The candidates who have registered for Ph.D. Program on or after 11th July 2009 are governed by UGC (MINIMUM STANDARDS AND PROCEDURE FOR AWARD OF M.Phil/Ph.D. DEGREE), REGULATION, and 2009 PUBLISHED IN THE GAZETTE OF INDIA, DATED 11TH July, 2009.

Based on and adhering to this, University of Pune has formulated the Revised rules for Ph.D. and circulated vide circular no.406/2009 dated 29th December 2009.

All the Procedures, rules and regulations regarding Short title, Applications, Commencement, Supervisor Eligibility Criterion, Procedure for Admission, Course work, Evaluation, and Assessment methods etc. as laid down in these revised rules, are applicable to PhD Programs for Faculty of Engineering (Architecture), University of Pune.

The following guidelines are a supplement to these rules and regulations; for only those sections, which require better and adequate comprehension.

Course Work for Ph. D. in Architecture and Planning

Table-1
Structure for Ph.D. Course Work for Architecture & Planning

<table>
<thead>
<tr>
<th>CODE</th>
<th>NAME OF COURSE</th>
<th>CONTACT HOURS</th>
<th>CONTINUOUS ASSESSMENT</th>
<th>END SEMESTER EXAM</th>
<th>TOTAL</th>
<th>CREDITS</th>
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<tr>
<td>700001</td>
<td>Research Methodology</td>
<td>5</td>
<td>50</td>
<td>100</td>
<td>150</td>
<td>5</td>
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<tr>
<td>700002</td>
<td>Seminar</td>
<td>10</td>
<td>50</td>
<td>50</td>
<td>100</td>
<td>5</td>
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<tr>
<td>700003</td>
<td>Faculty Specific Topics for Architecture Research</td>
<td>10</td>
<td>100</td>
<td>100</td>
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<td></td>
<td>Part-A (700003-A) Methodologies for Architectural Research</td>
<td></td>
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<td></td>
<td>Part-B (700003-B) Branch Specific Topics</td>
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<td>Total</td>
<td>25</td>
<td>200</td>
<td>250</td>
<td>450</td>
<td>20</td>
</tr>
</tbody>
</table>
SYLLABUS

Ph.D. COURSEWORK UNDER FACULTY of ENGINEERING

(ARCHITECTURE & PLANNING)

700001: Research Methodology

Teaching Scheme:  Contact Hours: 5 hrs/week
Credits: 5

Marking Scheme:
Continuous Assessment: 50 Marks
End Semester Examination: 100 Marks

Objectives
- Learn to focus on a research problem using scientific methods
- Learn methods to devise and design an experimentation set-up
- Learn basic instrumentation and data collection methods
- Learn parameter estimation and related modelling methods

Unit 1: Research Problem

Unit 2: Basic instrumentation
Instrumentation schemes. Static and dynamic characteristics of instruments used in experimental set up. Performance under flow or motion conditions. Data collection using a digital computer system. Linear scaling for receiver and fidelity of instrument. Role of DSP in collected data contains noise.

Unit 3: Applied statistics

Unit 4: Modelling and prediction of performance

Unit 5: Developing a Research Proposal
Format of research proposal. Individual research proposal. Institutional proposal.
Proposal of a student – a presentation and assessment by a review committee consisting of Guide and external expert only. Other faculty members may attend and give suggestions relevant to topic of research.
Reference Books:
1. ‘Research methodology: an introduction for science & engineering students’, by Stuart Melville and Wayne Goddard
2. ‘Research Methodology: An Introduction’ by Wayne Goddard and Stuart Melville
4. ‘Research Methodology: Methods and Trends’, by Dr. C. R. Kothari
5. ‘Operational Research’ by Dr. S.D. Sharma, Kedar Nath Ram Nath & co.
6. Software Engineering by Pressman

700002: Seminar

Teaching Scheme:  Contact Hours: 5 hrs/week  Credits: 5
Marking Scheme:  Continuous Assessment: 50 Marks  End Semester Examination: 50 Marks

Unit 1: Formulating Problem Statement
Overview of research process: Formulating the Research Problem, Extensive Literature Review, Developing the objectives, preparing the Research Design including Sample Design, Collecting the Data, Analysis of Data, Generalization and Interpretation, preparation of the Report or Presentation of Results-Formal write-ups of conclusions reached.
Problem statement – Conditions and steps in selecting a research problem, Understanding the Key research area of interest, How to get new ideas (Criticizing a paper), Finding a good problem: Top-down and Bottom-up approach, Creative thinking techniques, Coming up with a problem statement
Defining objectives – How to find objectives, characteristics of objectives

