



NICMAR

Table of Content

About NICMAR University, Pune.....	2
About NICMAR Doctoral School.....	2
About Ph.D Programme	2
Enrolment to the Ph.D. Programme	3
Eligibility Criteria	3
Seats Available	3
Duration of the Programme.....	3
Admission Process	4
NICMAR Ph.D. Admission Test (NPAT)	4
Exemption from NICMAR Ph.D. Admission Test	4
Fellowship	4
Fees.....	5
NPAT Syllabus.....	6
School of Construction (SoC) & School of Engineering (SoE).....	7
NICMAR Business School (NBS).....	8
School of Project Management (SoPM).....	9
School of Architecture and Planning (SAP)	10
School of Real Estate & Facilities Management (SREFM)	11
School of Energy and Environment (SoEE).....	12

About NICMAR University, Pune

National Institute of Construction Management and Research (NICMAR) was established by the Indian Construction Industry in 1983 as a leading educational Institute with the major objective of enhancing the employability and career aspirations of the ambitious student community who would like to serve the Indian construction Industry. NICMAR for the past four decades has been a knowledge leader for the Construction, Real Estate, Infrastructure, and Projects (CRIP) sector and continues to be the harbinger of educational changes for this sector.

NICMAR received university status in 2022 when the NICMAR University Pune Act (L. C. Bill No. of 2022) was passed by Maharashtra State Government on 16th March, 2022 and appeared in "Maharashtra Government Gazette" on 12th May 2022 (Mah. Act No. XXXVI of 2022).

About NICMAR Doctoral School

NICMAR Doctoral School: Pioneering Research and Innovation

The NICMAR Doctoral School (NDS) stands as a beacon of academic excellence and innovation. Our Ph.D. programmes are meticulously crafted to offer a rigorous, supportive, and transformative research experience. At NDS, Ph.D. scholars not only acquire new knowledge but also contribute to the creation of it.

Our Ph.D. programme promotes research excellence with continuous training and mentorship. Scholars engage with concurrent topics in an intellectually stimulating environment guided by highly qualified faculties of NICMAR University, Pune. These faculty members and supervisors are dedicated to providing unparalleled academic guidance, ensuring the necessary mentorship to effectively navigate and contribute to the research objectives.

NDS offers Ph.D. programmes under two schemes: Full Time & Part Time. To attract talented research scholars, NICMAR University, Pune, offers generous tuition fee waivers and fellowships for its full-time doctoral programmes.

At NDS, scholars can choose from a vast range of academic areas under any of NICMAR's schools. Our programs are designed to ignite scholars research passion, enabling them to make original contributions to the Built Environment Field. Through focused and time-bound research, scholars at NDS develop a research career that aligns with their ambitions and interests.

About Ph.D Programme

Applications for Ph.D. admissions are invited twice a year in the August/ September for January Batch and in February/March for July Batch.

NICMAR University, Pune offers research programme leading to award of Doctor of Philosophy (Ph. D.) in three domains:

- Engineering (Civil Engineering)
- Management
- Planning

The University has following seven schools:

1. School of Construction (SoC)
2. School of Engineering (SoE)
3. NICMAR Business School (NBS)
4. School of Project Management (SoPM)
5. School of Architecture and Planning (SAP)
6. School of Real Estate & Facilities Management (SREFM)
7. School of Energy and Environment (SoEE)

Enrolment to the Ph.D. Programme

The doctoral programme at the University is offered through two modes:

1. **Full Time** - This mode requires scholars to commit to their research and studies on a full-time basis, typically involving daily attendance and engagement with the university's academic activities and resources.
2. **Part Time** - This mode is designed for scholars who are employed or have other commitments, allowing them to pursue their doctoral studies alongside their professional responsibilities.

Both these modes are governed as per the Ph.D. regulations notified by University Grant Commission (UGC) from time to time

Eligibility Criteria

4-year bachelor's degree in relevant disciplines with minimum 75% Marks or equivalent

OR

Master's Degree in relevant disciplines with minimum 55% marks or equivalent grade 'B' in the UGC 7-point scale or equivalent grading points on other scales.

OR

M. Phil. Degree in relevant discipline with minimum 55% marks or equivalent.

Seats Available

The University announces vacancies after getting inputs from the respective School Dean. The vacancies are based on the available seats the supervisors would like to admit depending upon their academic designations, resource availability and other academic commitments.

