

**National Institute of Technology, Uttarakhand**  
**Information Brochure of Ph.D. Programme**  
**Odd Semester-2024**



Applications are invited for admission to Ph.D. Programme **Full Time (Institute-Sponsored), Full Time (Self-Sponsored), Full Time (Sponsored), and Part Time** in Odd Semester-2024.

Application form and Information brochure are available at NITUK website [www.nituk.ac.in](http://www.nituk.ac.in)

**Eligibility: A candidate is eligible for registration to Ph.D. Program if he/she satisfies the following conditions:**

A Master's degree in the concerned or an allied subject with a minimum 6.5 CGPA or 60% for General/OBC and 6.0 CGPA or 55% for SC/ST/PWD candidate and GATE / NET (CSIR/UGC/LS) in the concerned subject or discipline.

**Or**

A minimum of 6.5 CGPA or 60% for General/OBC and 6.0 CGPA or 55% for SC/ST/PWD at Bachelors level with at least 55% marks at Master's level and GATE / NET (CSIR/UGC/LS) in the concerned subject or discipline.

**Note: GATE/NET (CSIR/UGC/LS) in the concerned subject or discipline is mandatory. However, relaxation from the requirement of GATE/NET will be given only for admission into part time Ph.D. Program, for part time candidate candidates with minimum two years of relevant experience in reputed Academic/Industrial Organizations or Govt. funded Research Projects. Minimum 2 year serving experience is mandatory (spell of one contract should be minimum 6 months) and the candidate should be in service at the time of application. NOC in case of regular serving candidate is mandatory with the application form.**

**However, fees structure, essential qualifications, other terms & conditions will be same as per Ordinances of the Institute.**

**Minimum Qualification(s) required for shortlisting of Ph.D applications:**

Department	Minimum Educational Qualification
<b>CIVIL</b>	M.E., M. Tech., M.S., and M.Sc.(Engg.) in relevant engineering and technology disciplines.
<b>CSE</b>	B.E./B. Tech. in Computer Science and Engineering/Computer engineering/Information Technology/Communication and Computer Engineering/Electronics and Communication engineering/Electronics Engineering/Electrical Engineering /Artificial Intelligence/Cyber Security/Machine Learning/ or other relevant Engineering and Technology disciplines.  and  M.E./M.Tech./M.S. in Computer Science and Engineering/Software engineering / Information Technology/Computer Applications/ Information Security/IoT/Robotics/Data Science/Artificial Intelligence/Cyber Security/Machine Learning or other relevant Engineering and Technology disciplines.  or

	MCA/MSc (in relevant discipline)
<b>ECE</b>	B.E./B. Tech. and M. Tech.in Electrical/ Electronics/ Computer/ Communication/ Telecommunication/ Instrumentation/ Control/ Microelectronics/Signal Processing or equivalent discipline consistent with research areas of the department, MSc in Physics or Electronics with valid GATE Score.
<b>EEE</b>	M.E./M.Tech. or equivalent degree in respective & relevant Engineering disciplines
<b>MEC</b>	B.Tech./M.Tech. degree or equivalent degree in Mechanical/Industrial/Production Engineering, Manufacturing Engineering, Automobile Engineering, other allied branches of Engineering and Technology. B.Tech./M.Tech. degree/ disciplines consistent with the research areas of the department.
<b>PHYSICS</b>	M.Sc. in Physics/Applied Physics/Engineering Physics/allied areas of Physics/interdisciplinary areas in physical sciences  (OR) M. Tech or equivalent degree in Materials Science/Solid State Physics/Optics/ Nanotechnology/allied areas of Physics/interdisciplinary areas in physical sciences/ equivalent discipline consistent with research areas of the department.
<b>CHEMISTRY</b>	M.Sc. in Chemistry with or without specialization.
<b>MATHEMATICS</b>	M.A./M.Sc. in Mathematics, M.Sc. (Applied Mathematics), M.Sc. (Industrial Mathematics), M.Sc. (Mathematics & Computing), M.Tech (Mathematics/Applied Mathematics).
<b>HSS</b>	Master's or equivalent degree in Organisational Behavior/ Psychology/ Sociology/ Applied Discipline

