuel cell); Battery management system; Electric vehicle; Fractional order systems. ➤ Digital ICs, modern semiconductor devices, solar cells, Image processing. ➤ Control of Cyber Physical Systems, Network Control Systems, Event-triggered Control, Sliding Mode Control, Learning Based Control, Application areas: Biological | Group A and Group B |

| DEPARTMENT | SPECIALISATION | GROUP |
|-------------------------|---|----------------------------|
| | <p>systems, Robotics, etc., Modelling of Epidemics.</p> <ul style="list-style-type: none"> ➤ Communication: UAV for 5G and beyond, IoT & IIoT Communication, Vehicular: V2X communication, D2D, mmWave 5G, Cognitive Radio, MIMO, etc., Image and Signal Processing: Image Segmentation models for real-time and medical applications, Medical Imaging, Signal Processing and its application in Biomedical and BCI, AI: Machine Learning, Deep Learning and its applications in Healthcare, Communication and Signal Processing. ➤ Control systems with application to robotics, Path planning and trajectory tracking based controller design for Autonomous Underwater Vehicles (AUV), Formation control of multiple robotic systems. ➤ Biomedical Instrumentation, Pain Measurement, Automation for societal needs, Biomedical waste disposer - sanitary napkin and condom, Design and development of products. ➤ Time Delay Systems, Robust & Adaptive Control, Lyapunov Stability, Fractional Order Systems, Modeling of Dynamical Systems, Linear and Nonlinear Multi-Dimensional Systems, Biological Control System, Control of Renewable energy. ➤ Design and Development of Energy Harvesting Devices, Design and Development of Sensors for Biomedical Applications, Design and Development of Sensing Devices for water quality and air quality monitoring, Design, development and optimization of supercapacitors, Gas-sensors. ➤ Time Delay Systems, Robust & Adaptive Control, Lyapunov Stability, Fractional Order Systems, Modeling of Dynamical Systems, Control of Renewable energy. ➤ Application of Sensors & Transducers for Virtual Power Plant communications. | |
| <p>Chemistry</p> | <ul style="list-style-type: none"> ➤ Synthesis of Nanocatalysts and their applications in photochemical and Chemical transformation. ➤ Physical Chemistry, Nanoscience and Nanotechnology, Nanocatalysts, Synthesis and characterization of inorganic nanostructured materials (microporous zeolitic and mesoporous materials, clays, layered doubled hydroxides-LDHs, nanosized metals and metal oxides), as catalysts, sorbents or polymer reinforcing nano-additives. Nanomaterials, Greener methodologies for the production of noble metal and metal oxide nano-materials, nano-composites, Application of nanomaterials in various organic transformations, photodegradation of industrially emerging pollutants and water treatment, waste-derived catalysts for various organic transformations and photodegradation of organic compounds, Adsorption/Interfacial Phenomenon, Development of low-cost and synthetic nano-adsorbents for wastewater treatment, Waste plastics recycling, Co-processing of petroleum vacuum residue with plastics and biomass, Cracking or pyrolysis of biomass Polymer composites and nano-composites, Polymers, Desulfurization, Solid waste Management. ➤ Organic Synthesis, Development of newer synthetic | <p>Group A and Group B</p> |

| DEPARTMENT | SPECIALISATION | GROUP |
|---------------------------------------|---|---------------------|
| | <p>methodologies, •Regioselective C-S coupling, • Synthesis of O,N,S donor transition metal complexes, and their Biological and catalytic applications in organic transformations.</p> <ul style="list-style-type: none"> ➤ Synthesis and Characterization of Nano-structured materials from solid-waste for various potential applications (Photo-catalysis, Nano-electronics, Sensors etc.). Efficiently convert industrial wastes into high value silica- based materials. Renewable energy. ➤ Organic synthesis, Heterogeneous catalysis, Renewable energy. ➤ Studying the photophysical and photochemical processes of organic fluorophores in homogeneous and heterogeneous environments using fluorescence spectroscopy; protein-ligand interaction. ➤ Transition metal complexes of nitrogen based heterocyclic ligands: Synthesis, properties and application. | |
| Physics | <ul style="list-style-type: none"> ➤ Semiconductor nanostructures, resistive memory devices. ➤ Ferroelectric materials, multiferroics, structural phase transition in oxide perovskites. ➤ Crystal growth, nonlinear optics, nonlinear optical fibers, medical imaging ➤ Solar energy materials, solar photocatalysis, solar photovoltaics ➤ Condensed matter physics theory, DFT study of perovskite solar cell, topological insulators. ➤ Experimental condensed matter physics, Energy storage materials and devices, Nanoionics based resistive switching memory. | Group A and Group B |
| Mathematics | Fuzzy set Theory, Convergence of Sequence spaces, Fuzzy optimization, Fuzzy Topology, Eigenvalues problem, Integral Equation, Integro-differential equation, Elastodynamics, Complex Analysis, Approximation of Entire Functions, Operations Research, Evolutionary Optimization, Multi objective Optimization, Networking Optimization, Ordinary & Partial Differential Equation, Fractional Calculus, Mathematical Modelling, Computational Fluid Dynamics: Micro and Nano fluidics Modelling. | Group A and Group B |
| Humanities and Social Sciences | <ul style="list-style-type: none"> ➤ Development Economics | Group A and Group B |
| Management Studies | <ul style="list-style-type: none"> ➤ Finance ➤ Marketing ➤ Human Resource ➤ Intellectual Property Rights. | Group A and Group B |

ADMISSION GROUP:

1. There are two Groups (A and B) of admission under Ph.D. Program

GROUP A: Ph.D. Program - Regular Category who may receive fellowship from the MoE / CSIR/UGC or any other recognized funding agency.