Reservation is offered as per Government of Maharashtra's norms.

Duration of the Programme

The full-time Ph.D. programme shall be for a minimum duration of three years and a maximum of six years from the date of admission to the final submission of the thesis.

However, a part-time Ph.D. shall be for a minimum duration of three & half years and a maximum of six years from the date of admission to the final submission of the Thesis.

Admission Process

NICMAR Ph.D. Admission Test (NPAT)

Eligible applicants are required to appear for NICMAR Ph.D. Admission Test (NPAT). NPAT has no negative markings and the question paper consists of two parts with a total of 120 marks:

Paper I (General Aptitude): This part carries 60 marks and consists entirely of multiple-choice questions (MCQs).

Paper II (Specialization Specific): This will also carry 60 marks, split evenly between 30 marks for MCQs and 30 marks for descriptive questions. The descriptive section includes specializations, and candidates must select and respond to a question related to their specific specialization selected in the admission application form.

Exemption from NICMAR Ph.D. Admission Test

Those holding NET, SET, GATE, M.Phil., or other eligible fellowships are exempted from the entrance exam. Applicants who wish to receive the NICMAR Doctoral Fellowship (NDF) must appear in the NPAT.

Personal Interview

Personal Interviews are conducted by a panel of experts on assigned dates and time slots. Marks are awarded based on criteria such as research problem articulation, subject understanding, and the potential contribution of the proposed research. It is expected from each appearing candidate that they present a short research proposal highlighting the research area of interest, its importance, and its uniqueness in the field.

The weightage of the entrance test and interview shall be 70% and 30% respectively. Only those students securing at least 50% marks in the written examination and 50% in the interview separately shall be eligible for admission. For NICMAR Doctoral Scholarship (NDF)(application only to full time scholars), appropriate cut-off will be decided by the competent authority.

Merely securing the minimum marks criteria does not guarantee admission. Some other criteria such as the research aptitude of the candidate, availability of a supervisor in the relevant field, etc. will also be considered for the final admission offer.

Fellowship

NICMAR Doctoral Fellowship (NDF) is offered to attract quality research scholars to the Ph.D. programme. This fellowship is offered to the scholars who wish to register themselves for full-time Ph.D. programme. Under this scheme, scholars will be paid a monthly fellowship for 3 years. Along with monthly fellowship, NDF provides a contingency grant in each fellowship year. This contingency grant is to meet expenses such as conference paper presentations,

stationery purchases, relevant books, software, equipment, etc. and is reimbursed on actual subject to the contingency limit.

The award of the NDF fellowship will be as per university norms and may change from time to time. It will be mandatory for each full-time scholars to undertake 4-6 hours of work per week as assigned by the university.

Ph.D. Admission Journey



Fees

Ph.D. January 2025 Batch	
Fee Structure 2024-25	
	Part Time Student
Tuition Fees (Per Semester)	Rs 50000 (Rs Fifty Thousand Only)
One Time Security Deposit (Refundable)	Rs 10000 (Rs Ten Thousand Only)

Within 7 days of the commencement of subsequent Semesters*: Rs. 50,000/-

NPAT Syllabus

The NICMAR Ph.D. admission Test will consist of two papers: Paper-I and Paper II. Paper-I contains the syllabus of Research Aptitude consisting of 60 multiple-choice questions of one mark each. There is no negative marking. It consists of questions on reading comprehension, logical & mathematical reasoning, analytical reasoning, and Data Interpretation. Paper-I is for 60 minutes.

Paper II is based on the area of specialization. The syllabus for each area of specialization is given below. Candidates are advised to select the most relevant school based on their qualifying degree and research area of interest. Paper-II syllabus can be one of the references for this. Paper II carries a total of 60 marks and is divided into two parts. The first part consists of multiple-choice questions (30 marks) that cover the entire syllabus of the school. The second part, worth 30 marks, includes six descriptive questions based on the selected specialization, with each question carrying 5 marks.

School of Construction (SoC) & School of Engineering (SoE)

Specialisation:

1. Construction Materials
2. Concrete technology
3. Construction Management (Inclusive of soil mechanics & Foundation engg, transportation and highway pavements and fluid mechanics)

Paper II Exam -The multiple-choice questions will cover the whole syllabus, while the descriptive questions will focus on the chosen specialization.