**Table 1. Department-wise Areas of Research for admission in Ph.D. Programme under Institute/CSIR/UGC/ fellowship:**

<b>Department</b>	<b>Area of Research</b>
<b>CIVIL</b>	1. Structural Engineering, Advanced Materials, and Advanced Concrete / Technology.
	2. Geotechnical Engineering, Soil & Rock Slope Stability, and Computational Geomechanics
	3. Transportation Engineering, Pavement Materials, and Pavement maintenance and evaluation
	4. Structural Engineering, Earthquake Resistant Design of Structures, and Structural Health Monitoring
	5. Structural engineering, Earthquake Structural Analysis, and Life Cycle Assessment.
	6. Geotechnical Engineering, Engineering behavior of rock masses, and Computational Geomechanics.
<b>CSE</b>	1. Cryptography & Information Security, Computer Network, Machine Learning.

<b>ECE</b>	1. Biomedical Signal and Image Processing, Speech Signal Processing, Signal Processing and AI/DL/ML Algorithms for Communications and VLSI Design
	2. Signal Processing, Robust Control, Robotics and Computer Vision
	3. Optical Communication and Sensors, Optoelectronics Devices & Interconnects, AI/ML based sensors
	4. Planar Antennas, THz mmwave Applications, Remote Sensing,
	5. Novel MOS based Device -circuit Co-design for 5G/6G communication, Spin based memory design for in-compute logics, Design and implementation of A/D Convertors for health-care applications
	6. Device Circuit Interaction of Novel Semiconductor Devices, FeFET for Inmemory Computation and Neuromorphic computing, Self-Heating Effects on Novel Semiconductor Devices
	7. Microelectronics & VLSI Design: Modeling and Simulation of CMOS Nanoscale Device, Thermal Analysis of Semiconductor Devices, AI & ML based Nanoscale Device Modeling
	8. Circularly Polarized Patch Antennas, Beamforming Antennas, THz Antennas
<b>EEE</b>	1. Reliability Engineering, Power System Analysis, Renewable Energy, Failure Analysis, System Design, Power System Restructuring /Deregulation, Electricity Market, Distributed Energy Resources and Smart Grid
	2. Control Scheme for Various Applications in Power System, Control Scheme for Various Applications in Power Electronics Such as Load Frequency Control of Multi Interconnected Area for Hybrid Micro Grid System, Fractional Control System.
	3. Distribution System Planning, Power System Stability, Renewable and Energy storage Integration Issues in Microgrid and distribution system
	4. Power Electronics and Electric Drives, Renewable Energy System, Electric Vehicle.
	5. Protection of conventional transmission line and distribution line, Protection of renewable energy (Solar, wind) integrated based power system, Protection and control of Microgrid system.
	6. Single-Phase and Three-Phase Microgrids, Power Quality Improvement of the Grid connected renewable energy sources, Water pumping system, Power electronics and drives.
	7. Electric Drives, DC Microgrid, Power Electronics and Electric Vehicle.
	8. Application of IoT, Data analytics methodologies, Renewable energy systems and battery management systems for electric vehicles.
	9. Autonomous vehicles, Electric vehicles, Renewable energy and power electronics.
	10. Power distribution systems, power system analysis, Deregulated power systems & power pricing, Application of block chain technology in electrical systems.
<b>MEC</b>	1. Computer-Aided Design (CAD) and Additive Manufacturing (3D Printing).
	2. Renewable energy technologies, Biomass gasification, Alternative fuels, Combustion, heat transfer, Smart materials and Composite materials
	3. Advanced Machining and Joining Processes, Welding, Simulation of Manufacturing Processes, Materials Processing, Thermoplastic Composites (Extrusion).
	4. Renewable energy-based hydrogen generation, Alternative fuels for I C Engines, Solar energy storage and applications, Bio-hydrogen generation.
	5. Composite and Bio-Material characterization, Vibration, FEM analysis and MD simulation

