

National Institute of Technology Silchar

Silchar – 788010, Assam.

Advertisement for IPDF admission for July – December 2024 session

No.: Dean (RC)/IPDF/02/2024-25/

Date:14.06.2024

Applications are invited for admission into **Institute Post-Doctoral Fellowship (IPDF) programme** in the following departments with the area/ specializations and admission group as mentioned in the table for the session July – December 2024.

Department	Area of Research
Civil Engineering	"Transportation Engineering: Traffic Engineering, Transportation Planning, Travel Demand Forecasting, Concrete pavement, Volatilization of waste materials, microstructural analysis, Asphalt mix, Waste materials, microstructural analysis" "Structural Engineering / Structural Dynamics & Earthquake Engg: New Concrete Materials for Sustainable Infrastructure, Nanomaterials, Recycled Aggregate Concrete, Fiber Reinforced Concrete, Hybrid soil modeling; Base Isolation; FE Modeling of Dam, etc; Liquefaction; Earthquake Early Warning; Machine Learning; Condition Assessment of Structure; App Development; Evaluation of relevant IS code; Geotechnical; Structure; Earthquake Engg., Risk and Resilience of Critical Infrastructure Systems ,Physics informed Machine Learning in Structural Engineering, Structural Engineering, Composite Structures, GFRP Pultruded Profiles, Steel Structures, Lightweight structures, fire behaviour of structures, Timber and Bamboo-based Structures, Fracture Mechanics, Ground Response Analysis, Vibration Control of Structure using Passive system, Behaviour of Base Isolated building with new isolator, Risk and Reliability, Optimisation of Performance of Structure under uncertainty, Structural Health Monitoring, Vibration Control, Seismic Retrofit, Concrete technology, Structural Dynamics and Vibration Control, Functionally graded material and composite material, Machine learning in structural engineering, Turbulence modelling" "Geotechnical Engineering: Ground Improvement, Soil-Structure Interaction, Dynamics of Improved Soil, Transportation Geotechnics, Slope Stability Analysis, Analytical and Numerical Modeling, Application of Image Processing in Geotechnical Engineering" "Water Resources Engineering / Environmental Engineering: Hydrology & hydro-climatology, Homogeneous clustering, Climate change impact

	<p>assessment, Downscaling of climate variables and Uncertainty quantification, Coastal Engineering, Remote Sensing and GIS applications, Offshore Engineering, Water and wastewater treatment, Industrial waste management, Adsorption, River health monitoring"</p>
<p>Mechanical Engineering</p>	<p>Green Hydrogen Production, Carbon Capture and Utilization (CCU), Synthetic Fuels (e-fuels), Waste to Energy, IC Engine Combustion, Biofuel, Energy Storage Technologies , Energy Harvesting, Computational fluid dynamics, Bio fluid dynamics and heat transfer, Magneto hydrodynamics, Microchannel flow, Porous media flows, Droplet dynamics, Microfluidics, Fabrication of microfluidic devices, Wettability, Multiphase flow, Non-Newtonian fluid mechanics, Instability analysis, Natural convection, , Thermal protective clothing, Passive cooling methods, Boiling heat transfer, Heat transfer, Micro and macro scale heat transfer, Phase change materials and encapsulation technology, Atomization and spray, Solar Thermal Energy, Solar Passive heating systems, Machine learning based meta modeling of renewable energy systems Solar passive systems for net-zero building, HVAC and Building information modeling (BIM) for thermal performance management, Design and development of vertical axis wind turbines , Site and application specific tailoring of hybrid renewable energy systems, , Battery, Fuel cell, Micro/Pico water turbines, Ocean Renewable Energy, Ocean Thermal Energy conversion, Wind Energy System, Performance study of Oscillating Water Column, Supersonic combustion, Scramjet, Turbulence modeling in high-speed flows, Shock-Boundary Layer Interaction, Computational combustion, drag and heat reduction problem of hypersonic reentry vehicles, Aerodynamics, Molecular Dynamics, Uncertainty Quantification, , Digital Twin, Metamaterials, Development and Synthesis of polymer composites, Hybrid composite materials, Energy materials and management, Fatigue and fracture behaviour of materials, Machining of Composite materials, Hybrid multiscale laminated composites, Bio-composites, Self-healing composite materials and FRP laminates, Material Selection, Material Synthesis and Characterization, Metal Matrix Composites, Vibration and Rotordynamics, Vibration energy harvester, Biomedical system design and analysis, Design and control of micro and macro Mechatronics systems, Mechatronics systems and energy harvester, Analysis, design, and control of Mechatronics systems, Surface coatings, additive manufacturing, powder</p>

