

National Institute of Technology, Uttarakhand
Information Brochure of Ph.D. Programme
Even Semester-2022



Applications are invited for admission to Ph.D. Programme (**Full Time (Self Sponsored), Full Time (JRF/SRF Sponsored), and Part Time**) in Even Semester-2022. Application form and Information Brochure can be downloaded from NITUK 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. 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 Ph.D Admission 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 Engg./ Computer Engg./ Information Technology/ Communication and Computer Engg./ Electronics and Communication Engg. M.E./M.Tech. in Computer Science and Engg./ Computer Engg./ Software Engg./ Information Technology/ Information Security/ VLSI
ECE	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.
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/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.

CHEMISTRY	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.
MATHEMATICS	M.A./M.Sc. in Mathematics/Applied Mathematics
ENGLISH	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:

Name of Department	Area of research
CIVIL	1. Transportation Engineering, Pavement Materials, Ground Improvement Techniques, Traffic Engineering, Pavement Evaluation.
	2. Computational Modelling of Underground Geotechnical Structures, LRFD for Slope Stability Analysis, Studies on Soil-Reinforcement Interface Properties.
	3. Structural Engineering, Structural Dynamics, Earthquake Resistant Design, Structural Health Monitoring.
	4. Geotechnical Engineering, Foundation Engineering, Stability Analysis of Slopes, Stability Analysis of Underground Excavations, Earth Retaining Structures, Ground Improvement Techniques, Lumped Parameter Modelling of Reinforced Earth Bed, Influence of Dynamic Loads on Geotechnical Engineering Structures.
	5. Stability Analysis of Underground Excavation, Bearing Capacity of Foundation, Pull Out Capacity of Anchors, Strength Behaviour of Rocks, Reinforced Earth Structures.
	6. Computational Mechanics, Behaviour of Cold Form Steel Shear Wall Panels, Base Isolation Techniques, Earthquake Engineering, Wind Engineering, Soil Structure Interaction, Fluid Structure Interaction, Structural Engineering, Finite Element Method, Meshless Method.
	7. Water Treatment, Wastewater Treatment, Solid Waste Management, Environmental Impact Assessment, Sustainable Development, Advanced Oxidation Process, Waste to Energy, Water Management.
	8. Groundwater Hydraulics, Sediment Transport and Control, Hydrological Safety and Risk Assessment of Hydraulic Structures, Unsaturated flow modelling.
CSE	1. Multimedia Analysis, Video Processing, Deep Learning, Machine Learning, Cloud Security, Real-Time Systems, Bioinformatics
	2. Computing Systems, Wireless Sensor Networks and IOT, Artificial Intelligence and Deep Learning,
	3. Biometrics, Privacy and Security in Biometrics, Pattern Recognition, Image Processing, Visual Attention Modeling and Machine Learning.
	4. Computer Vision, Machine Learning, Deep Learning, Visual Saliency, Object Detection, Security and Privacy.
	5. Pattern Recognition and Machine Learning, Computer Vision, Deep Learning, Reinforcement Learning.
	6. Multimedia Data Security, Machine Learning, Biometrics Security.
	7. Computer Networks, Real-Time Systems, Security, Networks Security, Artificial Intelligence in IoT, and Edge Computing.
	8. Cryptographic Key Establishment, Cryptography, Network Security, and Machine Learning.

ECE	1. Biomedical Signal and Image Processing, Hyperspectral Image Processing, Soft Computing Methods for Microwave and Millimeter-Wave Design, Evolutionary Techniques for System Identification, Evolving Deep Convolutional Neural Networks, Speech Signal Processing, Application of AI Techniques in VLSI Design and Communication Systems, Signal Processing for Wireless 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.
	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.
	6. Signal Processing for IoT, Machine Learning, Deep learning, Context Awareness, Image Processing, Speech Processing, Biomedical signal processing
	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.
EEE	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.
	2. Distribution System Planning, Power System Stability, Renewable Energy Integration Issues in Microgrid
	3. Electric Vehicle, Fast charging of Electric vehicle, Advance Electric Drives like BLDC, PMSM, SRM and its control: Different types of Induction generator (DFIG, SFIG) and it's applied to induction generator. Renewable energy: Solar energy conversion system, Battery energy storage system, and its control. Wind Energy Conversion System. Power Electronics: Different types of DC-DC converter and DC-AC converter for Solar energy conversion system. Multilevel Inverter and its control, Variable frequency drives, Solar Inverter. Closed loop control of DC-DC isolated, non-isolated converter, Bi-directional DC-DC converter, Multi-output DC-DC Converter Resonant Converter, Z-source Inverter, and Unity power factor rectifier. Flexible AC Transmission System, Active Power Filter.
	4. Model Order Reduction; Robotics, Optimal and Sub-Optimal Control Systems; Tuning and Design of Conventional and Intelligent Controllers
	5. Protection of renewable energy source based power system.
	6. Single and Three Phase Microgrid based on Renewable Energy Sources, Solar Energy based Water Pumping System, Multilevel Converters.
MEC	1. CAD and Additive Manufacturing (AM or 3D printing) - Medical AM and physical modeling of terrain using AM
	2. Renewable energy technologies, Alternative fuels, Combustion, heat transfer, Smart materials and Composite materials
	3. Manufacturing, Welding, Composites, Non-Traditional Machining.
	4. Composite materials.