Fellowship: As per MoE / CSIR / UGC guidelines.

Research Fellowship is available to the scholars who are admitted to Ph.D. programmes in different departments subject to the availability as stipulated by Ministry of Human Resources Development. The award and renewal of the fellowship is as per the guidelines issued by MoE, from time to time.

In case of students, who secure a new job or otherwise wish to move outside the institute and end their doctoral program prematurely, need to refund any scholarship received.

Eligibility for application in GROUP A:

1. Students for admission into Ph.D. Programs in Engineering Departments must satisfy one of the following criteria:
 - i) M.E./M.Tech. or equivalent with GATE / NET qualification in an appropriate area with a minimum CPI of 6.5 (on a 10 point scale) or equivalent (60% of marks). For SC/ST/PwD candidates, a minimum CPI of 6.0 (on a 10 point scale) or equivalent (55% of marks).
 - ii) B.E./B.Tech. with an excellent academic record with valid GATE score and with a CPI of at least 8.0 (on 10 point scale) or equivalent (75% of marks). For graduates from IITs/NITs, the minimum CPI requirement is 7.0 (on 10 point scale). For SC/ST/PwD candidates, there is a relaxation of 0.5 CPI or 5% of marks.
2. Students for admission into the Ph.D. Programs in Science departments must have a Master degree in the relevant discipline with a GATE / UGC / CSIR / NBHM / NET score for admission with a minimum CPI of 6.5 (on a 10 point scale) or equivalent (60% of marks). For SC/ ST/ PwD candidates, a minimum CPI of 6.0 (on a 10 point scale) or equivalent (55% of marks) with a GATE / UGC / CSIR / NBHM / NET score is required for admission.
3. Students for admission into the Ph.D. Programs in Management Studies departments must have a Master's degree in Business Administration or Master's degree in Engineering /Technology with a minimum CPI of 6.5 (on a 10 point scale) or equivalent (60% of marks) or Master degree in other disciplines with a minimum CPI of 6.5 (on a 10 point scale) or equivalent (60% of marks). For SC / ST / PwD candidates, a minimum CPI of 6.0 (on a 10 point scale) or equivalent (55% of marks) is required. A score in NET / GATE / UGC is required for all.
4. Students for admission into the Ph.D. Programs in Humanities and Social Sciences (HSS) Department must have a Master's degree in any field with a minimum CPI of 6.5 (on a 10 point scale) or equivalent (60 % of marks) or Master degree in other disciplines with a minimum CPI of 6.5 (on a 10 point scale) or equivalent (60 % of marks). For SC / ST/ PwD candidates, a minimum CPI of 6.0 (on a 10 point scale) or equivalent (55 % of marks) is required. A score in NET / GATE / UGC is required for all.
5. Candidates appearing for final year ME / M.Tech/ MSc/ MA/ MBA are also eligible to apply. However, their final result must be published on or before the publication of the provisional selection list.

GROUP B: Ph.D. Program—No financial assistance or stipend by NIT Silchar will be provided for this GROUP.

Following students will be considered under this GROUP:

- I) REGULAR-The regular students are those who work full-time for their Ph.D. and self-financed.
- II) SPONSORED—who are employed in a Central/State Govt. Departments/PSUs/Reputed Educational Institutes/Research organizations/Reputed Industries for doing research in the Institute on a full-time basis. He/She should have at least two years of working experience in the respective field. The candidate must submit the filled-in sponsorship letter (FORM I) from the employer with the application for admission. He / She shall not be entitled to any financial support from the Institute.
- III) PART-TIME- This category refers to the candidates who are professionally employed personnel. They have to stay in the Institute/around the Institute at least during the period of course work so that they

can attend regular classes as per the Institute academic norm. The applicant must be an employee of a State/Central Govt. Departments/PSUs/ Reputed Educational Institutes/Research organizations/Reputed Industries/Faculty under TEQIP III at the time of admission having at least one year experience in the discipline in which admission is sought. No financial assistance shall be provided by the Institute to such students. A No Objection Certificate from the Head of the Institute/Organization, in which he/she is employed, must be enclosed with application in FORM II-A.

IV) INSTITUTE EMPLOYEES- Employees of NIT Silchar. A No Objection Certificate from the concerned Head of the Department and the Director must be enclosed with application form (FORM II-B).

