



**NATIONAL INSTITUTE OF SCIENCE EDUCATION AND RESEARCH
BHUBANESWAR**

Advt.No:NISER/ACAD/Ph.D & Intg MSc-PhD/2022-23 (1)

Date-14.03.2022

Notice for Admission to Ph.D Program: 2022-23 (Summer Session)

Online applications are invited from Indian citizens for admission to Ph.D program scheduled to commence from August, 2022 in the following schools of NISER, Bhubaneswar:

1. School of Biological Sciences (SBS)
2. School of Chemical Sciences (SCS)
3. School of Computer Sciences (SCPS)
4. School of Earth & Planetary Sciences (SEPS)
5. School of Humanities and Social Sciences (SHSS)
6. School of Mathematical Sciences (SMS)
7. School of Physical Sciences (SPS)

1. Eligibility

School	Minimum Educational Qualifications #
Biological Sciences	60% or equivalent GPA in Masters or M. Tech or M. Pharm in any branches of Agricultural Sciences, Biology, Life Sciences, Pharmacy (any specialization), Veterinary Sciences, Computer Sciences, Bioinformatics and Biotechnology. Students with Master's degree in Physics, Chemistry or Mathematics having interest in pursuing a career in Biology are also encouraged to apply.
Chemical Sciences	60% or equivalent GPA in Masters in Chemistry or allied Chemistry fields. Student with Master's degree in any branches of Basic Sciences with undergraduate degree in Chemistry (or chemistry as one of the subjects) or M.Tech in applied Chemistry or Computer Sciences with interest in pursuing a career in Chemistry are also encouraged to apply.
Computer Sciences	60% or equivalent GPA in Masters in Computer Science/Mathematics/Electronics /Electrical Engineering or related fields.
Earth & Planetary Sciences	60% or equivalent GPA in Masters or M.Tech or M.E in Physics/Astronomy and Astrophysics /Geology/ Geophysics/ Earth Science / Chemistry /Space / Atmospheric and Oceanic Sciences / Engineering Physics/ Mechanical engineering / Civil engineering / Computer engineering. In addition to the above criteria, candidates with M.Sc. degrees should possess a mathematical, physical or Chemical science based Bachelor's degree.
Humanities and Social Sciences	55% or equivalent GPA in Masters in Social Sciences or in allied disciplines.
Mathematical Sciences	60% or equivalent GPA in Master's degree examination.
Physical Sciences	60% or equivalent GPA in Masters in Physics or M.E/M.Tech in Applied Physics.

Candidates who are appearing in the final semester/year of qualifying examination in 2022 are also eligible to apply. However, if selected, their admission will be subject to submission of final semester / year result mark sheet wherein they should have obtained the requisite percentage/GPA.

2. Requirement of Qualifying in National Level Examinations for pursuing Ph.D program

School of Biological Sciences - Candidates should have qualified at least one of the National Level Examinations i.e. CSIR-UGC-NET (LS or JRF)/ GATE/ JEST/ GPAT/ DBT/ ICMR/ JGEEBILS or any other equivalent national level examination valid for the academic year August 2022- July 2023.

School of Chemical Sciences -Candidates should have qualified at least one of these National Level Examinations i.e. CSIR-UGC NET (LS or JRF)/GATE valid for the academic year August 2022- July 2023.

School of Computer Sciences –Candidates should have qualified at least one of these National Level Examinations i.e. CSIR-UGC-NET(JRF) /GATE/JEST valid for the academic year August 2022- July 2023.

School of Earth and Planetary Sciences –Candidates should have qualified at least one of these National Level Examinations i.e. CSIR-UGC-NET (LS or JRF) /GATE/JEST valid for the academic year August 2022- July 2023.

School of Humanities & Social Sciences –Candidates should have qualified at least one of the National Level Examinations i.e. UGC-NET (LS or JRF)/ ICSSR fellowship or any other equivalent national level examination valid for the academic year August 2022- July 2023.

School of Mathematical Sciences - Candidates should have qualified at least one of these National Level Examinations in **Mathematical Sciences** i.e. CSIR-UGC-NET (JRF **only**)/ GATE/ NBHM* or any other equivalent national level examination valid for the academic year August 2022- July 2023.

