

# National Institute of Technology, Uttarakhand

## Information Brochure of Ph.D. Programme

### Odd Semester-2022



Applications are invited for admission to Ph.D. Programme [**Full Time (Institute Sponsored), Full Time (Sponsored), Full Time (Self-Sponsored), and Part Time**] in Odd Semester-2022. Application form and Information Brochure can be downloaded from the Institute's 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 candidates with two years of relevant experience in reputed Academic/Industrial Organizations or Govt. funded Research Projects. However, fees structure, essential qualifications, other terms & conditions will be same as per Ordinances of the Institute.**

**Minimum Qualification(s) required for shortlisting the application forms 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. 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. MCA/MSc in relevant discipline (Only Self Sponsored/Part Time)
<b>ECE</b>	ME/M.Tech./M.S Degree in concerned or allied subject/discipline.
<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/ allied areas of Physics/ interdisciplinary areas in physical Sciences.

or

	M.Tech of 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.
<b>Mathematics</b>	M.A/M.Sc. (Mathematics/Applied Mathematics), M.Sc. (Industrial Mathematics), M.Sc. (Mathematics & Computing), M.Sc. (Mathematical Sciences), M.Tech. (Mathematics/Applied Mathematics/Applied Mathematics & Computation).

**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. Transportation Engineering, Pavement Materials, Pavement Evaluation, Ground Improvement Techniques, Traffic Engineering.
	2. Structural Concrete, Structural Behavior of Steel Fiber Reinforced Concrete, Repair and Restoration of Structures, Sustainable Advanced Materials
	3. 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.
	4. Slope stability monitoring and deformation analysis, Finite Difference Method, Lumped parameter modelling, Ground Improvement Techniques, Geotechnical Engineering
	5. Finite element limit analysis, Stability analysis of underground structures/tunneling, Strength behavior of rocks, Uplift capacity of anchors, Bearing capacity of foundations, Stability analysis of slopes and earth retaining structures, Probabilistic analysis of geotechnical structures
	6. Structural Engineering, Cold Formed Steel Design, Finite Element Method, Earthquake Resistant Design, Analysis of Structures, Computational mechanics, Meshless Method
	7. Water and wastewater treatment, Solid waste management. Sustainable development, Waste to energy, Advanced water treatment Advanced oxidation process
	8. Structure Engineering, Construction Materials, Smart Construction materials, Finite Element Modelling, Concrete Mechanics
	9. Groundwater Hydraulics, Sediment Transport and control, Modeling unsaturated flow and contaminant transport, Hydrological Safety and risk assessment of hydraulic structures
	10. Traffic Engineering, Road Traffic Safety, Vulnerable Road users, Pedestrian Safety, Traffic Conflict Technique, Traffic Flow and Modelling
<b>CSE</b>	1. Cloud/Fog/Edge computing, WSNs, Networks and Distributed Systems
	2. Fog/Edge computing, Real-time Systems IoT Network Security Cryptography
	3. Biometrics Recognition and Security, Pattern Recognition, Machine Learning, Image Processing, Salient Object Detection, Small Sample Size Problems, Deep Learning.
	4. Pattern Recognition and Machine Learning, Computer Vision and Deep Learning, Medical Imaging
	5. Cryptographic Key Establishment, Authentication in Smart Grid, Attribute based cryptosystem.