	6. Advanced Materials and alloys, Composite Materials, Biomechanics, Finite Element Analysis, Tribology, Computational Mechanics, Mechanical Characterization
	7. Renewable energy, heat transfer enhancement, composite materials
	8. Micromachining, Flow and heat transfer through microchannels, Advanced manufacturing processes, Composites, Microwave material processing
	9. Two phase flow, numerical modelling, thermo-fluids
	10. Computer-Aided Design (CAD) and Additive Manufacturing (3D Printing).
<b>Physics</b>	1. Nano Energetic Materials, thermal and pressure studies
<b>Chemistry</b>	1. Organic synthesis, Transition-Metal-Catalyzed C-H bond activation reactions, Photocatalytic reactions.
<b>Mathematics</b>	1. Mathematical Analysis, Summability Theory, Approximation Theory
	2. Biofluid mechanics, Microfluidics and nanofluidics, Nanofluids.
<b>Humanities &amp; Social Sciences</b>	1. Management/ Sociology/Education

**Table 2. Department-wise Areas of Research for admission in Ph.D. Programme under Part-time/Self-sponsored/CSIR/UGC/Scheme:**

<b>Department</b>	<b>Area of Research</b>
<b>CIVIL</b>	1. Geotechnical Engineering, Soil & Rock Slope Stability, and Computational Geomechanics.
	2. Structural engineering, Earthquake Structural Analysis, and Life Cycle Assessment
	3. Geotechnical Engineering, Engineering behavior of rock masses, and Computational Geomechanics.
	4. Transportation Engineering, Geospatial Techniques, and Transportation Planning and Safety.
	5. Geotechnical Engineering, Soil & Rock Slope Stability, and Computational Geomechanics.
	6. Groundwater Contamination, Environmental Hydraulics and Pollution Management, and Groundwater Hydraulics.
	7. Transportation Engineering, Traffic Engineering, and Traffic Safety.
	8. Structural Engineering, Advanced Materials, and Advanced Concrete / Technology.
	9. Transportation Engineering, Pavement Materials, Pavement maintenance and evaluation.
	10. Structural Engineering, Earthquake Resistant Design of Structures, and Structural Health Monitoring.
	11. Structural engineering, Concrete and Construction materials, and Construction Management and Planning.
<b>CSE</b>	1. Cryptography and Multimedia Data Security, Secret Sharing Schemes, Machine Learning.
	2. Cryptography, Cryptographic Key Establishment, Secure Multicasting, Attribute Based Cryptosystem, Smart Grid.
	3. Computer Networks, Secure Real Time System, Network Security, Vehicular and Mobile Ad-hoc network.
	4. Cryptology and Information Security, Logical Analysis of Data, Machine Learning.
<b>ECE</b>	1. Biomedical Signal and Image Processing, Speech Signal Processing, Signal Processing and AI/DL/ML Algorithms for Communications and VLSI Design

