

**National Institute of Technology, Uttarakhand**  
**Information Brochure of Ph.D. Programme**  
**Odd Semester-2023**



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-2023.

Application form and Information Brochure can be downloaded from 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 of 1st class (C.P.I or C.G.P.A. greater than 6.75 on a 10 point scale, if class is not provided or 60% marks where CGPA is not awarded) and GATE / NET (CSIR/UGC/LS) in the concerned subject or discipline.

**Or**

A Bachelor's degree with a minimum of 1st class (C.P.I or C.G.P.A. greater than 6.75 on a 10 point scale if class is not provided or 60% marks where CGPA is not awarded) 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 two years of relevant experience in reputed Academic/Industrial Organizations or Govt. funded Research Projects. Minimum 2 year serving experience is mandatory. However, at the time of application against Institute advertisement, candidates should be in service. NOC in case of serving candidate is mandatory.**

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

**Minimum Qualification (s) required for Ph.D Admission is as under:**

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.
<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 Inorganic Chemistry/Organic Chemistry/Physical Chemistry/Analytical Chemistry/Nuclear Chemistry/Medicinal Chemistry/Environmental Chemistry and related disciplines with Chemistry as one of the optional subjects.
<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>ENGLISH</b>	M.A./M.Com. or equivalent degree with 6.75 CGPA on a 10-point scale or 60% marks (where CGPA is not awarded)

**Department/Subject wise list of Areas of Research in Ph.D. Programme is as under:**

<b>Name of Department</b>	<b>Area of Research</b>
<b>CIVIL</b>	1. Advanced civil engineering materials, Non Destructive Testing of Materials, Retrofitting of Structures, Structural Behavior of Concrete
	2. Structural Engineering, Earthquake Resistant Design, Structural Health monitoring, Application of machine learning in damage identification of structures, System identification, Seismic analysis of buildings and other structures
	3. Light Gauge Steel Frames, Seismic Analysis and Design, Analysis of the Transmission Tower
	4. Structure Engineering, Construction Materials / Concrete Technology, Construction Management, Sustainable Infrastructure Development
	5. Transportation Engineering, Pavement Materials, Pavement Evaluation, Ground Improvement Techniques, Traffic Engineering.
	6. Traffic Engineering and Management, Road Traffic Safety (Vehicles and Pedestrians), Transportation Planning, Traffic analysis of Hill Roads.
	7. Ground Improvement Techniques, Computational Geomechanics, Landslide assessment and risk mitigation, Slope Stability Analysis
	8. Computational Geomechanics, Earth Retaining Structures and Reinforced Earth, Ground Improvement Techniques, Reliability Based Design of Geotechnical Structures, Allied Areas with Soil Mechanics and Foundation Engineering, Subsurface Exploration and Testing.

	<p>9. Stability analysis of geotechnical structures, Stability of tunnels / underground structures, Engineering behavior of rocks, Soil Mechanics, Foundation engineering, Slope stability.</p> <p>10. Groundwater Contamination in unsaturated porous medium and flow modeling, Environmental Hydraulics and Pollution Management, Groundwater Hydraulics, Hydrogeological safety and risk assessment of hydraulic structures, Sediment transport and control in streams or rivers, Hydrometeorological modeling, Climate change and Irrigation schemes</p>
<b>CSE</b>	<p>1. IoT Forensic, Edge Computing, Computer Networks, Real Time Systems</p> <p>2. Sensor and Ad Hoc Networks, Deep Learning, Biometric and Intrusion Detection, NLP applications, Generative Networks</p> <p>3. Biometrics Recognition and Security, Pattern Recognition, Machine Learning, Image Processing, Salient Object Detection, Small Sample Size Problems, Deep Learning</p> <p>4. Image/Video Saliency Detection, Image Processing and Computer Vision, Machine Learning, Deep Learning, Multimedia Security</p> <p>5. Cryptography and Multimedia Security, Machine Learning</p> <p>6. Computer Networks, Real-Time Systems (Scheduling &amp; Energy Optimization), AI and ML, IoT and Edge Computing, Cloud Computing</p> <p>7. Cryptographic Key Establishment, Authentication in Smart Grid, Attribute based cryptosystem</p>
<b>ECE</b>	<p>1. Biomedical Signal and Image Processing, Hyperspectral Image Processing, Soft Computing Methods for VLSI and Communication Systems, Evolutionary Techniques for System Identification, Evolving Deep Convolutional Neural Networks, Speech Signal Processing, Evolutionary Methods for Wireless and Optical Communications</p> <p>2. Optical Communication, Optical Sensors, Plasmonics, Photonics, Applications of nanomaterials in sensing field, Magneto-optic surface plasmon resonance sensor ,Optoelectronics Devices, Interconnects, Metamaterials, Metasurface, Communication System, Wireless Communication</p> <p>3. Multidimensional Systems, Finite Wordlength Effects, Delayed and Uncertain Systems, Discrete Control Systems, Robotics, Computer Vision</p> <p>4. Analog Circuit design, Analog Signal Processing, Current-mode circuits, Electronic Devices and Circuits. Design of high performance active building blocks.</p> <p>5. Planar Antennas for Inter-satellite link and Future mobile technologies, Microwave Harvesting, Microwave Hazards on Ecosystem, Microwave applications for Bio-Medical, Information extraction from radar images using image processing, Radar signal processing, Target detection and estimation, Radar based remote sensing, Disaster Management.</p> <p>6. Semiconductor Device Modeling, Novel MOS-based device/circuit co-design, Parasitic extraction and non-ideal effects, Low-power Memory/SRAM Design, Spin-based Memories and logic.</p> <p>7. Novel MOS-based device/circuit co-design, Low Power Device-Circuit Codesign, Semiconductor Device Modeling, 3D IC Integration, Through Silicon Via</p> <p>8. Novel MOS-based device-circuit co-design for VLSI Circuits and RF Circuits, Low Power Device-Circuit Codesign, Semiconductor Device Modeling, Ferroelectric FETs, In-memory computation, neuromorphic circuits, Negative Capacitance FETs.</p>
<b>EEE</b>	<p>1. Control scheme for various application in Power System and Power Electronics such as Load frequency control of multi interconnected area for hybrid micro grid system; close loop control of DC-DC isolated, non-isolated converter, Bi-directional DC-DC converter, Fuzzy based MPPT and Energy Management Strategy etc.; Fractional control system; Anti-windup techniques</p> <p>2. Distribution System Planning, Power System Stability, Renewable Energy Integration Issues in Microgrid.</p>

