Syllabus

PhD Course Work

2024

(as per the Revised Ordinance 2024)

Department of Architecture
Faculty of Architecture & Ekistics
Jamia Millia Islamia, New Delhi

Ph.D. in Architecture

The Ph.D. programme in Architecture provides scholars with the opportunity to engage in interdisciplinary research on topics critical to society, the profession, and architectural education. The objective is to foster scientific thinking and innovation for advancing architectural discourse. The programme encourages critical thinking skills, evidence-based investigations, advanced research methodologies and data analysis techniques.

Research areas span diverse disciplines within architecture and ekistics, including building technology, conservation, design, architectural education, energy efficiency, healthcare, architectural history, housing, landscape architecture, recreation, urban design, urban and regional planning, transportation, and related fields.

SCHEME OF EXAMINATION *(w.e.f. 22.10.2024)*

CODE	SUBJECT	CLASSES		MARKS				EXAM HOURS	CREDIT
		L	T/ST	IA	WR	VV	TOT		
PARH-01	Research Methodology	2	2	80	120	-	200	3	4
PARH-02	Elective-I (Theoretical Framework)	4	0	80	120	-	200	3	4
PARH-03	Research and Publication Ethics	2	0	40	60	-	100	3	2
PARH-04	Elective-II*	2	2	80	120	-	200	3	4
PARH-05	Seminar/ Term Paper	2	0	40	-	60	100	-	2
TOTAL		**12**	**4**	**320**	**420**	**60**	**800**	**-**	**16**
PARH-06	Elective-III**	2	2	80	120	-	200	3	4
PARH-07	Elective-IV**	2	2	80	120	-	200	3	4

** Elective includes a choice of opting any one subject having same credits from Masters Courses*

*** Electives to be pursued only by PhD scholars seeking PMRF Scholarship*

List of Electives

CODE	SUBJECT	CLASSES		MARKS				EXAM HOURS	CREDIT
		L	T/ST	IA	WR	VV	TOT		
PARH-02 (A)	Advanced Architectural Theory	4	0	80	120	-	200	3	4
PARH-04 (A)	Architecture for Health and Well-being	4	0	80	120	-	200	3	4
PARH-04 (B)	Research Design and Application	2	2	80	120	-	200	3	4
PARH-04 (C)	Architecture: History and Criticism	2	2	80	120	-	200	3	4
PARH-04 (D)	Theory & Principles of Heritage Conservation	2	2	80	120	-	200	3	4
PARH 04 (E)	Seismic evaluation and retrofitting of heritage buildings	2	2	80	120	-	200	3	4
PARH 04 (F)	Circular Economy for Sustainable Habitat	2	2	80	120	-	200	3	4
PARH 04 (G)	Seismic Vulnerability and Risk Assessment	4	0	80	120	-	200	3	4
PARH-04 (H)	Environmental Governance and Jurisprudence	2	2	80	120	-	200	3	4
PARH-06 A	Tribal Jurisdiction and Institutional Framework for sustainable development	4	0	80	120	-	200	3	4
PARH-06 B	Land Use and Transportation Planning	2	2	80	120	-	200	3	4
PARH-06 C	Gamification in Education	4	0	80	120	-	200	3	4
PARH-06 D	Emerging Practices of 'Commoning' in Global South	4	0	80	120	-	200	3	4
PARH-07 A	Resource Management and Material Ecology for homogeneous regions	4	0	80	120	-	200	3	4
PARH-07 B	GIS and Remote Sensing Techniques for Transport Planning	2	2	80	120	-	200	3	4
PARH-07 C	The Art and Psychology of Engagement in Gamification	4	0	80	120	-	200	3	4
PARH-07 D	Economics of Managing Urban Commons	4	0	80	120	-	200	3	4

NOTATIONS:

L Lectures **T** Tutorials **ST** Studio
IA Internal Assessment **WR** Written Exam **VV** Viva Voce

PARH - 01: Research Methodology

CLASSES/ WEEK		MARKS				EXAM HOURS	CREDITS
L	*ST*	*IA*	*WR*	*VV*	***TOT***		
2	2	80	120	-	**200**	3	4

Objectives:

- To introduce the students with research methods and inculcate the critical thinking ability.
- To acquaint the students in detail about quantitative and qualitative research methods, tools and analysis.