*A student will be considered to be qualified in National Level Written Examination conducted by NBHM if he/she has received call letter from NBHM to appear in the interview for PhD fellowship 2022 (irrespective of getting selected for NBHM PhD fellowship 2022 or not).

School of Physical Sciences – Candidates should have qualified at least one of these National Level Examinations i.e. CSIR-UGC-NET (JRF only)/ GATE/ JEST valid for the academic year August 2022- July 2023.

Important Note:

(a)The cut off marks for national examination such as GATE/ JEST/ GPAT/ NBHM/ JGEEBILS/ CSIR-UGC-NET etc will be further decided by each School for the relevant subject area.

(b)As per HBNI Ordinance, student having INSPIRE Doctoral Fellowship ONLY, without qualifying any of the above mentioned national level written examination will NOT be considered for admission to Ph.D program in NISER.

(c) Candidates with GPA in qualifying degree may need to produce the conversion note (in case it is not mentioned in their mark sheet) from their institution towards calculation of percentage.

3. Fellowship

1. The institute fellowship given by NISER is ₹31,000/- for first two years, which will subsequently be enhanced to ₹35,000/- for remaining three years, subject to the condition that he/she fulfills all the requirements of the Institute that will be stipulated from time to time.
2. Students with external fellowship from agencies viz. CSIR, UGC etc will be eligible to draw fellowship as per the extant rules of the respective funding agencies.

4. Research Areas for some Schools

School of Biological Sciences

- Regulation of cell adhesion and signaling in gastric cancer progression. (Dr. Asima Bhattacharyya Lab)
- Regulation of cell structure and functions by thermosensitive TRP ion channels (Dr. Chandan Goswami)
- Understanding the Translational Control mechanism in Eukaryotes (Dr. Pankaj V Alone Lab)
- The gut microbiota and its role on gut-adipose-brain axis to understand health in humans, mice models, and organoids (Dr. Palok Aich)
- Interaction of light and auxin in shaping development in plants; Role of splicevariant of CONSTANS, CO like and GIGANTEA in the regulation of Florigen (Dr. Kishore C. Panigrahi Lab)
- Cell Mediated Immune responses (CMI) associated to altered T cell and Macrophage responses towards Infection Immunity and Cancer Immunity (Dr. Subhasis Chattopadhyay Lab)
- Cellular Regulation of morphogenesis and degradation of complex cell shapes (Dr. Renjith Mathew Lab)
- Mechanism and regulation of nuclear remodelling: Role of dynamin related protein and Endoplasmic reticulum. (Dr. Abdur Rahaman)
- Molecular Genetics and Epigenetics of Ageing Disorders: Neuro degeneration and Cancer (Dr. Debasmita P. Alone)
- Molecular Microbiology: Functional significance of membrane proteins and mechanisms underlying bacterial persistence (Dr. Harapriya Mohapatra)
- Molecular Genetics of Gallbladder cancer; putative angiogenic regulators and tumorigenesis (Dr. Manjusha Dixit)
- Structure-function studies on terminase complex proteins of herpes viruses (Dr. Tirumala K. Chowdary)
- Evolutionary origins, biogeography and systematics of biota within the Indian subcontinent (Dr. Aniruddha Dutta Roy)
- Phylogeography and species diversification patterns (Dr. Aniruddha Dutta Roy)
- Structure-and-function work on two component systems/transporters. (Dr. Rudresh Acharya)
- Cell based models for characterizing small molecules in the area of drug discovery (Dr. V. Badireenath Konkimalla Lab)
- Mechanism of membrane remodelling during host-pathogen interactions. (Dr. Mohammed Saleem Lab)

For more information please visit: <https://www.niser.ac.in/sbs/page/faculty-and-area-research>.