	<p>3. Electric Vehicle, Renewable Energy Conversion Systems, Design of controller for various power electronic converters, Bi-directional DC-DC Converter, Multiport DC-DC converter, Multi-level Inverter, Z source Inverter, Matrix Converter, Unity power factor rectifier, Design of controller for Induction Motor, PMSM, BLDC, SRM, etc.</p> <p>4. Protection of conventional transmission line and distribution line, Protection of renewable energy (Solar, wind) integrated based power system and Protection and control of Microgrid system</p> <p>5. Single-Phase and Three-Phase Microgrids, Power Quality Improvement of the Grid connected renewable energy sources, water pumping system, Power electronics and drives.</p> <p>6. Electric Drives, DC Microgrid, Power Electronics and Electric Vehicle.</p>
<b>MEC</b>	<p>1. CAD, Additive manufacturing (AM or 3D printing) – Medical AM and physical modeling of terrain using AM</p> <p>2. Renewable energy technologies, Biomass gasification, Alternative fuels, Combustion, heat transfer, Smart materials and Composite materials</p> <p>3. Advanced Machining and Joining Processes, Welding, Simulation of Manufacturing Processes, Materials Processing, Thermoplastic Composites (Extrusion).</p> <p>4. Composite materials.</p> <p>5. Renewable energy-based hydrogen generation, Alternative fuels for I C Engines, Solar energy storage and applications, Bio-hydrogen generation.</p> <p>6. Nanofluids, heat transfer and energy.</p> <p>7. Material Science, Vibration FEM analysis and MD simulation</p> <p>8. Advanced Materials and alloys, Composite Materials, Biomechanics, Finite Element Analysis, Tribology, Computational Mechanics, Mechanical Characterization</p> <p>9. Micromachining, Flow and heat transfer through microchannels, Advanced manufacturing processes, Composites, Microwave material processing</p> <p>10. Two phase flow, numerical modelling, thermo-fluids</p> <p>11. Conceptualization and development of polymer matrix composites, joining of green composites, primary and secondary processing of composite materials.</p> <p>12. Advanced manufacturing, Microwave material processing &amp; Computational Material Science</p> <p>13. Prognostics, analysis if nonlinear vibration and its assessment. Condition monitoring. Fault diagnosis, Fault assessment. Application of AI and machine learning in mechanical engineering. Signal processing and its application.</p> <p>14. Heat transfer in nanofluids, Desiccant-based dehumidification system</p>
<b>Physics</b>	<p>1. Thin films, Nanowires, Multilayers, Composite Materials</p> <p>2. Material Science, Optics, Bio-medical materials and luminescence.</p> <p>3. Magnetism, Thin films, Spintronics, Nanotechnology, Sensors</p>
<b>Chemistry</b>	<p>1. Organic Synthesis, Development of novel and sustainable organic reactions and Transition-Metal-Catalyzed C-H bond activation reactions.</p> <p>2. Organic Fluorescent Molecules, Small Molecule Probes, Responsive Materials, Crystal Engineering, Supramolecular Chemistry, Covalent Organic Frameworks, Functional Materials, Soft &amp; Hybrid Nanomaterials</p> <p>3. Theoretical Chemistry, Computational Material Science</p>