Method:

- Lectures, presentations, tutorials to introduce and inform the theories of topics contained in the syllabus.
- Students to augment the understanding by undertaking various reading and writing assignments based on the topics in the syllabus. The same shall be evaluated for Internal Assessment.

Course Content:

1. **Introduction to Research (12 hrs)**
    - Definition of Research
    - Objective and Purpose of Research
    - Research Enquiry, Research Question, Problem, Knowledge gap
    - Selection Bias, Confirmation Bias
    - Hypothesis, Thesis, Anti-Thesis, Null-Hypothesis.
    - Difference between Dissertation and Ph.D.
    - Classification of Research: Pure, Applied; Exploratory, Descriptive, Explanatory; Quantitative, Qualitative, Mixed.
    - Primary and Secondary Data
    - Variations in research in diverse disciplines e.g. Sciences, Social Sciences, History, Economics, Management, Engineering etc.
2. **Quantitative Methods (16 hrs)**
    - Sampling: Sample Size and Method; Population. Probabilistic and Non Probabilistic Sampling. Random Sampling, Stratified Sampling, Systematic Sampling, Cluster Sampling, Multistage Sampling, Snowball Sampling, Judgemental Sampling, Convenience Sampling, Voluntary Sampling etc.
    - Surveys: Type of Surveys; Polls, Simple, Cross-Sectional, Longitudinal.
    - Questionnaire: Type of Questions; Open Ended, Close Ended, Yes-No type, True-False, Multiple Choice Questions, Rating Scales, Ranking Questions.
    - Tests and Experiments: Field Experiments, Laboratory Experiments, Natural Experiments. Control Group, Control Environment.
    - Quantitative Analysis: Variables- Dependent and Independent; Mean, Mode, Median, Average; Correlation; Regression, Causal-Comparative Research.
    - Softwares and Tools: Google Form, Excel, SPSS etc

3. **Qualitative Methods (16 hrs)**
    - Type of Qualitative Research Design: Phenomenology, Case Studies, Grounded Theory, Ethnography, General Qualitative Enquiry.
    - Interviews: One on One, Focussed Group, Group Discussions.
    - Field Study: Observation, Photo-Documentation, Drawing and Mapping, Delphi Study, Social Experiments, Behavioural Study, Case Study, Cognitive Mapping etc.
    - Qualitative Analysis: Content Analysis, Conversation Analysis, Structural Analysis, Phenomenography, Repertory Grid, Critical Timeline - Cause & Effect, Comparative Analysis
    - Discourse Analysis: Analogy, Argumentation, Reasoning-Inductive & Deductive, Rhetoric, Dialectics.

4. **Research in Architecture (08 hrs)**
    - Variation of scale and range of research in Architecture. Multi-Disciplinarity of Research in Architecture.
    - Architecture Appreciation and Analysis: Spatial, Plan, Form, Elevation, Characteristic Elements, Material, Technology, Function, Performance and Efficiency.
    - Urban Scale Research: Cities, Life, Society, Environment and Culture.
    - Traditional, Vernacular and Informal Practices in Architecture.

5. **Research Writing Methods (12 hrs)**
    - Type of research writings. Synopsis, Research Proposal, Article, Research paper, Essay, Chapter, Book etc.
    - Structure of a Synopsis and Research paper.
    - Citations: Inline, Footnotes, Endnotes.
    - Graphs, Pictures, Tables and Other illustrations.
    - Quotations
    - References: Styles-APA, Harvard, Chicago etc.
    - Bibliography
    - Plagiarism: Similarity Index
    - Softwares and Tools: EndNote, Mendley, RefMe etc
    - Publishing the research: Refereed and Indexed Journals, Research Databases; Jstor, Academia, Research Gate etc.