	2. Signal Processing, Robust Control, Robotics and Computer Vision
	3. Optical Communication and Sensors, Optoelectronics Devices & Interconnects, 4. AI/ML based sensors
	5. Planar Antennas, THz mmwave Applications, Remote Sensing,
	6. VLSI and Microelectronics, 3D ICs, Low Power Circuit Design.
	7. Device Circuit Interaction of Novel Semiconductor Devices, FeFET for Inmemory Computation and Neuromorphic computing, Self-Heating Effects on Novel Semiconductor Devices
	8. Microelectronics & VLSI Design: Modeling and Simulation of CMOS Nanoscale Device, Thermal Analysis of Semiconductor Devices, AI & ML based Nanoscale Device Modeling
	9. Circularly Polarized Patch Antennas, Beamforming Antennas, THz Antennas
<b>EEE</b>	1. Reliability Engineering, Power System Analysis, Renewable Energy, Failure Analysis, System Design, Power System Restructuring /Deregulation, Electricity Market, Distributed Energy Resources and Smart Grid
	2. Control Scheme for Various Applications in Power System, Control Scheme for Various Applications in Power Electronics Such as Load Frequency Control of Multi Interconnected Area for Hybrid Micro Grid System, Fractional Control System.
	3. Distribution System Planning, Power System Stability, Renewable and Energy storage Integration Issues in Microgrid and distribution system
	4. Power Electronics and Electric Drives, Renewable Energy System, Electric Vehicle.
	5. Protection of conventional transmission line and distribution line, Protection of renewable energy (Solar, wind) integrated based power system, Protection and control of Microgrid system.
	6. Single-Phase and Three-Phase Microgrids, Power Quality Improvement of the Grid connected renewable energy sources, Water pumping system, Power electronics and drives.
	7. Electric Drives, DC Microgrid, Power Electronics and Electric Vehicle.
	8. Application of IoT, Data analytics methodologies, Renewable energy systems and battery management systems for electric vehicles.
	9. Autonomous vehicles, Electric vehicles, Renewable energy and power electronics.
	10. Power distribution systems, power system analysis, Deregulated power systems & power pricing, Application of block chain technology in electrical systems.
<b>MEC</b>	1. Computer-Aided Design (CAD) and Additive Manufacturing (3D Printing).
	2. Renewable energy technologies, Biomass gasification, Alternative fuels, Combustion, heat transfer, Smart materials and Composite materials.
	3. Advanced Machining and Joining Processes, Welding, Simulation of Manufacturing Processes, Materials Processing, Thermoplastic Composites (Extrusion).
	4. Composite materials.
	5. Renewable energy-based hydrogen generation, Alternative fuels for I C Engines, Solar energy storage and applications, Bio-hydrogen generation.
	6. Composite and Bio-Material characterization, Vibration, FEM analysis and MD simulation.
	7. Advanced Materials and alloys, Composite Materials, Biomechanics, Finite Element Analysis, Tribology, Computational Mechanics, and Mechanical Characterization.
	8. Renewable energy, heat transfer enhancement, composite materials.

	9. Micromachining, Flow and heat transfer through microchannels, Advanced manufacturing processes, Composites, Microwave material processing.
	10. Heat transfer in nanofluids, Thermal storage, Renewable energy, Solar Thermal Energy.
	11. Conceptualization and development of polymer matrix composites, joining of green composites, primary and secondary processing of composite materials.
	12. Two phase flow, numerical modeling, and thermo-fluids.
	13. Prognostics, analysis of nonlinear vibration and its assessment. Condition monitoring, Fault diagnosis, Fault assessment, Application of AI and machine learning in mechanical engineering and Signal processing and its application.
<b>Physics</b>	1. Nano Energetic Materials, thermal and pressure studies
	2. Magnetism, Thin films, Spintronics
	3. Magnetic thin films, Nanowires, Composite Materials
	4. X-ray Scattering, Charge and Magnetic Compton Profile, ab-initio Calculations
	5. Material Science, Optics, Bio-medical Materials and Luminescence
<b>Chemistry</b>	1. Synthesis of nanomaterials, Synthesis of reagents for valuable metal ion extraction, Computational chemistry
	2. Supramolecular organic chemistry, Small molecule probes, Functional organic and fluorescent materials
<b>Mathematics</b>	1. Biofluid mechanics; Microfluidics and nanofluidics; Nanofluids.
	2. Mathematical Analysis, Summability Theory, Approximation Theory
	3. Mathematical Modeling, Mathematical Biology, Epidemiology.
	4. Computational Mechanics, Numerical Methods
	5. Wave propagation in Gaseous Media; Quasilinear Hyperbolic System of PDEs.
<b>Humanities &amp; Social Sciences</b>	1. Postcolonial Literature and Cinema, Environmental Studies, Cultural Studies
	2. Management/ Sociology/ Economics

**Table 3: Details of seats as per the reservation roster for Full Time (Institute Fellowship) are as under:**

Department	Open/Open (PwD)	SC	ST	OBC	Open-EWS	Total
HSS*	1					1
Chemistry	1					1
Physics	1					1
Mathematics	1			1		2
Civil Engg.	2	1		2	1	6
Mech. Engg.	3+1 (PwD)	1	1	3	1	10
ECE	3	2	1	2		8
EEE	4	1+1(PwD)	1	1	1	9
CSE	1			1		2
	18	6	3	10	3	40

\*The seat is for Humanities. There is no vacant seat for English.