	6. Cryptography and Security, Machine Learning and Deep Learning
	7. Video/Image Saliency, Machine Learning, Deep Learning, Computer Vision, Image Processing, Multimedia data Security.
	8. Real-time Systems, IoT, Cloud Security, Virtualization, ML/DL, Computer Vision, Multimedia Analysis, Bioinformatics
	9. WSN/IoTs, Deep Learning/ Machine Learning, Drug Design, Natural Language, Cloud Computing, Data Warehousing
<b>ECE</b>	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.
	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.
	3. Multidimensional Systems, Finite Wordlength Effects, Delayed and Uncertain Systems, Discrete Control Systems, Robotics, Computer Vision.
	4. Analog Circuit design, Analog Signal Processing,Current-mode circuits,Electronic Devices and Circuits.Design of high performance active building blocks.
	5. Radio Frequency Active Circuits and Passive Circuits such as Power Amplifier, Baluns, low loss power combining topology, RF and Microwave applications in interdiscipline domains such as agriculture, Modeling of GaN HEMT.
	6. Signal Processing for IoT, Machine Learning, Deep learning, Context Awareness, Image Processing, Speech Processing, Biomedical signal processing, Structural health monitoring.
	7. 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.
	8. 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.
<b>EEE</b>	1. Control Scheme for Various Applications in Power System and Power Electronics Such as Load Frequency Control of Multi Interconnected Area for Hybrid Micro-Grid System, Closed-Loop Control of DC-DC Isolated and Non-isolated Converter, Bi-directional DC-DC Converter, Fractional Control System, Anti-Windup Techniques etc.
	2. Power System Stability, Renewable Energy Integration issues in Power Systems, Microgrid, Smart Grid, FACTS applications in Power Systems, Distributed Generation, Application of Optimization Techniques in Power Systems
	3. Electric Vehicle, Renewable Energy Conversion System: solar and Wind, 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.
	4. Control Systems, Model Order Reduction; Robotics, Optimal and Sub-Optimal Control Systems; Tuning and Design of Conventional and Intelligent Controllers.
	5. Protection of conventional power transmission system, Distribution system and Microgrid.
	6. Single-Phase and Three-Phase Microgrids, Power Quality Improvement of the Grid connected renewable energy sources, water pumping system, Power Converters.
	7. Electric Drives, power electronics and DC microgrid.

<b>MEC</b>	1. CAD, Additive manufacturing (AM or 3D printing) – Medical AM and physical modeling of terrain using AM.
	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. Processing and Characterization on Composite materials, Advanced Machining and Joining Processes".
	5. Renewable energy based hydrogen generation, Alternative fuels for I C Engines, Solar energy storage and applications, Bio-hydrogen generation.
	6. Nanofluids, heat transfer and energy.
	7. Material Science Vibration, FEM analysis and MD simulation
	8. Thermal fluid engineering, Solar thermal, CFD, Heat transfer analysis.
	9. "Advanced Materials and alloys, Composite Materials, Biomechanics, Finite Element Analysis, Tribology, Computational Mechanics, Mechanical Characterization"
	10. Micromachining, Flow and heat transfer through microchannels, Advanced manufacturing processes, Composites, Microwave material processing
	11. Two phase flow, numerical modelling, thermo-fluids
	12. Conceptualization and Development of polymer matrix composites, Joining of green composites, Primary and Secondary Processing of composite materials.
	13. Advanced manufacturing, Microwave material processing & Computational Material Science
	14. Prognostics, analysis if non-linear vibration and its assessment. Condition monitoring, Fault diagnosis, Fault assessment, Application of AI and machine learning in mechanical engineering, Signal processing and its application.
	15. Heat transfer in nanofluids, Desiccant-based dehumidification system, Natural convection, Thermal comfort.
<b>Physics</b>	1. Thin films, Nanowires, Multilayers, Composite Materials.
	2. Material Science, Optics, Bio-medical materials and luminescence.
	3. Magnetism, Thin films, Spintronics, Nanotechnology, Sensors.
	4. X-ray scattering, charge and magnetic Compton Profile, ab-initio calculations, density functional theory, Solar cell Materials.
<b>Chemistry</b>	1. Synthesis and Structural Chemistry, Metal-Organic Frameworks, Supramolecular Chemistry, Soft and responsive materials, Catalysis and photo-catalysis.
	2. Development of new methodology reactions, Total Synthesis of Bioactive Natural Products, Transition-Metal-Catalyzed C-H Activation Reactions.
	3. Small Molecule Probes, Fluorescent Materials, Supramolecular Chemistry, Covalent-Organic Frameworks, Biochar based Functional Materials.
	4. Theoretical calculations on molecules and materials, Computational material science, Membrane Science and Technology, Separation of hazardous contaminants from aqueous streams.
	5. Ground water quality, Coordination Chemistry, Biological Applications of metal-complexes.
<b>Mathematics</b>	1. Computational Mechanics & Numerical Methods.
	2. Biofluid–Mechanics, Mathematical Modelling, CFD, Pumping Flow, Bone Mechanics, Microfluidics, Nanofluids, Non-Newtonian fluids, Heat transfer and Energy.
	3. Nonlinear Wave propagation in Gaseous Media, Quasilinear Hyperbolic System of PDEs, CFD.
	4. Mathematical Biology & Molecular Dynamics.
	5. Approximation Theory & Summability 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
CHEM	1	0	0	1	0	2
PHYS	1	1	0	1	0	3
MATH	0	1	0	0	0	1
CIV	1	0	1	0	0	2
MECH	1+1(PWD)	0	1	1	1	5
ECE	0	0	0	1	1	2
EEE	1	1	0	0	0	2
CSE	2	0	0	1	0	3
	8	3	2	5	2	20