	5. Alternate fuels-their combustion, performance and emissions; Energy storage and cogeneration/trigeneration systems; Hybrid/Electric vehicles and battery management system; Renewable energy based hydrogen production.
	6. Heat Transfer, Fluid flow, Nanofluids, CFD, Combustion, Energy, and Environment
	7. Thermal-Fluid, Solar thermal, Heat transfer in mini/micro channels.
	8. Advanced Materials, Composite Material, Alloys, Fracture Mechanics, Finite Element Method, Tribology
	9. Advanced Manufacturing processes; Flow and heat transfer through microchannels; Microwave material processing; Composites
	10. Prognostic, fault diagnostic, condition assessment, Application of machine learning and artificial intelligence, smart algorithm and expert systems. Vibration based assessment and control. Structural health monitoring and physical modelling of structure. Vibration study in Medical applications.
	11. Two phase flow and heat transfer
	12. Composite Materials: Conceptualization and Development, Manufacturing of Polymer Matrix Composites, Natural Fiber Based Green Composites, Joining of natural fiber reinforced composites.
	13. Advanced Manufacturing Processes, Microwave Material Processing, Micromachining, Computational Material Science.
Physics	1. Thin films, Nanomagnetism, Spintronics, Ion-irradiation, Sensors.
	2. Material Science, Nanomaterials, Optics, Optical Materials, Optical devices and Bio-Medical applications.
	3. Magnetic thin films, nanowires and nanocomposite materials.
	4. X-ray scattering, charge and magnetic Compton Profile, ab-initio calculations, density functional theory, Solar cell Materials.
Chemistry	1. Small Molecule Probes, Supramolecular Chemistry, Fluorescent Materials, Covalent Organic Frameworks, Soft & Hybrid Materials, Biochar based Functional Materials
	2. Theoretical calculations on molecules and materials, Membrane Science and Technology, Methods for separation of hazardous contaminants from aqueous streams.
	3. Total Synthesis of Bioactive Natural Products and Transition-Metal-Catalyzed C-H Activation Reactions.
Mathematics	1. Mathematical Modelling and Simulation, Bio-fluids Mechanics, Bone Mechanics, Peristaltic Transport, Non-Newtonian Fluids, MHD Fluids, Nanofluids, Electrokinetic Transport, Computational Fluid Dynamics, Microfluidics and Pumping mechanisms for Bio-Inspired pumps.
	2. Computational Mechanics, Numerical Methods in Smart Materials
	3. Nonlinear Waves, Hyperbolic systems of PDEs
	4. Mathematical Biology, Mathematical Modeling
	5. Summability theory and Approximation theory.
English	1. Literature of the Indian diaspora, Popular Culture, Indigenous literature, and Postcolonial literature, Eco cultural perspectives in Literature and critical theories

Selection Procedure:

Whole selection process will be through online/offline (physical) mode, keeping in view the COVID-19 Situation. The shortlisted candidates will be called for online/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 online/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 to Assistant Registrar (Academic), NIT Uttarakhand on or before 31st January, 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. 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 Even Semester-2022.
- Research scholar selected for the Ph.D. Programme will have to complete the specified course work as per Ordinances.
- Hostel accommodation is subject to the availability.



- 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)

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.*

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 (10th 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/Tahsildar).
- (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/Tahsildar) indicating the status regarding Non Creamy Layer (NCL). **The certificate should be issued on or after 1st April, 2021.**
- (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/Tahsildar) indicating the annual income of the family for last financial year. **The certificate should be issued on or after 1st April, 2021.**
- (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 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 Even Semester 2022:

The application form and other relevant information for admission to Ph.D. Programme Even Semester 2022 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 Assistant Registrar (Academic), NIT Uttarakhand on or before 31st January, 2022 by 05:00 PM.



Account details for payment of application fees online:

SBI bank A/C No: **37530602667**

Name of A/C holder: **Director, NIT Uttarakhand**

IFSC Code: **SBIN0003181**

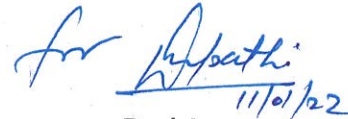
Important Dates:

Last date for receipt of application form.	31st January, 2022
Date of displaying the list of eligible candidates for written test on Institute website.	Within One week 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 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.

for 
11/01/22
Registrar
NIT, Uttarakhand