fabrication, Hydrophobic/hydrophilic coating, Robotics and control, Mechanism, Parallel Manipulator, Compliant Mechanism, Sensor and actuator, 3D printing mechanism, lower limb rehabilitation robotic devices, underwater robotic manipulator, Bionic Prosthesis, Mobile Robotic manipulator, Shape memory Alloy based soft robotics, Kinematics and dynamics of the robotic system, Planar and spatial parallel manipulators. Vehicle Manipulator Robotic System, Bioscience/ Biotechnology/ Bio-Mechanics, Modelling and development of Expert System for communicable and non-communicable diseases, Augmented/ virtual reality, AI / ML based Mechanical Design & Manufacturing, Composites / Functionally Graded Materials // Smart / Deployable structures, Additive Manufacturing, Tribology, 4D printing of SMP, Synthesis and Characterization of Metal Matrix Composites (MMC) through Powder Metallurgy (PM), Advanced (Non-traditional) Machining, Surface Modification through thin films Coating & Heat Treatment, Tribology of Bearing, Laser Welding, Application of Soft Computing Techniques in Manufacturing, Manufacturing Process Modelling & Optimization, Artificial Intelligence (AI) and Machine Learning (ML) Application in Manufacturing, Multi-criteria Decision Making (MCDM) Techniques, Welding Technology, Soft Computing, Fatigue & Fracture, Nontraditional Optimization Tools, Smart Adhesives and their joining, Surface engineering and functionalization, 3R Composites and vitrimers. Energy-efficient building materials, Vibration analysis, Machine Dynamics, Condition monitoring of dynamic system, Sustainable materials for coatings, Vibration isolation using additive manufacturing, Machine fault diagnosis and prognosis, Biomedical system design and analysis, Energy harvesters designed for biomedical applications, Machining, Electrodeposition, Product Development, Dissimilar welding of materials, Welding for Biodevices, Corrosion science, Thin film deposition, Sheet metal joining and riveting, Metal forming/Joining, Nano materials, Unconventional machining, Micromachining, Hydrophobic films and filtration membranes, Fabrication of Nanopowder for Additive manufacturing, Additive manufacturing of special structures and metal components, Graphene and coating-based sensors, Modeling of abrasive machining and finishing processes, Digital Manufacturing, Tribology of Bearings,