School of Computer Sciences

Computational Geometry, Cryptography, Graph Algorithms, Parameterized Algorithms, Information Theory, Secure Multiparty Computation, Property Testing and Machine Learning

School of Earth and Planetary Sciences

- Physics of star and planet formation; Observing the origin of stars and planets using ground (e.g., IRAM, NOEMA, ALMA in mm/sub-mm) and space-based telescopes (e.g., NASA's JWST in near and mid-infrared); Exoplanets (atmospheres, formation mechanisms, and observations using ground and space-based telescopes) [Dr. Liton Majumdar's lab]
- Diversity and uniqueness of planetary bodies and their moons in the terrestrial and icy regions of the Solar System including the small bodies (asteroids, comets, Kuiper belt objects) using hyperspectral data (surface and subsurface composition) and imaging data (morphology and topography) from various missions (e.g., ISRO's Chandrayaan II, NASA's Mars program, NASA's Cassini, NASA's Dawn) [Dr. Guneshwar Thangjam's lab].
- Physics of friction at low sliding rates (theory and experiment), mechanics of fluid-induced earthquakes and rainfall-induced landslides, earthquake source physics, geodetic constraints on plate boundary deformation, fault zone hydrology and permeability evolution, non-linear inverse problems in geosciences, Bayesian inference techniques, high performance code development in fault mechanics [Dr. Pathikrit Bhattacharya's lab].
- Exoplanet Atmospheres Theory and Observations; Understanding Physics and Chemistry of exoplanet/solar-system atmospheres using electromagnetic radiation and spectroscopy, developing models to interpret their observations from telescopes like HST, VLT and JWST, terrestrial planet modeling for habitability/bio-signature detection with future telescopes, developing atmospheric retrieval techniques, exoplanet transit observations. [Dr. Jayesh Goyal's Lab].
- (1) Tropical climate/atmospheric dynamics, radiative-convective equilibrium and constraints on subtropical heat stress. (2) Convection physics in tropical and subtropical regions. [Dr. Jaya Khanna's Lab]
- Early evolution of solar nebula as inferred from nanometer scale mineralogy, structure and isotopic anomalies in components (e.g. first solids to form in the solar nebula, presolar grains, organic-rich matrix) within meteorites, evolution of planetesimals in the solar system, impact related high P,T transformation of minerals in meteorites, laboratory simulations of space weathering on Mercury and on asteroids in the solar system and structural and chemical evolution of dusts in the ISM, methods development for correlative nanometer scale study of extraterrestrial materials using high-end analytical instruments (e.g. FIB-SEM, TEM, SIMS, Atom-probe tomography, synchrotron nano-XRD/XRF). [Dr. Surya Rout's Lab].

For more information, please visit: <https://www.niser.ac.in/seps/page/faculty>

School of Humanities and Social Sciences

English and Sociology (In case of Sociology, please specify the area of research viz. i) non-power applications of nuclear science and technology, (ii) nuclear energy and policy, (iii) human-wildlife conflict and wildlife conservation and (iv) Science & Technology-Society interface).

School of Mathematical Sciences

Algebraic Geometry, Algebraic Graph Theory, Cryptography, Differential Equations, Differential Geometry, Discrete Mathematics, Functional Analysis, Harmonic Analysis, Incidence Geometry, Number Theory, Probability Theory.

For more information please visit: <https://www.niser.ac.in/sms/professors>

School of Physical Sciences

- **Condensed Matter Theory:**

Strongly correlated electron systems and many body theory, Study of the entanglement content of ground states of quantum magnets, Computational approaches to lattice models, Dirac and Weyl Physics in Topological Insulators and Graphene, Study of strong correlations in Ultracold Bosons, Multiscale Material Modelling Simulations within ab initio electronics structure and model Hamiltonian, Electronic Structure Theory, Theoretical nanoscale science, Quantum information theory, Game Theory.

Statistical Mechanics and Soft Matter: Disordered complex systems, non-equilibrium statistical mechanics, active matter, polymers, colloids, stochastic processes in biology.

- **Condensed Matter Experiment:**

Domain wall dynamics, Skyrmionics & Topotronics, Spin pumping and Inverse Spin Hall effect, Organic Spintronics, Compensated/Antiferromagnetic spintronics, Anomalous and topological Hall effect in non-trivial magnets, Spin triplet supercurrent generation, Induced superconductivity in confined Geometry, Josephson Junction physics, Ion beam based Nanomaterials Research, Nanophotonics/Plasmonics, Semiconductor Device Physics, Medical Diagnostic Devices, Ultrafast dynamics, Nonlinear and Time-resolved terahertz spectroscopy, Quantum Optics and Cold Atom Research, Coherent Rydberg Excitation in Atomic Vapor, Nonlinear Optics and Lasers, Optical Parametric Oscillators and Amplifiers, Soft Matter & Biophysics, Fluid Dynamics.