Construction Materials: Structural Steel – Composition, material properties and behaviour; Sustainable construction materials

Concrete Technology: Constituents, mix design, short-term and long-term properties, Types of concrete, Production methods.

Construction Management: Types of construction projects; Project planning and network analysis - PERT and CPM; Cost estimation.

Transportation Infrastructure: Geometric design of highways - cross-sectional elements, sight distances, horizontal and vertical alignments. Speed and Cant.

Highway Pavements: Highway materials - desirable properties and tests; Desirable properties of bituminous paving mixes; Design factors for flexible and rigid pavements

Geomatics: Principles of surveying; Errors and their adjustment; Maps - scale, coordinate system; Distance and angle measurement. Photogrammetry and Remote Sensing - Scale, flying height; Basics of remote sensing and GIS.

Structural Analysis: Statically determinate and indeterminate structures by force/ energy methods; Method of superposition; Analysis of trusses, arches, beams, cables and frames; Displacement methods: Slope deflection and moment distribution methods

Structures: Working stress and Limit state design concepts for concrete and steel structures.

Fluid Mechanics: Properties of fluids, fluid statics; Continuity, momentum and energy equations and their applications; Potential flow, Laminar and turbulent flow; Flow in pipes, pipe networks; Concept of boundary layer and its growth; Concept of lift and drag.

Soil Mechanics: Three-phase system and phase relationships, index properties; soil classification systems; Permeability, Seepage, flow nets, uplift pressure, piping, capillarity, seepage force; Principle of effective stress and quicksand condition; Compaction of soils.

Foundation Engineering: Sub-surface investigations, sampling, plate load test, standard penetration and cone penetration tests; Earth pressure theories; Stability of slopes; Stress distribution in soils; Pressure bulbs, Shallow foundations, effect of water table.

NICMAR Business School (NBS)

Specialisation:

1. Finance
2. Marketing
3. Human Resource Management
4. Operations and Supply Chain Management
5. Construction/Applied Economics and allied Areas

Paper II Exam -The multiple-choice questions will cover the whole syllabus, while the descriptive questions will focus on the chosen specialization.

Financial Management: Financial Statements, Capital Structure, Leverages, Value & Returns, Capital Budgeting, Risk and Return, Dividend, Mergers and Acquisition, Investment Analysis and Portfolio Management, Derivatives, Working Capital Management.

Human Resource Management: Human Resource Management, Strategic Role of Human Resource Management, Competency Mapping & Balanced Scoreboard, Career Planning and Development, Performance Management and Appraisal, Organization Development, Change & OD Interventions, Talent Management & Skill Development, Employee Engagement & Work-Life Balance, Organizational Behavior.

Marketing: Market Segmentation, Positioning, and Targeting; Product and Pricing Decision, Place and promotion decision; Consumer and Industrial Buying Behaviour, Brand Management, Designing and Managing Salesforce, Personal Selling, Service Marketing, Customer Relationship Marketing, Retail Marketing, Emerging Trends in Marketing, International Marketing, Digital Marketing.

Operations and Supply Chain Management: Management in Operations, Manufacturing Process Design and Analysis, Inventory management, Aggregate Operations Planning and Scheduling, Works and motion Study. Logistics and Supply Chain Management, Sourcing Strategic Services.

General Management: Management Theories, Management Functions, Communication, Decision Making, Organization Structure and Design.

Applied Economics: Demand analysis, Market Structures, National Income, Inflation, Micro and Macro Economics.

Strategic Management: Strategic Management, Strategic Analysis, Strategy Formulation, Strategy Implementation.

Information Technology Management: Artificial Intelligence and Big Data, Data Warehousing, Data Mining, and Knowledge Management.

Statistics and Data Analytics: Data analytics, Probability modelling, inferential statistics, multivariate data analysis, time series analysis, optimization, econometric modelling.

School of Project Management (SoPM)

Specialisation:

1. Project Management

Paper II Exam -The multiple-choice questions and descriptive questions will cover the whole syllabus.

Statistics and quantitative methods: Central limit theorem, mean mode, median, sampling and population survey, correlation, regression, hypothesis testing, random sampling, ANOVA, design of experiment, deterministic models- linear programming, transportation models, Multi-criterion decision making using AHP, probabilistic models- queuing theory, decision theory and simulation models

Project planning and control: Project management processes, systems approach to project management project life cycle, preparing work breakdown structure (WBS), Matrix organization structure for projects, Roles and responsibilities of project manager, professional practice and ethics, Students syndrome in project management, project planning and scheduling using Critical path method (CPM), concept of total float and free float, Project planning and scheduling using Program Evaluation and Review Technique (PERT), project scheduling using line of balance method, Critical Chain Project Management; feeding buffer, project buffer.