<p>Electrical Engineering</p>	<p>Brainwaves analysis, Design and development of Underwater Autonomous Vehicles, their control and applications, Advanced Battery Management System of electrical vehicles to overcome sudden explosion of batteries, Nonlinear dynamics and chaos, their control with advanced nonlinear controllers and applications, including secured communications, Design and development of a mobile application to measure the correctness of Pranayam in terms of number/ sec and postures and suggest corrections, Design and development of a solar-based trimming of lawns and trimming of bushes; road cleaner along with bruising for a 5000 + population campus, Designing an awareness program on cybersecurity for common people, Develop a unified criterion for using blockchain technologies to satisfy cybersecurity properties, Stability analysis of networked-isolated micro-grids in the presence of source, load disturbances and faults, Design, develop and control drones for different societal applications, Application of control theories for -- Power & Energy System Problems, Robotics, Biomedical Systems.</p> <p>Nanoelectronic materials and devices, Ferro-electric transistors and memories, Image processing, Low power VLSI, Vedic mathematics and its application in digital signal and image processing.</p> <p>Power system Reliability, Microgrid, Smart Grid, Deregulated power system operations, Power Economics, Forecasting and optimization of electrical systems, Charging Infrastructure planning for Electric Vehicles, Electric Vehicle Route Planning using Machine Learning, Aging assessment for Battery Energy Storage System in Electric Vehicles, Automatic generation control, Power system operation and control, application of soft computing techniques in power systems, Power quality, Machine learning for power system and micro grid, Computational Intelligent approaches for future power systems with high Renewable Energy Share, Power Electronics applications to Electric Power and Energy Systems, Renewable Energy Technologies, Distributed Generation, Virtual Power Plant</p> <p>Grid interactive and isolated Renewable Energy Systems and Control (Wind, SPV, Hybrid); Power Conditioning of Power Distribution Systems using Active Filters (Shunt/ Series/ Combined/ Hybrid); Multifunctional and Flexible Power Converters and its applications; Power Converters</p>
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	applications in Electric Vehicles; Electric Drives; Smart Grid Power Management and Control
Electronics and Instrumentation	Sensing Technology, Instrumentation, Biomedical Instrumentation & Signal Processing, Smart Sensors, Industrial Instrumentation, Machine Learning, and Applications of IoTAI: Machine Learning, Deep Learning and its applications in Healthcare, Communication and Signal Processing. Control systems (conventional and data driven Modelling, estimation, control); Renewable Energy system; Energy storage (battery, supercapacitor, fuel cell); Battery health diagnostics and management; Electric vehicle; Smart village and agriculture; Fractional order systems
Computer Science and Engineering	Human Language Technology, Applied Machine Learning, Big Data, Cloud Security, Social Media Analytics, Cryptography, Cryptanalysis, Visual Cryptography, Watermarking, Steganography, Data Mining, Blockchain Technology, e-Governance System, Quantum Computing, Quantum Algorithm, Optimization, Coding theory, Optimization Techniques, Social Network Analysis, Music Information Retrieval, Sanskrit-based Technologies, Microprocessor & System Programming, Programming Language, Distributed Computing, Distributed Artificial Intelligence, Graph Algorithms, Approximation, Communication Networks, Time Series Mining, Activity Recognition, Network Security, Internet of Things, Biometric Security, Computer Vision, Computational Biology, Natural Language Processing, Deep Reinforcement Learning.
Electronics and Communication	Micro/Nanoelectronics: Semiconductor Device Physics and Modelling;, Micro/Nanoelectronics Devices, Circuits and Systems, HEMT; Nanotechnology, Energy Harvesting: Perovskite Solar Photovoltaics; Electronic Materials, Quantum modeling and computing, Neuromorphic computing, Renewable Energy, Li-Ion Battery, Organic Electronic Devices and Photodetectors, SPICE/Compact modeling of Multigate FETs, Statistical analysis of Reliability issues/Self-heating/Stress, Machine learning based device modeling, Non-volatile memory/RRAM/DRAM/Memristor, MEMS/NEMS, Sensors and Actuators, Lab on Chip, Organ on Chip, Optimization. VLSI Design: Digital. Analog and Mixed Mode VLSI design and Technology, Algorithms to VLSI Architectures, VLSI Testing and Verification, VLSI Interconnects, Stretchable Electronics, Biomedical Electronics, IC Design.

	<p>Wireless Communication, Cognitive Radio Networks, UAV based Communication and networking, 5G communication and beyond, Energy Harvesting protocols, Network Slicing, Caching and Splitting of network function in 5G, Satellite Communications, Wireless Sensor Networks, Communication Systems, Millimeter Wave Communications, Digital Communication, Information Theory and Coding, Mobile Communication, Underwater Networks, Free Space Optical Communications and Green Communications, Massive/Cooperative MIMO, NOMA, Power Line Communications, IoT, Artificial Intelligence, Convex Optimization, Cooperative Communications, Soft Computing Techniques, Smart Grid Communications, MIMO-OFDM Communications, Efficient Scheduling of Wireless Resources, Physical Layer Security, Cooperative Communications, Optical Fibre Communication.</p> <p>Signal Processing, Speech Processing, Image and Video Processing, Bio-medical Signal and Image Processing, Multimedia Authentication, Computer Vision, Medical Imaging, Neuroimaging, Pattern Recognition, Optimization Techniques, Signal Processing for Communication, Soft Computing Techniques, Computer Aided Dignosis, Bio-Medicine, Health Informatics.</p> <p>Antenna and Antenna Array Design for Different Applications (Biomedical, Flexible Electronics, MIMO), RF Energy Harvesting Systems, Dielectric Resonators and Applications, EBG and FSS Structures, Antennas for 5G Communications, Computational Intelligence Applications in Microwave and Millimeter Wave Engineering, WBAN, Antenna Array Optimization, Resonators for RF Applications, Machine Learning for Microwave & mm-Wave Devices, Microwave Imaging, RADAR Signal Processing, Metamaterials for RF , Microwave and mm-wave Structures, Active and Passive Microwave Devices, Microwave Imaging, Smart Antenna Systems</p>
Physics	<p>Memristive Systems and Applications, II-VI semiconductor nanostructures for memory devices, Resistive Random access Memory, Perovskite for Solar Cell, energy harvesting (nanogenerator)</p>
Chemistry	<p>Photocatalytic and/ or catalytic applications of Graphitic carbon nitride and Hydroxyapatite based nanomaterials for environmental remediation and energy storage and harvesting</p>