<b>Mathematics</b>	1. Computational Fracture Mechanics, Extended Finite Element Method, Virtual Element Method, Meshfree Methods, Singular Integral Equations, Riemann-Hilbert problems, Fracture in Smart Materials
	2. Biofluid mechanics; Pumping Mechanisms; Microfluidics and nanofluidics; Non-Newtonian fluids; Nanofluids; Bone mechanics; Heat Transfer; Energy; Particle Motion; Complex transport phenomena.
	3. Nonlinear Wave Propagation/Quasilinear Hyperbolic PDES,/Computational Fluid Mechanics
	4. Mathematical Modeling, Epidemiology, Population Dynamics, Mathematical Biology
	5. Summability and approximation Theory

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

Department	Open	SC	ST	OBC	Open-EWS	Total Seats
Civil Engineering	1	1	0	1 (PwD)	0	3
Mechanical Engineering	1+1(PwD)	0	1	1	2	6
Electronics Engineering	1	1	0	1	0	3
Electrical Engineering	1	1	0	1	0	3
Computer Science & Engineering	0	0	0	0	0	0
Humanities & Social Science	0	0	0	0	0	0
Chemistry	1	0	0	1	0	2
Physics	1	0	0	0	0	1
Mathematics	1	0	0	1	0	2
<b>Total</b>	<b>8</b>	<b>3</b>	<b>1</b>	<b>6</b>	<b>2</b>	<b>20</b>

### 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:

- Candidates are required to submit duly filled Application form along with all the enclosures and fee deposit slip by registered or speed post/courier to Assistant Registrar (Academic), NIT Uttarakhand on or before **8<sup>th</sup> September, 2023** by 05:00 PM. "Ph.D application form in.....(Subject) should be mentioned on the top of the envelop.
- 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 on the day of physical reporting. In case of failure to produce any original document, the candidature will be cancelled.

- Clear passport photograph should be attached on the application form.
- Application Forms received after the deadline will be rejected. Incomplete / incorrect applications will not be considered for admission.
- Candidates MUST specify broad areas of research in the application form in which he/she is interested to work.
- 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 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-2023.
- 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.
- Institute does not guarantee the availability of supervisor in the area of research desired by the candidate. Candidates are advised to discuss with faculty of the Department to identify whether their research interest match with the experts available and whether any supervisor is willing to offer project in the desired area.
- The rules & regulations regarding Ph.D program are mentioned in the Ph.D Ordinances and the same is uploaded on Institute website.
- **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.

**All fees should be paid online to the following account**

**Institute's Account details:**  
**Bank name:** SBI Srinagar Garhwal  
**Account holder's name:** NIT Uttarakhand  
**Account No.:** 37530602667  
**IFSC code:** SBIN0003181

**Note:**

- 1. 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.*
- 2. 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, 2023.**
- 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, 2023.**

- (viii) PWD certificate (if applicable), the Certificate (In Central Govt. Format) should be issued by the authorized medical authority.
- (ix) If employed, No Objection Certificate (NOC) from the current employer in support of your application must be attached with application form.
- (x) All the publications (if any).
- (xi) Teaching/research experience certificate (if any).
- (xii) Profile of the Organization/ Employer in case of SRS category candidate.
- (xiii) Credentials including AICTE recognized short-term courses attended, research publications, professional qualifications etc.

**Note:**

1. 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 produce 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.

**How to apply for admission to Ph.D. Programme in Odd Semester 2023:**

The application form and other relevant information for admission to Ph.D. Programme Odd Semester 2023 can be downloaded from the Institute website: [www.nituk.ac.in](http://www.nituk.ac.in).

Duly filled Application form alongwith Fee submission proof and all the documents mentioned above should reach to Assistant Registrar (Academic), NIT Uttarakhand on or before **8<sup>th</sup> September, 2023 by 05:00 PM.**

**Important Dates:**

Last date for receipt of application form.	<b>8<sup>th</sup> September, 2023</b>
Date of displaying the list of eligible candidates for written test on Institute website.	<b>14<sup>th</sup> September, 2023</b>
Date & time for written Test.	<b>20<sup>th</sup> September, 2023 at 9.00 AM</b>
Date and time of interview.	<b>20<sup>th</sup> September, 2023 at 4.00 PM</b>

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.

**-Sd-  
Registrar  
NIT, Uttarakhand**