**Selection Procedure:**

Whole selection process will be through offline mode. The shortlisted candidates will be called for offline 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 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/by hand to Assistant Registrar (Academic), NIT Uttarakhand on or before **08/09/2022 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. 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 before written test. 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 and no part of fee will be refunded. 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).
  - Candidates 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 NITUK) 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 Institute 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-2022.
- 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 Ph.D. 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 matches with the experts available and whether any supervisor is willing to offer project in the desired area.
- The student will be governed by the rules & regulations of Ph.D Ordinances and the same is uploaded on Institute website.
- **Institute reserves the right to cancel the admission of a scholar 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 anyreason.**

### 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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**TOTAL** **Rs. 25,000/-**

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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:

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.*

## Required documents:

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

- (i) Photo ID card (Aadhar Card/Driving License).
- (ii) High School (10<sup>th</sup> class) certificate.
- (iii) Under-Graduate degree certificate and all mark sheet(s).
- (iv) Post-Graduate degree certificate and mark sheet.
- (v) GATE score card or NET (CSIR/UGC/LS) qualifying certificate.
- (vi) Caste certificate (if applicable):
  - (a) 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/Tehsildar).
  - (b) 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/Tehsildar) indicating the status regarding Non Creamy Layer (NCL). **The certificate should be issued on or after 1<sup>st</sup> April, 2022.**
- (vii) EWS certificate (if applicable), the Certificate (In Central Govt. Format) should be issued by the competent authority (not below the rank of SDO/SDM/Tehsildar) indicating the annual income of the family for last financial year. **The certificate should be issued on or after 1<sup>st</sup> April, 2022.**
- (viii) PWD certificate (if applicable), the Certificate (In Central Govt. Format) should be issued by the authorized medical authority.
- (ix) TC/Migration Certificate. Candidate who will not attach the copy of TC/Migration Certificate with the application form has to submit the original copy of the same within one month of admission in Ph.D Programme, otherwise the admission in the Institute will stand cancelled.
- (x) If employed, No Objection Certificate (NOC) from the current employer in support of your application must be attached with application form.
- (xi) All the publications (if any).
- (xii) Teaching/research experience certificate (if any).
- (xiii) Profile of the Organization/ Employer in case of SRS category candidate.
- (xiv) 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 attached format at the time of applying.
  - (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 part of fee will be refunded to the candidate.



### How to apply for admission to Ph.D. Programme in Odd Semester 2022:

The application form and other relevant information for admission to Ph.D. Programme Odd Semester 2022 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 the following address on or before **8<sup>th</sup> September, 2022 by 05:00 PM:**

**Assistant Registrar (Academic),  
National Institute of Technology, Uttarakhand  
Temporary Campus at Govt. ITI, Srinagar Garhwal  
Dist. – Pauri Garhwal  
Uttarakhand-246174**

### Account details for payment of application fees online:

SBI bank A/C No: **37530602667**  
Name of A/C holder: **NIT Uttarakhand**  
IFSC Code: **SBIN0003181**

### Important Dates:

<b>Last date for receipt of application form.</b>	<b>8<sup>th</sup> September, 2022</b>
<b>Date of displaying the list of eligible candidates for written test</b>	Will be notified on Institute's website
<b>Date &amp; time for written Test.</b>	Will be notified on Institute's website
<b>Date and time of interview.</b>	Will be notified on Institute's 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**