	<p>Nanoscience and Nanotechnology, Nanocatalysts, Synthesis and characterization and application of inorganic nanostructured materials as catalysts, sorbents or polymer reinforcing nano-additives. Application of nanomaterials in various organic transformations, photodegradation of industrially emerging pollutants, bio-energy production and water treatment, waste-derived catalysts for various organic transformations and photodegradation of organic compounds, Waste plastics recycling, Co-processing of petroleum vacuum residue, Polymers, Desulfurization, Solid waste Management, Multifunctional Porous Materials (Metal Organic Frameworks and Covalent Organic Frameworks) for Energy, Environment and Catalysis applications, Physical Chemistry</p> <p>Organic synthesis, Synthesis of Schiff bases and Metal complexes, DFT and Biological studies.</p>
Mathematics	<p>Integral equations, Integro-differential equations and their applications, Linear algebra, Inverse eigenvalue problem, Fuzzy set theory and optimization, Sequence spaces.</p> <p>Supply Chain Management, Inventory Management, Project Management, Queuing Theory, Operations Research & Optimization Techniques, Fuzzy Optimization & Decision Making</p> <p>Number Theory : q- Series, Hypergeometric series, Exponential Sums and related Mathematics</p> <p>Functional Analysis, Operator Theory, Operator Algebra and its applications to Quantum Information Theory.</p> <p>Elastodynamics, Wave Propagation, Theoretical Seismology, Solid Mechanics, Micro and Macro-mechanical Modeling</p> <p>Evolutionary Optimization, Graph Theoretic approaches, Networking Optimization, Multi-objective Optimization, Multi Criteria Decision Making, Optimization in Machine Learning</p> <p>Dynamical Systems: Mathematical Modelling of Biological Problems, Numerical Methods for ODE and PDEs, Fractional Calculus</p> <p>Micro-Nano Fluidic Modelling, Computational Fluid dynamics</p>
Management Studies	Accounting, Finance, Entrepreneurship

The Institute offers **Post-Doctoral Fellowship (PDF)** with a view to providing an opportunity for competent researchers to do independent research work in an appropriate area. Institute will admit young researchers, as Institute Postdoctoral Fellows (IPDFs) and Sponsored Postdoctoral Fellows (SPDFs).

Institute PDF: Those who are applying through advertisement of this institute. These PDFs are termed Institute Post Doctoral Fellows (IPDF). Their rules and regulation are governed by the Institute's policy. The total number of IPDF will be as per the sanctioned strength at any time in a department.

Sponsored PDF: Post-Doctoral Fellow from sponsored project/ agency or awarded by R&D /Other Organizations like DST, SERB, ICSR, UGC, NBHM, INSPIRE, N-PDF, etc. These PDFs are termed Sponsored PDF (SPDF). These SPDFs should follow the rules and regulations (for fellowship, contingency, and duration) as stated by the sponsoring agency. NIT Silchar will offer mentor(s) and they are also broadly governed by the Institute's policy for other issues. The number of SPDFs supported by sponsored projects/agencies will be over and above the sanctioned number of IPDFs.

