National Institute of Technology, Uttarakhand

Information Brochure of Ph.D. Programme

Even Semester-2023

Applications are invited for admission to Ph.D. Programme [**Full Time (Institute Sponsored), Full Time (Sponsored), Full Time (Self-Sponsored), and Part Time**] in Even Semester-2023. Application form and Information Brochure can be downloaded from the Institute's website **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. greaterthan 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
CIVIL	M.E., M.Tech., M.S., and M.Sc (Engg.) in relevant engineering and technology disciplines.
CSE	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).
ECE	ME/M.Tech./M.S Degree in concerned or allied subject/discipline.
EEE	M.E/ M.Tech or equivalent degree in respective & relevant engineering disciplines.
MEC	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.

Physics	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.
Chemistry	M.Sc. in Chemistry.
Mathematics	M.Sc. (Mathematics), M.Sc. (Applied Mathematics), M.Sc. (Industrial Mathematics) M.Sc. (Mathematics & Computing), M.Tech (Mathematics/Applied Mathematics)

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

Name of Department	Area of research
CIVIL	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. Stability Analysis of Tunnels/Underground Structures, Bearing Capacity of Foundations, Pull Out Capacity of Anchors, Strength Behaviour of Rocks, Reinforced Earth Structures, Stability Analysis of Embankment over Soft Clay.
	9. Flow and Contaminant/tracer(s) transport through porous media, Assessment of Groundwater pollution and management of water resources, Groundwater Hydraulics, Hydrogeological safety and risk assessment of hydraulic structures, Sediment transport in streams or rivers, Hydrometeorological study for development of water resources.
CSE	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. Cryptographic Key Establishment, Authentication in Smart Grid, Attribute based cryptosystem.
	5. Cryptography and Security, Machine Learning and Deep Learning
	6. Video/Image Saliency, Machine Learning, Deep Learning, Computer Vision, Image Processing, Multimedia data Security.
	7. WSN/IoTs, Deep Learning/ Machine Learning, Drug Design, Natural Language, Cloud Computing, Data Warehousing

ECE	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. 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.
	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.
	7. Novel MOS-based device/circuit co-design, Low Power Device-Circuit Codesign, Semiconductor Device Modeling, 3D IC Integration, Through Silicon Via.
	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.
EEE	1. Power System Stability, Renewable Energy Integration issues in Power Systems, Microgrid, Smart Grid, FACTS applications in Power Systems, Distributed Generation, and Application of Optimization Techniques in Power Systems.
	2. Protection of conventional transmission and distribution system and protection of Microgrid
	3. Single-Phase and Three-Phase Microgrids, Power Quality Improvement of the Grid connected renewable energy sources, water pumping system, and Power Converters.
	4. Control Scheme for Various Applications in Power Systems and Power Electronics Such as Load Frequency Control of Multi Interconnected Areas for Hybrid Micro-Grid Systems, Closed-Loop Control of DC-DC Isolated and Non-isolated Converter, Bi-directional DC-DC Converter, Fractional Control Systems, Anti-Windup Techniques etc.
	5. Electric Vehicle, Renewable Energy Conversion Systems: 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.
	6. Electric Drives, power electronics and DC microgrid.
MEC	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. Composite materials.
	5. Renewable energy-based hydrogen generation, Alternative fuels for I C Engines, Solar energy storage and applications, Bio-hydrogen generation.

	6. Biomass gasification, Combustion, Nanofluids, Heat transfer, Energy, Smart materials, and Composite materials.
	7. Material Science, Vibration, FEM analysis and MD simulation.
	8. Thermal fluid engineering, Solar thermal, CFD, Heat transfer analysis, Renewable energy.
	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 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.
	15. Heat transfer in nanofluids, Desiccant-based dehumidification system.
Physics	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.
Chemistry	1. Synthesis and Structural Chemistry, Metal-Organic Frameworks, Supramolecular Chemistry, Soft and responsive materials, Catalysis and photo-catalysis.
	2. Organic Synthesis, Development of new methodology reactions, 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.
Mathematics	1. Advanced computational techniques for solving partial differential equations with applications in solid mechanics problems, Extended Finite Element Method, Meshfree Methods, Distributed Dislocation Method, Singular Integral Equations, Riemann-Hilbert problems, Fracture in Smart Materials.
	2. Mathematical modelling, Bio-fluids Mechanics, Bone Mechanics, Peristaltic Transport, Non-Newtonian Fluids, MHD Fluids, Nanofluids, Electrokinetic Transport, Computational Fluid Dynamics, Microfluidics and Nanofluidics, Numerical methods, Fractional calculus.
	3. Nonlinear Wave propagation, Quasilinear Hyperbolic Systems of Partial Differential Equations, Two-phase Flows; Lie Group Invariance for Solutions of PDEs, Computational Gasdynamics.
	4. Molecular Dynamics, Mathematical Biology.
	5. Summability and approximation Theory.

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

Department	Open	Open-EWS	SC	ST	OBC	Total
CIV	2	0	1 (PWD)	1	1	**05**
MECH	2+1(PWD)	1	1	1 (PWD)	2	**08**
ECE	2	1	1	0	3	**07**
EEE	1	0	1	0	0	**02**
CSE	1	0	1	0	0	**02**
CHEM	2	0	0	0	0	**02**
PHYS	1	0	0	0	1	**02**
MATH	1	0	1	0	1+1(PWD)	**04**
	13	**02**	**06**	**02**	**09**	**32**

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 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 **03/01/2023 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. 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 Even Semester-2023.
- Research Scholar selected for the Ph.D. Programme will have to complete the specified course work as per the 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 in the application form. Institute reserves the right to allocate a supervisor beyond the area of interest of the student. However, the candidates are advised to visit the webpage of the allotted faculty before joining.
- 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)

TOTAL Rs. 35,000/-

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

(II) Subsequent years: Annual fees
Tuition fee Rs. 15,000/-
Development fee Rs. 10,000/-

TOTAL Rs. 25,000/-

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 31st December /30th 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^{th} 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 1st 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 1st 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 an undertaking (as enclosed) that the original copy of the same will be submitted at the time of joining 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 application.

(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 Even Semester 2023:

The application form and other relevant information for admission to Ph.D. Programme Even Semester 2023 can be downloaded from the Institute website: **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 **03/01/2023 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:

Last date of receiving the applications	3rd January, 2023
Display of list of eligible candidates for written test on Institute's website	Within 15 days of deadline of application
Date & Time of Physical Reporting for written test	Within 25 days of deadline of application
Date & Time of Interview of eligible candidates	Same day of written test at 4.00 pm
Display of list of selected candidates on Institute's website	Within 15 days after interview

Visit institute website: **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 responsibilitywill 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-
I/c Registrar
NIT, Uttarakhand