Suggested Readings:

1. The Craft of Research by Booth, W., Colomb, G., & Williams, J.
2. Case Study Research Methods by Bill Gillham
3. DOING URBAN RESEARCH by G D ANDRANOVICH & GERRY RIPOSA
4. Architectural Research methods by Linda N. Groat and David Wang
5. Analysing Architecture by Simon Unwin

PARH – 02 (A): Advanced Architectural Theory

CLASSES/ WEEK		MARKS				EXAM HOURS	CREDITS
L	*ST*	*IA*	*WR*	*VV*	***TOT***		
4	0	80	120	-	**200**	3	4

Intent:

The intent of this subject is to initiate a dialogue about the different facets of architecture especially relevant to the Indian society. Following are the broad headings for discussions and may include relevant topics for holistic understanding of the discipline.

Course Content:

1. Urban Planning through Five Year Plans in the Post Independent India
2. Post Independent India and the Evolving Architecture Vocabulary
3. Architecture Pedagogy – Perception to Precipitation
4. National Education Policy 2020 and Architecture Education
5. Sustainability in Architecture – Brand Marketing Vs Inherent Nature of Sustainability in Architecture
6. Climate Change and Challenges to Societies and Human Settlements
7. Housing Scenario in India – Phases, Policies, Challenges and Possibilities
8. Islamic Architecture – Philosophy, Perception and Paradox
9. Vernacular Architecture – Importance, Relevance and Application in the Contemporary Indian Buildings/Society
10. Poetry and Architecture: Sensitivity and Humanitarian Aspects of the Creative Process

PARH - 03: Research and Publication Ethics

CLASSES/ WEEK		MARKS				EXAM HOURS	CREDITS
L	*ST*	*IA*	*WR*	*VV*	***TOT***		
2	0	40	60	-	**100**	3	2

Intent

- To develop insights towards philosophical and ethical aspects of research
- To understand the process of publication, indexing and referencing
- To be aware of issues relating to ethics and misconduct in publication

Course Content:

THEORY

Unit 1: Philosophy & Ethics (3hrs.)

1. Introduction to philosophy: definition, nature & scope, concept, branches
2. Ethics: definition, moral philosophy, nature of moral judgments and reactions

Unit 2: Scientific Conduct (5hrs.)

1. Ethics with respect to science and research
2. Intellectual honesty & research integrity
3. Scientific misconducts: Falsification, Fabrication & Plagiarism (FFP)
4. Redundant Publications: duplicate & overlapping publications, salami slicing
5. Selective reporting and misrepresentation of data

Unit 3: Publication Ethics (7hrs.)

1. Publication ethics: definition, introduction and importance
2. Best practices/standards setting initiatives and guidelines: COPE, WAME
3. Conflict of interests
4. Publication misconduct: definition, concept, & kinds of problems that lead to unethical behaviour and vice versa, types
5. Violation of publication ethics, authorship and contributorship
6. Identification of publication misconduct, complaints & appeal provisions
7. Predatory publishers & journals

PRACTICE

Unit 4: Open Access Publishing (4hrs.)

1. Open access publications and initiatives
2. SHERPA/RoMEO online resource to check publisher copyright & self-archiving policies
3. Software tool to identify predatory publications developed by SPPU
4. Journal finder/ journal suggestions tools viz., JANE, Elsevier Journal Finder, Springer Journal Suggester etc.

…contd.

Unit 5: Publication Misconduct (4 hrs.)

A. Group Discussions (2 hrs.)

1. Subject specific ethical issues, FFP, authorship
2. Conflict of interests,
3. Complaints & appeals: examples and frauds from India & abroad

B. Software tools (2 hrs.)

1. Use of plagiarism software like Turnitin, Ouriginal & other open source software tools

Unit 6: Databases and Research Metrics (7hrs.)