#### **Selection Procedure:**

Whole selection process will be through offline (physical) mode. The shortlisted candidates will be called for written test. There will be objective type questions as per Gate/NET syllabus. **The candidate who secures at least 40% marks in the written test will be shortlisted for online/offline interview. List of shortlisted candidates for written test and Interview schedule will be displayed on Institute website [www.nituk.ac.in](http://www.nituk.ac.in) separately. No separate letter/communication will be made to any individual for written test/Interview. Candidates are advised to visit the Institute website regularly in this regard.**

#### **Important Points:**

- There is no vacant seat for Full-time Institute fellowship in English under HSS department. However candidates can apply for Full time category in Humanities only and for other category candidate can apply for. both (Humanities & English).
- Candidates may specify at least one broad area of research in the application form in which he/she is interested to work. However, Institute does not guarantee the allotment of supervisor in the area of interest filled by the candidate in the application form.
- Candidates are required to submit duly filled Application form along with all the enclosures and fee deposit slip through online mode only.
- Candidates are required to pay Rs.500/- as application fee (Non-Refundable) through online mode (SBI Collect) Fee link will be available on Institute Website. Transaction ID along with date should be mentioned on the application form. In case of missing of transaction ID or wrong transaction ID on the application form, application will be summarily rejected.

- Candidate has to produce all the Original documents against the documents attached with the application at the time of reporting for written test and admission. In case of failure to produce any original document, the candidature will be cancelled.
- Clear passport photograph should be attached on the application form.
- Full Time (Sponsored) Candidates may be one of the following:

Candidates:

- Having NET-JRF (CSIR/UGC).
- Already engaged under some Project at NIT, Uttarakhand can also apply as an Internal Candidate (Sponsored). However, the required educational qualification for shortlisting will be same as mentioned above. Assistantships shall be declared by the Project's Investigator with approval from NITUK and sponsoring agency.
- Self or externally (outside NIT, UK) Sponsored candidate.
- Part time Candidates will not be provided any fellowship from the Institute.
- Conversion from Part Time to Full Time and from Self Sponsored to Scholarship at a later stage will not be allowed irrespective of the fund state.
- List of shortlisted candidates for written test will be displayed on institute's website.
- Candidates are advised to visit Institute's website to know the Fees structure, Ordinances, Rules & Regulations for Ph.D. Programme.
- The candidates are advised to visit the Institute website for Faculty Expertise and also for updated information about the Ph.D. Programme of Odd Semester-2024.
- Research scholar selected for the Ph.D. Programme will have to complete the specified course work as per Ordinances.
- Hostel accommodation is not available for PhD scholars.
- The rules & regulations regarding Ph.D program are mentioned in the Ph.D Ordinances and the same is uploaded on Institute website.
- A candidate applied under part-time category will not be allowed for admission in full-time Institute fellowship although the seat is available in the Department during allotment.
- Institute reserves the right to cancel the admission of a student at the time of joining or at any stage of Ph.D. Program, if it is found that the candidate provided wrong information in the application form.
- Institute reserves the right to cancel the admission of student at any stage of Ph.D. Program, if it is found that the candidate did not fulfill the essential qualifications/experiences/other terms & conditions as per the requirements of the Advertisement.
- Institute reserves the right to cancel the process of Ph.D admission at any stage without assigning any reason.

#### Details of Ph.D. Fee Structure:

a) **Application fee for Ph.D. registration:** Rs.500/-

b) **Other fees :**

(I)	Registration	Rs. 5,000/- (one time)
	Tuition Fee	Rs. 15,000/- (annual)
	Caution money	Rs. 3,000/- (refundable)
	Library fee	Rs. 2,000/- (one time)
	Development fee	Rs. 10,000/- (annual)

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**TOTAL**

**Rs. 35,000/-**  
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Rs. 35,000/- is to be paid before 31<sup>st</sup> January / 31<sup>st</sup> July.