Eligibility:

The eligibility criterion of the applicant for IPDF are as follows:

1. The National Institute of Technology Silchar is offered Full Time (FT) IPDF program in the area of research/ specialization mentioned in above for the respective department.
2. Institute Post-Doctoral Fellowship is intended for persons normally below 35 years of age. However, for persons from teaching institutions recognized by AICTE/UGC/ R&D organizations or persons sponsored by DSIR-recognized industrial organizations, the maximum age limit shall be 40 years.
3. Institute Post-Doctoral Fellowship will be offered to persons who have a Ph.D. degree in the mentioned branch of Engineering/ Science/ Social Sciences/ Management studies and has a minimum of 03 (Three) research publications in peer-reviewed SCI/SCIE/SSCI indexed journals.
4. All the degrees acquired by the candidate must be in first class, with at least one degree from IIT/NIT/Government Funded/CFTI/Centrally Funded Institutes and/or the institute NIRF rank within 100.
5. Candidate must apply within five years after completing his/her Ph.D. degree.
6. The candidates who have completed their Ph.D. from NIT Silchar can apply for the fellowship after **03** (Three) years of completion of their Ph.D. degree.
7. SC/ST/OBC/EWS/Women reservations and relaxation will be followed as per Government of India norms.
8. Fellowship is available to Indian Nationals only.

Application procedure:

- a) A proposal must be submitted by the aspiring post-doctoral fellow with the consent of a faculty member of NIT Silchar as a mentor.
- b) The proposal submitted by the fellow must not be a mere extension of the Ph.D. work.
- c) The applicant is allowed to submit only one concept note with respect to a single advertisement.
- d) The expertise brought in by the applicant will be an important criterion in the selection process.

- e) The concept note must be submitted as per the format given in **Annexure – I** with filled up application form.
- f) The candidate/ applicant will be allowed to pursue IPDF only once at NIT Silchar.

The filled up application form with the proposal must reach to the following address on or before **28/07/2024**.

All the applications cover must be mention the subject line “**Application for the IPDF program – Name of the Department**”.

To
 The Dean (R&C)
 2nd Floor, Administrative Building
 National Institute of Technology Silchar
 Dist.: Cachar, City: Silchar
 Pin – 788010, Assam, India.

Also a copy of the applications with all supporting documents should be sent to the email id **ipdf_nitsilchar@nits.ac.in**. The candidates are advised to give their latest contact numbers/e-mail ids in the application form. The Institute reserves the right to reject any or all applications or it may amend any of the clauses above as per orders of the competent authority/Government of India.

Important Dates:

Sl. No.	Details	Tentative Dates
01.	Last date of receipt of applications	28.07.2024
02.	Publication of shortlisted candidates for interview/ test	30.07.2024
03.	Tentative date of interview/test	10.08.2024
04.	List of selected candidates to be uploaded in the institute website	05.09.2024

An Application Fee of **Rs. 1000/-**(for Open/OBC) **OR Rs. 500/-** (for SC/ST/ PwD) must be paid via online payment and steps for online payment is as follows:

1. www.onlinesbi.com
2. State Bank Collect (SB Collect).
3. Accept and proceed.
4. State of Institute>Assam.
5. Type of Institute> Educational institute> Go.
6. Educational Institutions Name>Select online fee collection account NIT Silchar>Submit.
7. Select payment category as “Application fee for IPDF Admission2024”.
8. Fill the required information and submit.

The payment reference number and date of the payment to be mentioned in the application form,

otherwise the application form will be treated as cancelled.

The applicant must enclosed all relevant documents, self-attested, in connection with the credentials claimed by the applicant along with the signed copy of the Declaration form at the time of submission of application form.

GENERAL TERMS AND CONDITIONS

1. The Institute reserves the right to cancel the candidature without assigning any reason thereof.
2. The prescribed qualification are minimum and mere possession of the same does not entitle candidates to be called for written test and counselling.
3. No correspondence will be entertained with the candidates, who are not called for counselling/selected for appointment.
4. Canvassing in any form will result in disqualification of candidature.
5. Legal disputes, if any, will be restricted within the jurisdiction of Silchar Court only.
6. Candidates should submit their application form along with all supporting documents duly self-attested.
7. All reserved category candidates shall be required to submit self-attested copies of the latest Caste certificate issued by competent authority.
8. Candidates must produce original mark sheets and certificates during verification and counselling at the time of counselling, if called for.
9. Selected candidates shall have to sign an agreement at the time of joining.
10. **The fellowship is Rs. 50000/- per month.**
11. **Initial appoint of the fellow for the period of One year extended up to one more year.**

OTHER IMPORTANT INFORMATION

1. Candidates are requested to provide their active email Id/ mobile phone numbers/ landline phone numbers in the application form for easy contact.
2. List of shortlisted candidates will be displayed on the Website of the Institute. No personal intimation will be made to the candidates. Candidates are advised to visit the Institute website regularly.