Unit 2: Literature survey
Overview – What is literature survey, Functions of literature survey, maintaining a notebook, developing a Bibliography
Methods of data collection – Observation, survey, contact methods, experimental, determining sample design
Searching for publications – Publication databases, search engines and patent databases, Find some/all of the references for a given paper, including those that are not on the web
Online tools – google, CiteSeer, ACM Digital Library, IEEE, The on-line Computer Science bibliography, Survey papers, Finding material not on the web, Searching patents

Unit 3: How to study a scientific paper
Summarizing paper – Reading abstracts and finding ideas, conclusion, Advantages of their approach, the drawbacks of the papers (What is lacking – can be found in the sections such as future work) Generalize results from a research paper to related research problems
Comparing the approach - Identify weaknesses and strengths in recent research articles in the subject
Unit 4: Publishing a paper
How to write scientific paper - Structure of a conference and journal paper, how (and How Not) to write a Good Systems Paper: Abstract writing, chapter writing, discussion, conclusion, references, bibliography, and in-class discussion of technical writing examples. Poster papers, review papers, how to organize thesis/ Project report, How to write a research proposal? How research is funded?
Research ethics – Legal issues, copyright, plagiarism
General advice about writing technical papers in English - Tips for writing correct English

Unit 5: How to present scientific paper
Talk structure, basic presentations skills
Documentation and presentation tools – LATEX, Microsoft office, PowerPoint and SLITHY

Reference Books:
1. Lecture Notes and presentations

700003-A: Methodologies for Architecture & Planning Research
Note: Each Unit is of 2 credits. A candidate has to take any two units (4 credits)

Unit 1: Genesis of Architectural Research: Definition-Importance of Architectural research. Nature and areas of research in architecture,

Unit 2: Research Typologies in Architectural Research: Historical studies-Comparative studies-Case studies -Critical Evaluation of buildings.

Unit 3: Tools for Data Collection: Primary sources: Survey methods and tools. Secondary sources: archival records, literature survey etc.

Unit 4: Sampling: Techniques, Methods and digital analysis techniques.

Unit 5: Probability and Sampling: Types of probability, sampling Unit and Frame, Sample Size, Sample Design, Non-response errors Probability and normal distribution-binominal and Poisson distribution.

Unit 6: Measures of Association and Hypothesis testing: Percentage difference, Nominal and ordinal measure, The Chi test, The Z-Score Test, The T-Test, and Test for Proportion.

Unit 7: Correlations and Regression: Auto correlation based on statistical methods, linear / Non-Linear regression analysis.

Unit 8: Graph Theory: Graph as mathematical model, Planar and Dual Graphs, Vector Spaces of a Graph, Matrix Representation of Graphs, Graph Theoretic Algorithms and Computer Programs
Unit 9: Social Research Methods: Definitions-approaches, concept and theories

Unit 10: Visual Research methods: Environmental Measurement, Imageability and Environmental Mapping etc.

Unit 11: Qualitative Analysis: Grounded Theory –Definitions-approaches and concept

Unit 12: Qualitative Analysis: conversation and discourse analysis

Unit 13: Spatial Analysis: Definitions-approaches, concept and theories

Unit 14: Phenomenological Study: Definitions-approaches, concept and analysis

Unit 15: Environmental Psychological Study: Introduction to environmental psychology, Roots, Issues, and Principles of environmental psychology,

Unit 16: Environmental Psychological Study: Theories and Approaches, Environmental inventory types, etc.

Unit 17: Concepts and Research Methods in Psychology:

Unit 18: Behavioral Science Study: Methods of knowing, social psychology, experimental and quasi experimental approaches etc.

Unit 19: Decision making models: General introduction to various decision making models.

Reference books:

2. Sanoff Henry (1991), VISUAL RESEARCH METHODS IN DESIGN, Van Nostard Reinhold, USA
Part-B (700003-B)

Branch Specific Topics

Note: Each Unit is of 2 credits. A candidate has to take any three units (6 credits)

ARCHITECTURE:

Unit 1 – Architectural Theories – I : Architectural design, Mathematics and architecture, Parti (Ideas), Pattern language, Proportion (architecture), architectural semiotics, Modernism and deodorization, Anthology, Corporeal architecture, Modular coordination etc.