(II) Subsequent years: Annual fees	
Tuition fee	Rs. 15,000/-
Development fee	Rs. 10,000/-
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<b>TOTAL</b>	<b>Rs. 25,000/-</b>
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Rs. 25,000/- is to be paid before six monthly seminars of June / December.

**Examination fee:**

The examination fee of Rs. 5000/- shall be paid by the candidate prior to the Submission of the thesis.

**Note:**

- The delay in payment of semester fees may invite cancellation of registration. Payment of fees is annual. Six-monthly seminar shall not be conducted without payment of fees.*
- If the thesis is submitted after 31<sup>st</sup> December /30<sup>th</sup> June, candidates are required to pay the fees for next academic session.*

The self-attested copies of the following documents (whichever applicable) should be enclosed along with the duly filled application:

- Photo ID card (Aadhar Card/Driving License).
- High School (10<sup>th</sup> class) certificate.
- Under-Graduate degree certificate and all mark sheet(s).
- Post-Graduate degree certificate and mark sheet.
- GATE score card or NET (CSIR/UGC/LS) qualifying certificate.
- Caste certificate (if applicable):
  - In case of SC/ST candidates, Caste Certificate (In Central Govt. Format) should be issued by the competent authority (not below the rank of SDO/SDM/Tahsildar).
  - In case of OBC candidate, Caste Certificate (In Central Govt. Format) should be issued by the Competent Authority (not below the rank of SDO/SDM/Tahsildar) indicating the status regarding Non Creamy Layer (NCL). **The certificate should be issued on or after 1<sup>st</sup> April, 2024.**
- EWS certificate (if applicable), the Certificate (In Central Govt. Format) should be issued by the Competent Authority (not below the rank of SDO/SDM/Tahsildar) indicating the annual income of the family for last financial year. **The certificate should be issued on or after 1<sup>st</sup> April, 2024.**
- PWD certificate (if applicable), the Certificate (In Central Govt. Format) should be issued by the authorized medical authority.
- If employed, No Objection Certificate (NOC) from the current employer in support of your application must be attached with application form.
- All the publications (if any).
- Teaching/research experience certificate (if any).
- Profile of the Organization/ Employer in case of SRS category candidate.
- Credentials including AICTE recognized short-term courses attended, research publications, professional qualifications etc.

**Notes:**

- Same photo ID card should be produce at the time of reporting.**

2. For seeking admission to Ph.D. Programme as Part Time candidate, candidate has to attach original NoC in format as given in application form at the time of applying that he/she will be granted leave for a minimum period of six months for course work. In case of failure to produce the same, the candidate will not be allowed to appear in written test.
3. The eligibility of the candidate shall be determined on the basis of the documents attached with the application form.
4. Application forms received after the deadline will not be considered for short listing and no amount of fees will be refunded to the candidate.
5. Original TC/Migration certificate has to be submitted at the time of joining.

**How to apply for admission to Ph.D. Programme in Odd Semester 2024:**

The application form and other relevant information for admission to Ph.D. Programme Odd Semester 2024 are available at Institute website: [www.nituk.ac.in](http://www.nituk.ac.in).

**Important Dates:**

Last date for receipt of application form.	<b>30 June 2024</b>
Date of displaying the list of eligible candidates for written test on Institute website.	Within ten days from the last date
Date & time for written Test.	Will be notified on Institute website
Date and time of interview.	Will be uploaded separately on Institute website.

Visit institute website: [www.nituk.ac.in](http://www.nituk.ac.in) regularly for more details and updates.

**Disclaimer:**

The statement made in the Information brochure and all other information contained herein is believed to be correct at the time of publication. However, the Institute reserves the right to make any changes in and additions to the regulations, conditions governing the admission, requirements, seats, fees and any other information, or statements contained in this information brochure, at any time without notice. No responsibility will be accepted by the Institute for hardship or expenses encountered by its students / any other person for such changes, additions, omissions or errors, no matter how they are caused.

**Registrar  
NIT, Uttarakhand**