Sd/-

Dean (R&C)



National Institute of Technology Silchar
Silchar – 788010, Assam, India.

Application for Institute Post-Doctoral Fellowship (IPDF)

Advertisement No.:

Dated:

1. Applied For

Name of Department:

Name of Mentor:

Name of Co-Mentor (if any):

Proposed area of research:

2. Personnel Details

Full Name (in Block Letter):

Mother's Name:

Father's Name:

Date of Birth (DD/MM/YYYY):
(Proof to attached)

Age as on ___/___/2023:

Gender (Male/ Female):

Marital Status:

Category (Open/OBC-NCL/SC/ST):
(Proof to be attached)

Whether PwD: Yes/ No:

%age of disabilities (if yes):
(Proof to be attached)

Nationality:

Domicile:

Email ID:

Mobile number:

Address for Communication:

Permanent Address (if separate):

Affix your recent colour
photograph

3. Academic details

Educational Qualifications: (Class X onwards with proof)

Sl. No.	Name of Examination	Year of Passing	Institute/ Board/ University	Subject/ Branch	Class/ Division	%age / CGPA/ CPI

Details of Ph.D.:

Title of the thesis:	
Name of Supervisor (s):	
Name of Institute/ University:	
Year of Degree award: (Proof to be submitted)	

NET/ GATE examination passed (Proof to be attached, if any):

Subject	Qualifying Year	Score	Valid up to

Employment details (including PDF, if any; Proof to be attached):

Sl. No.	Name of Organization	Nature of Post	Period (From-To)	Pay Scale	Nature of Duty

4. Publication details

Details of Peer-review Journal Publications (1st Page to be attached):

Sl. No.	Author (s) name	Journal name	Title of Paper	Volume/ Issue/ Page	Year	Indexing, Impact Factor (if any)

Details of Conference Publications (1st Page to be attached):

Sl. No.	Author (s) name	Conference details	Title of Paper	Volume/ Issue/ Page	Year	Indexing, Impact Factor (if any)

Details of Other Publications (Patent/ Book/ Book chapters/ any other) (Proof to be attached):

Sl. No.	Author (s) name	Details	Title	Volume/ Issue/ Page	Year	Indexing, Impact Factor (if any)

5. Any other relevant information that you may like to furnish:

Declaration

I declare that the above information are true and correct to the best of my knowledge and belief.

Date:

Place:

Signature of Applicant

Research Proposal/ Concept Note Format

The complete format for research proposal consisting of the following contents/sections is a part of the Application Form. No research proposal or a section thereof needs to be submitted separately. All the proposal to be signed by the applicant as well as Mentor and Co-Mentor (if any).

In all, the research proposal shall be in about 3,000 words comprising of the following sections:

- i. **Title of the Research Proposal:** The research proposal should have a clear, meaningful and confirmed topic reflecting the scope of the study.
- ii. **Abstract** of the proposed research proposal should be given (in about 200 words).
- iii. **Introduction:** The introduction should clearly state the research problem to be investigated in the light of its theoretical and/or empirical context in the relevant area (in about 400 words).
- iv. **Major Research Works Reviewed:** (National and International): Reviews of at least 15 to 20 significant national and international research works related to the proposed theme of research is to be given in this column (in about 300 words).
- v. **Identification of Research Gaps:** The applicant should summarize the current status of research in the area and major findings, including the researcher's own work in the area. Existing empirical findings may also be discussed. The overview should clearly demonstrate the inadequacies/ gaps in the existing findings or approaches and its relevance (in about 300 words).
- vi. **Objectives of the Study:** The general aim of the study along with the specific objectives to be accomplished, should be clearly stated in bullet form (in about 100-150 words).
- vii. **Framework and methods proposed for research:** The researcher must describe in detail (a) the scope and coverage of his/her study; and (b) approach and methodology with adequate justification to conduct the research. The details of the methodology may include research design, data to be collected and empirical and analytical methods to be used. The description of the methodology must be clearly linked to the aims of the research and the research questions/hypotheses of the study (in about 300 words).
- viii. **Expected outcomes of the Study:** A brief note on the proposed plan of publications, during the course of research and after its completion, must be provided. The section should enlist the proposed outputs from the study in terms of publications in the form of research papers / articles in journals/ books/ monographs, etc.) (in about 150-200 words).