Core knowledge areas of project management: Project time management: project schedule monitoring and control; project cost management: cost estimation methods, project budgeting, cost control using Earned value management, depreciation, activity-based costing, project scope management: work break down structure, project quality management: Project quality control, quality assurance and audits.

Facilitating knowledge areas of project management: Project procurement management : process of tendering, bidding and contracting in projects, Project integration management: preparing project charter, team building in projects, conflict and dispute resolution, Project risk management : Assessing political, economic, social, technological and environmental risks in projects, Human resources management in projects : Managing men, machine, money and materials in projects; Project stakeholder management :internal and external stakeholders, financial appraisal of project with NPV& IRR, stakeholder engagement strategies.

School of Architecture and Planning (SAP)

Specialisation:

1. Planning

Paper II Exam -The multiple-choice questions and descriptive questions will cover the whole syllabus.

Planning Concepts and Plan Process – Urban Regional Land Use and Spatial Planning; Types and hierarchy of plans; Various schemes and programs of central government; Transit Oriented Development (TOD), Development controls – FAR, Densities and building byelaws; Urban renewal and conservation; Heritage conservation; Historical public spaces and gardens; Planning process; Theories and principles of urban planning; Concepts of cities - Eco-City, Smart City; Planning theories; Ekistics; Urban sociology; Social, Economic and environmental cost benefit analysis; Methods of non-spatial and spatial data analysis; URDPFI guidelines; Urban design.

Planning Techniques – Application of G.I.S and Remote Sensing techniques in urban and regional planning; Tools and techniques of Surveys – Physical, Topographical, Land use and Socio-economic Surveys; Urban Economics, Law of demand and supply of land and its use in planning; Graphic presentation of spatial data.

Housing – Housing typologies; Concepts, principles and examples of neighbourhood; Residential densities; Affordable Housing; Real estate valuation; Public Perception and user behaviour; National Housing Policies, Programs and Schemes; Slums, Squatters and informal housing; Standards for housing and community facilities; Housing for special areas and needs.

Infrastructure Planning – City infrastructure including Water Supply, Sanitation, Sewerage and Drainage, Solid Waste Management; Demand Forecasting; Norms, regulations and service level benchmarks; Water demand management, sources of water, treatment and storage, transportation and distribution, quality, networks, distribution losses, wastewater recycling and reuse, norms and standards of provision; Sanitation – points of generation, collection, treatment, disposal, norms and standards, sewerage network, sewage disposal, institutional arrangements, management issues; Integrated municipal solid waste management and plan preparation for urban areas: Solid waste management rules; Stormwater collection and disposal, norms and standards, water harvesting, urban flood management; Various current schemes of the government

Environmental Planning - Trends, Effects & Challenges of Urbanization; Background of development crises; Environmental Implications of Developmental Activities; Need for an Environment-centric Planning Approach, Climate Change Impacts, Disaster Risk Management; Adaptation and Mitigation.

Transportation Planning - Process and Principles of Transportation Planning and Traffic Engineering; Road capacity and Travel demand forecasting; Traffic survey methods, Traffic flow Analysis; Traffic analysis and design considerations; Traffic and transport management and control in urban areas; Mass transportation planning; Intelligent Transportation Systems; Urban and Rural Infrastructure System Network.

Urban Governance and Finance - Planning legislation; Various acts governing planning; Urban and Metropolitan planning; Municipal Finance, Accounts and Revenues; Urban Land Management, Housing; Dealing Challenging Urban Issues; Managing Centrally sponsored Urban Missions.

School of Real Estate & Facilities Management (SREFM)

Specialisation:

1. Urban Infrastructure
2. Real Estate and Urban Economics
3. Real Estate Investment and Finance
4. Digital Transformation and BIM in Built Environment

Paper II Exam -The multiple-choice questions will cover the whole syllabus, while the descriptive questions will focus on the chosen specialization.

1. Urban Infrastructure

Urban Transport, Physical Infrastructure (water supply, sewerage, SWM, roads, drainage, power, and streetlights), Social Infrastructure (health care, education, wholesale trade markets, sports stadiums, parks, and playgrounds), and affordable housing, sustainable transportation, etc.