Unit 2 – Architecture Theory II: Master Architects and their approaches to Architecture, Analysis; Phenomenon & Expression of Structures


Unit 4 - Barrier free Architecture: Introduction and necessity, Design measures in different building types, Public awareness, Legislations of barrier free design.

Reference books:

SUSTAINABLE ARCHITECTURE:

Unit 5 – Issues and Principles: Introduction to the Environmental Architecture, Energy Consumption and environmental issues, Green Building – Background, Concept & initiatives, Democratic movements and the built environment awareness, Introduction to ECBC rules, Energy audits and green building ratings TERI Griha, LEED.

Unit 6 – Intelligent Buildings: Building automation protocols, Various AI techniques and their applications in Intelligent Buildings, Use of IT tools for Illumination design and HVAC load calculations, Life Cycle Cost Optimization.


Reference books:
1. Mosaedi-Arian (2003), Sustainable Architecture: High Tech Housing, Carlosvrato & Jospma Minguet

SOCIOLOGY & ARCHITECTURE:

Unit 9 – Sociology - Developments of concepts and principles and its relation with architecture.

Unit 10 – Anthropology: Nature and Scope of anthropology its relation with architecture, culture at various levels.

Unit 11 – Psychology in Architecture: Introduction and necessity and its application at various building types.

Unit 12 – Barrier free Design: Introduction and necessity, Public awareness, Efforts by Government and NGO’s in the field, Legislations of barrier free design.

Reference books:

ARCHITECTURE CONSERVATION:

Unit 13– History of Conservation: Study the origins and the development of the ideas and practices of conservation and restoration of architecture and environment.

Unit 14 – Conservation Theory & Practices: introduction to the several disciplines engaged in the conservation of the built environment, most specifically the current practice of architectural restoration and conservation, conservation of the cultural landscape and heritage.

Unit 15 – Conservation policies and Practices: Study of legislation abroad of natural and built heritage, Study of legislation in India, Urban planning commission report, 74th amendment to the constitution.

Unit 16 – Conservation Management: Various aspect of managements like heritage site management, disaster management.
Reference books:
2. INTACH(2008), Heritage Conservation in Pondicherry, INTACH Publication

DIGITAL ARCHITECTURE:

Unit 17 – Introduction to Computer Applications: Basic introduction to the use of computer applications in the field of Architecture and Building Design. Emerging computer technologies, changing cultures of the world due to technological innovation – digital architecture. Visualization.

Unit 18: Building Automation Systems: Introduction of various concepts like Automation in acoustical design, illumination, water supply, fire-fighting, HVAC& emergency; varous automation equipments

Unit 19: GIS & Mapping, MIS: Introduction of Geographic Information Systems and various tools available, uses of GIS in different fields, etc. Introduction to MIS and its application.


Reference books:
3. Dix Alan (2005), Human Computer Interaction, Pearson Education

ADVANCE BUILDING TECHNOLOGY

UNIT 21 – Introduction: Historic and significant contemporary examples, structural concepts; integration with architectural design objectives. Selection criteria for structure systems, with respect to context, trends and energy efficiency.

UNIT 22 – Concepts of long span structures: Study, Design and analysis of different suspension systems, construction materials and technology ,recenttrends.
UNIT 23 – High Rise Structures: Concept of sky scrapers, loading conditions, Study of structural systems, Earthquake resistance methods and global scenario.

UNIT 24 – Advanced Building Materials: Contemporary building materials, its applications, different types of buildings, its sustainability ratings; study of energy and cost efficient building materials.

Reference books:
2. Francis D.K. Ching(2009) Building Structures Illustrated, John Willey and Sons

URBAN DESIGN

UNIT 25 – Significance of Urban Design research, Nature of Urban Design research, translating values into design, Areas of research in Urban Design.

UNIT 26 – Theories and Principles of Urban Design.

UNIT 27 – Planning Theory and Practice, Planning and Governance.

UNIT 28 – Urban form Theories-Figure Ground Theory, Linkage theory and Place Theory Basic elements defining urban form-mass space, paths, edges, districts, nodes and Landmarks, Characteristics of Urban space – Hard space and soft space

Reference books:
1. Campbell Scott and Feinstein Susan(1996), Reading in Planning Theory, Oxford Blackwell Publication

INTERIOR DESIGN

Unit 29 – Design related cognitive learning, Theory and History of Interior Design, Various schools of thought and design emphasis.