A. Databases (4 hrs.)

1. Indexing database
2. Citation database: Web of Science, Scopus, etc.

B. Research Metrics (3 hrs.)

1. Impact factor of journal as per Journal Citation Report, SNIP, SJR, IPP, Cite Score
2. Metrics: h-index, g index, i10 index, altmetrics

PARH - 04 (A): Architecture for Health and Well-being

CLASSES/ WEEK		MARKS				EXAM HOURS	CREDITS
L	*ST*	*IA*	*WR*	*VV*	***TOT***		
4	0	80	120	-	**200**	3	4

Intent:

This attempts to build insights on the notions of health, wellbeing and comfort within the context of the built environment, with a Particular focus on buildings. It provides an overview of the main factors affecting health, wellbeing, human performance and comfort in building design/operation.

Course content

Introduction to the concept of health and well-being

- Concept of Health and well-being and the role of buildings and urban design/planning

Thermal comfort

- Air temperature
- Mean radiant temperature
- Air speed
- Humidity
- Metabolic rate
- Clothing insulation

Visual and Acoustic Comfort

- Light exposure
- Visual Lighting Design
- Circadian Lighting
- Daylighting
- Maximum Noise levels
- Sound mapping
- Reverberation Time
- Sound barriers
- Sound reducing surfaces
- Reducing background sound

Indoor environmental quality

- Air Quality
- Ventilation Design for mechanically ventilated and naturally ventilated spaces
- Pollution Infiltration management
- Air Filtration

Biophilia

- Visual Connection with Nature
- Non-Visual Connection with Nature
- Non-Rhythmic Sensory Stimuli
- Thermal & Airflow Variability
- Presence of Water
- Dynamic & Diffuse Light

- Connection with Natural Systems
- Biomorphic Forms & Patterns
- Material Connection with Nature
- Complexity & Order

Urban Design, Health and well-being

Suggested Readings:

1. Thaler, R., & Sunstein, C. (2008). Nudge: Improving decisions about health, wealth and happiness. New Haven, CT: Yale University Press.
2. King, D., Thompson, P., & Darzi, A. (2014). Enhancing health and well-being though 'behavioural design'. Journal of the Royal Society of Medicine, 336–337.
3. CABE. (2009). Sustainable places for health and Well-being. London: Commission for Architecture and the Built Environment.
4. Morgan, M. H. (1960). Vitruvius: The Ten Books on Architecture. New York: Dover Publications.
5. ISO. (2005). 7730:2005 – Ergonomics of the thermal environment. International Organization for Standardization.
6. Bluyssen, P. (2013). The Healthy Indoor Environment. Abingdon: Routledge.
7. Nicol, J., & Humphreys, M. (2002). Adaptive thermal comfort and sustainable thermal standards for buildings. Energy and Buildings, 563–572.
8. Anderson, J. (2014). Urban design and wellbeing. Cambridge: Doctoral thesis, University of Cambridge.
9. LEED Rating system
10. WELL rating system

PARH - 04 (B): Research Design and Application

CLASSES/ WEEK		MARKS				EXAM HOURS	CREDITS
L	*ST*	*IA*	*WR*	*VV*	***TOT***		
2	2	80	120	-	**200**	3	4

Intent:

- To understand research design in quantitative, qualitative, and mixed methods research
- To engage in a minor research project for understanding the application of research methods and techniques

Course Content

Unit 1: Introduction

- Procedures for designing and setting up a research study
- Understanding research design, Methods and tools of Research
- Literature Review
- Bibliometric analysis
- Mind Mapping
- Data Sampling, Measurement of data