V) PROJECT STAFF - This category refers to the candidates who work on sponsored projects in the Institute. A No Objection Certificate from the Principal Investigator of the concerned project and Dean (R & C) must be enclosed with application form (FORM II-C).

VI) SPONSORED (EXTERNAL REGISTRATION) - Candidates employed in R&D organizations / educational Institutes having adequate research facilities. Sponsorship certificate (FORM III) from the Head of the organization where the candidate is employed must be enclosed at the time of application.

Eligibility for application in GROUP B:

1. Students for admission into Ph.D. Programs in Engineering Departments must satisfy one of the following criteria:
M.E./M.Tech. or equivalent in an appropriate area with a minimum CPI of 6.5 (on a 10 point scale) or equivalent (60% of marks). For SC/ST/PwD candidates, a minimum CPI of 6.0 (on a 10 point scale) or equivalent (55% of marks).
2. Students for admission into the Ph.D. Programs in Science departments must have a Master degree in the relevant discipline with a minimum CPI of 6.5 (on a 10 point scale) or equivalent (60% of marks). For SC/ST/PwD candidates, a minimum CPI of 6.0 (on a 10 point scale) or equivalent (55% of marks) is required.
3. Students for admission into the Ph.D. Programs in Management Studies departments must have a Master's degree in Business Administration or Master's degree in relevant disciplines with a minimum CPI of 6.5 (on a 10 point scale) or equivalent (60% of marks). For SC/ST/PwD candidates, a minimum CPI of 6.0 (on a 10 point scale) or equivalent (55% of marks) is required.
4. Students for admission into the Ph.D. Programs in Humanities and Social Sciences (HSS) Department must have a Masters degree in any field with a minimum CPI of 6.5 (on a 10 point scale) or equivalent (60 % of marks). For SC / ST/ PwD candidates, a minimum CPI of 6.0 (on a 10 point scale) or equivalent (55 % of marks) is required.

APPLICATION

The applicants can apply for the PhD program through the online application portal available at <http://admission.nits.ac.in/phdadmission2021>

An Application Fee of **Rs.500/-** (for Open / OBC) **OR Rs.250/-** (for SC/ST/PwD) must be paid via online payment and steps for online payment is as follows:

1. www.onlinesbi.com
2. State Bank Collect (SB Collect).
3. Accept and proceed.
4. State of Institute > Assam.
5. Type of Institute > Educational institute > Go.
6. Educational Institutions Name > Select online fee collection account NIT Silchar > Submit.
7. Select payment category as "Application fee for PhD Admission 2021".
8. Fill the required information and submit.

The payment reference number and date of the payment to be mentioned in the online application form, otherwise the application form will be treated as cancelled.

The applicant must upload all relevant documents, self-attested, in connection with the credentials claimed by the applicant in pdf format along with the scanned signed copy of the Declaration form at the time of filling up of application form.

The final pdf copy of the Application form must be emailed to *phd_admission_21@nits.ac.in* with a copy to *admit_phd_21@nits.ac.in* on or before **2nd July, 2021 by 5.00 p.m.** Subject line should be **“Application for Ph.D. program- *Name of the department (applying for)- Group A / Group B*”**. No need to send the hard copy of the Application form.

The candidates are advised to give their latest contact numbers /e-mail ids in the application form. The Institute reserves the right to reject any or all applications or it may amend any of the clauses above as per orders of the competent authority/ Government of India.

The result will be available in the website.

Important Dates:

- (i) Last date of submission of form to the Institute. : 2nd July, 2021.
 - (ii) List of short-listed candidates to be uploaded in the institute website : 9th July, 2021.
- The date of counseling and document verification, upload of the list of provisionally selected candidates in the Institute website (including waitlisted candidates) and the period of Admission and Registration will be published at appropriate time in the institute website.
 - Candidates are requested to check the institute website regularly for updates.
 - Hostel accommodation is subject to availability.

GENERAL TERMS AND CONDITIONS

- 1. The Institute reserves the right to cancel the candidature without assigning any reason thereof.**
- 2. The prescribed qualification are minimum and mere possession of the same does not entitle candidates to be called for written test and counselling.**
- 3. No correspondence will be entertained with the candidates, who are not called for counseling/selected for appointment.**
- 4. Canvassing in any form will result in disqualification of candidature.**
- 5. Legal disputes, if any, will be restricted within the jurisdiction of Silchar Court only.**
- 6. Candidates should upload their application form along with all supporting documents duly self attested.**
- 7. All reserved category candidates shall be required to submit self-attested copies of the latest Caste certificate issued by competent authority.**
- 8. Candidates must produce original marksheets and certificates during verification and counselling at the time of counselling, if called for.**

OTHER IMPORTANT INFORMATION

- 1. Candidates are requested to provide their active email Id/mobile phone numbers/landline phone numbers in the application form for easy contact.**
- 2. List of short listed candidates will be displayed on the Website of the Institute. No personal intimation will be made to the candidates. Candidates are advised to visit the Institute website regularly.**

**Sd/-
Dean (R & C)**