Unit 30 - Study of Interior Design in the Indian & global context, contemporary styles with particular reference to India.

Unit 32 – Furniture, finishes and maintenance: Characteristics of Early American furniture, Mediterranean and French furniture, Twentieth-Century furniture. Types of flooring, Types of wall treatments and maintenance.

Reference books:
3. Taschen Argelika(2009), Indian interiors, Taschen

LANDSCAPE DESIGN

UNIT 33 – Introduction Landscape Architecture: History, visual evaluation of landscaped, use of open-scape, spatial characteristics of open space and behavior.


UNIT 35 – Ecological aspect of landscape and design, its application such as shelter belts, hill slopes, river fronts, roads and bio esthetic planting.

UNIT 36 –Regional Landscape Planning, Landscape Design of Communities, Landscape for historical conservation sites, and Computers in landscape.

Reference books:
2. Simonds John et.al (2006), Landscape Architecture: a Manual of Environmental Planning and Design

DISASTER MANAGEMENT

UNIT 37 –Introduction to disaster management: Different types of Environmental hazards & Disasters. Introduction to various different mitigation methods.

UNIT 38 – Types of Disasters and its effect on architecture: Design aspects and considerations for various types of buildings, especially the residential, congregational and institutional buildings.
UNIT 39 – Emerging approaches in Disaster Management: Pre- disaster stage (preparedness), Emergency Stage, Post Disaster stage-Rehabilitation, Natural Disaster Reduction & Management,

UNIT 40 – Disaster Management- An integrated approach for disaster preparedness - mitigation & awareness, Integrated Planning- Contingency management Preparedness, Monitoring Management,

Reference books:
2. Levinson Jaye & Granot Helim(2002), Transportation Disaster Response handbook, Academy Press

CONSTRUCTION PROJECT AND MANAGEMENT


Unit 44 – Facility Management: Need of special facility planning, introduction to types and design requirement, behavioural aspects, study of norms and international standards, and management in terms of resource planning.

Reference books:
1. Fisk Edward (1997), Construction Project Administration, Prentice Hall
PLANNING

Unit 45 – Urban Planning & Housing: Origin, evolution and contemporary developments in planning, socio-economic & technological, impacts of growth of population; rural urban migration, Characteristics of the urban environment: Land uses, physical structure The interim and comprehensive plans: Structure Plan, Master Plan, Zonal Development Plan - their purpose and contents, Surveys, analyses and design methods and practices in comprehensive planning, Residential Areas : Neighborhood and Sector Planning, Planning of New Towns in India and abroad. Housing problems: Urbanization and Industrialization, Slums and squatters settlements - problems and possibilities, Residential layouts, housing densities, neighborhood unit, community facilities,


Unit 47 – Infrastructure & Transportation Planning: Transportation systems; Land use-transportation interrelationships; transportation planning process; Traffic management., Recent innovations in technologies and its probable impacts, Transport policies and evaluation of transportation proposals, Water supply systems, Waste water disposal systems& Solid wastes collection and disposal, Reuse and recycle Techniques, Planning for urban electrical distribution system and communication systems,Economic feasibility tests.

Unit 48 – Participatory Planning: Participatory planning theory and context, Participatory methods for situational analysis, Introduction to Objective Oriented Participatory Planning, Analysis of opportunities and problems, Analysis of objectives to be addressed, Preparing a Logical Framework; the intervention logic, Defining indicators, External factors and assumptions, Assessing the comprehensiveness of a Logical Framework, From Logical Framework to budget, The Logical Framework in the project cycle, Prepare and present your personal action plan

Unit 49 – Environmental Management and Impact Assessment: Environmental management, problems and strategies; Future strategies; multidisciplinary environmental strategies, Environmental impact assessment (EIA), Sustainable development (SD), initial environmental examination (IEE), environmental impact statement (EIS), environmental appraisal, environmental audit (EA); Environmental impact factors and areas of consideration, measurement of environmental impact.

Reference books:
American society of Civil engineers (2001), Urban Planning Guide, American society of Civil Engineers
Claton Barry Dalal and others (2003), Rural Planning in Developing Countries, Earthscan, India
Charles Correa(1999) Housing Urbanisation, Urban Design Research Institute