2. Real estate and urban economics

Urbanization and land development, Characteristics and features of urban land and property, Hedonic nature of real estate/ property value, Real estate/ Property markets - demand, supply, and equilibrium, Real estate/ property markets in the long and short term, Urban Land rents and land uses, Urban Local governance, Residential and commercial property valuation. City demographics and sizes.

3. Real estate investment and finance

Linkages between Real Estate/ Infrastructure growth, inflation and policy rates, Financial Instruments for Real estate Projects, Innovative Financial Instruments for Real Estate/Infra sector, Risk and Return, Concept of Portfolio, Cost-Benefit Analysis, and Sustainable Finance.

4. Digital Transformation and BIM in Built Environment

Digital transformation basics, Digital transformation initiatives such as BIM, Smart cities and infrastructure, AR and VR, Digital Readiness Index, BIM Fundamentals, BIM Implementation, BIM Maturity Levels, etc., Digital transformation-related challenges.

School of Energy and Environment (SoEE)

Specialisation:

1. Energy Management
2. Environment Management

Paper II Exam -The multiple-choice questions will cover the whole syllabus, while the descriptive questions will focus on the chosen specialization.

Project Management: Types of construction projects; Project planning, scheduling, Monitoring and Control. Network Techniques - PERT and CPM; Cost estimation.

Civil / Construction materials / Green Construction Materials: Stones, brick, Lime & lime products, sand, cement & timer etc.-Manufacturing, properties and specifications, preparation and use of cement and lime mortars, plane and reinforced concrete. Building materials - Foundation, floors, walls and panels, roofing, wood work. Roof Treatment: Finishing items for floors, walls, panels and woodwork. Plumbing and fixtures, shuttering and staging, ready mixed concrete. General rules and regulations for Building construction. Sustainable building materials (product selection criteria and sustainable materials); Green procurement and subcontracting, Concept of Zero water building, water management and waste management, water conservation strategies in buildings, water footprint, carbon footprint, grey water management, smart water management, nature-based treatment.

Architecture and Planning: Building Construction, History of Architecture, Contemporary Architecture, Building Services, Building Bye-laws, Site Planning and Landscape design, Climate responsive design, Solar passive and active systems, Computer applications, Building Information Modelling, Sustainable development strategies, Green buildings, Green building rating systems. Energy conservation, Energy Efficiency.

Environmental Management / Science: Introduction to environmental Management System- - Implication of development projects on the eco-system- land, water and air; Protection of forests, fauna, fisheries and wild life; Initiatives at the international and national levels for protection of environment and ecology; Pollution -Types -Impact and Mitigation Strategies Role of industry and built environment in sustainable development: Introduction, Definition, Need, Principles, and Key terminologies, Drinking water Standards, Effluent standards, Emission and ambient standards. Benefits and barriers of EMS – Concept of continual improvement and pollution prevention - environmental policy – initial environmental review environmental aspect and impact analysis.

Mechanical/Electrical/Chemical Engineering: Mechanical Engineering systems: Gears, drives, Boiler, Pumps, fans, blower's compressor, turbine, heat pumps, HVAC, drives, steam cycles, Carnot cycle, thermal power plant, hydroelectric power plant. Electrical Engineering systems basics: Transformer, Electric Motors-DC -AC, switch gears, Power factor calculation, Iron losses, Distribution and transmission systems, Metering system. Mass and Energy balance. Thermodynamic properties and VLE. Fluid mechanics. Size reduction and size separation. Heat and Mass transfer. Chemical reaction engineering. Chemical technology. Instrumentation and process control. Plant design and economics.

Energy Management: Energy efficiency of different systems; boiler, compressor, pumps. Benchmarking of energy efficiency of these products. In Boiler -efficiency testing, excess air control, Steam distribution & use- steam traps, condensate recovery, flash steam utilization. Thermal Insulation. Electrical Systems: Demand control, power factor correction, star rating of an electrical appliance, Motor drives- motor efficiency testing, energy efficient motors. Energy conservation in Pumps, Fans (flow control), Compressed Air Systems, Refrigeration & air conditioning systems. Waste heat recovery: recuperates, Cogeneration - concept, options (steam/gas turbines/diesel engine based. Demand side management.



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