- **High Energy Theory:**

Relativistic dissipative fluid dynamics, Physics of heavy ion collisions, quark gluon plasma and QCD matter, Study of Hot and dense nuclear matter, Finite temperature field theory, Numerical relativistic hydrodynamics and magneto hydrodynamics, Lattice QCD, Black Holes, String Theory, Fluid-Gravity correspondence.

- **High Energy Experiment:**

Quantum Chromo dynamic (QCD) phase diagram, Transport properties of QCD matter and various signatures of Quark Gluon Plasma, Dark Matter Search, CP violation, Neutrino oscillation, Physics related to the Top quark and Beyond Standard Model (BSM) Higgs boson(s) at the Large Hadron Collider (LHC).

- **Cosmology and Astrophysics:**

Observational Cosmology, Epoch of reionization, Galaxy formation and evolution, N-body simulations, CMB observations, dust polarization, primordial gravitational waves, starlight polarization.

5. Selection Procedure

- The selection committee of the respective schools will short-list the candidates among those who meet the minimum educational qualifications and satisfy additional criteria which each school may set as deemed necessary.
- The short-listed candidates will be called for an interview, supplemented by a written test, if necessary, for the admission.
- Based on the academic record and the performance of the candidates in the selection process, the selection committee of the school will recommend candidates to the Chairman, Academic Council for admission to the Ph.D. program.
- All candidates called for the Test / Interview will be paid to and fro single, second-sleeper class railway fare by the shortest route from their place of residence to the Institute. They have to produce evidence (railway ticket) in support of their claim.

6. How to Apply

- The application form has to be filled up online at <http://www.niser.ac.in> and candidates should follow stepwise instructions mentioned to complete the application submission process. At the time of application, along with this online form, the candidate should upload soft copy of the supporting documents as per the eligibility criteria.
- Candidates intending to apply for more than one school should fill up separate online application forms for each school with appropriate supporting documents.
- NISER does not demand any application fee from the candidates who apply for Ph.D program.

7. Important dates:

- Online application portal will be activated on – 1st April, 2022
- Last date for filling up online application – 30th April, 2022
- Short-listed candidates list will be uploaded on NISER website – 10th-16th May, 2022
- Tentative dates for test/interview will be as follows:

1. School of Biological Sciences:	1 st – 4 th June, 2022
2. School of Chemical Sciences:	27 th – 29 th June, 2022
3. School of Computer Sciences:	6 th June, 2022
4. School of Earth & Planetary Sciences:	27 th June – 1 st July, 2022
5. School of Humanities and Social Sciences:	1 st -2 nd June, 2022
6. School of Mathematical Sciences :	15 th -17 th June, 2022
7. School of Physical Sciences:	30 th May – 1 st June, 2022
- Each school will send the call letters to the candidates separately. Kindly refer to the website for the announcement of the selected candidates.
- The registration is scheduled to be held in August, 2022. The exact date will be intimated in due course of time.
- If you have any further query, kindly send an email to cpsbs@niser.ac.in, cpscs@niser.ac.in, cpscps@niser.ac.in, cpseps@niser.ac.in, cpshss@niser.ac.in, cpsms@niser.ac.in, cpsps@niser.ac.in for Biological Sciences, Chemical Sciences,

Computer Sciences, Earth & Planetary Sciences, Humanities & Social Sciences, Mathematical Sciences and Physical Sciences respectively.

- Applicants are encouraged to visit school web page for more information on research activities.

Checklist for application submission

During online submission, you will need to have the following ready with you for uploading;

- JPEG file of your passport size photo.
- JPEG file of your valid signatures.
- Birth Certificate/10th pass certificate in support of date of birth.
- Certificate in support of category (SC/ST), only if applicable.
- Certificate and mark sheets in support of passing qualifying examination i.e Master's degree. In case the original pass certificate is not issued by University then a certificate from the University on its letterhead with seal of the concerned authority certifying the completion of degree should be submitted.
- Certificate/document in support of qualifying national level examination(s) viz. CSIR-UGC NET/GATE/GPAT/DBT/ICMR/JEST/NBHM or any other as applicable.
- For students applying for Ph.D in Mathematics through NBHM PhD written test-2022 need to upload the interview call letter received from NBHM.

Dean, Academic Affairs