Unit 2: Quantitative Research

- Introduction to quantitative research methods
- Tools & methods of data collection, Reliability and Validity
- Descriptive Statistics and Inferential Statistics
- Parametric and non-Parametric tests of Hypothesis
- Simple regression and correlation analysis, Factor Analysis and Discriminant Analysis
- Use of applications and software for Quantitative Research
- Interpretation of results, Quantitative data presentation

Unit 3: Qualitative Research

- Introduction to qualitative research methods
- Tools & methods of data collection
- Qualitative Data Analysis, Sorting and Coding
- Use of applications and software for Qualitative Research
- Interpretation, conclusion and presentation

Unit 4: Mixed Methods Research

- Introduction to mixed methods research,
- Mixing of research design,
- Tools and methods for holistic results,
- Triangulation and its types,
- Data collection and analysis
- Interpretation and conclusion

Unit 5: Research Application

The application of research methods will be undertaken in relation to the class lectures. Students will work on a pilot research project most suitably pertaining to their proposed area of research. In doing so, they will develop a theoretical and research framework for conducting the study, collect relevant data, analyze and interpret data to arrive at conclusions and inferences.

PARH - 04 (C): Architecture: History and Criticism

CLASSES/ WEEK		MARKS				EXAM HOURS	CREDITS
L	*ST*	*IA*	*WR*	*VV*	***TOT***		
2	2	80	120	-	**200**	3	4

Objectives:

- To introduce the students with historiography and theory of history of architecture.
- To acquaint the students with architecture criticism and analytical methods.

Method:

- Lectures, presentations, tutorials to introduce and inform the theories of topics contained in the syllabus.
- Students to augment the understanding through studying the topics and case studies in detail and presenting as a seminar. The same shall be evaluated for Internal Assessment.

Course Content

Introduction to Historiography: (12 hrs)

- Definition of History- Systematic Record of Events etc.
- Historical Writings- Annals, Travelogues, Diaries, Memoirs, Hagiography, Court Chronicles etc
- Traditional History Approaches - Political, Diplomatic and Economical
- Modern History Approaches- Social, Cultural, Urban, Architecture, Technology, Personality
- Development of Historiography- Greek Historiography e.g. Herodotus- The Histories; Islamic Historiography e.g. Ibn Khaldun- Muqaddimah; Age of Enlightenment e.g. Voltaire; Marxist Historiography etc.
- Periodisation in History - Ancient, Medieval, Modern, Post-Modern, Contemporary etc; Event Based e.g. Renaissance, French Revolution, Industrial Revolution, Post-Independence etc.

Theory of History of Architecture: (12 hrs)

- History of Architecture based on Culture and Civilisation (Greek, Roman, Indus Valley, Mesopotamia etc), Religion (Islamic, Buddhist, Hindu, Sikh etc), Geography (India, Persia, West-Asia, Arab, Europe etc), Ruler (Akbar, Shahjahan, Colonial, Victorian etc), Stylistic Movements (Indo-Turkic, Indo- Islamic, Indo-Saracenic, Gothic, Art-Deco, Art Nouveau, Bauhaus etc) Function (Secular, Religious, Funerary, Sacred etc)
- Portfolios or work of Great Architects e.g. Mimar-Sinan, Leonardo da Vinci, Michelangelo, Le-Corbusier, Frank Lloyd Wright, Hassan Fathy, Habib Rahman, I.M. Kadri, Laurie Baker, Joseph Allen Stein, Charles Correa, Raj Rewal etc
- Periodisation in Architecture History: based on chronology, based on critical projects, based on style etc.

Architecture Criticism: (12 hrs)

- Critical Timeline Method: Identifying critical buildings, mapping transformations and evolution of architecture.
- Analysis of Physical Elements e.g. Form, Spatial Configuration and Complexity, Stylistic and Characteristic elements, Proportions, Material and Construction Technology, Efficiency, Performance etc.

- Influence of Social, Economical, Environmental and Political factors on Architecture. Analysis of Cause & Effect.
- Influence of Patrons and Philosophers e.g. Shahjahan, Jahanara, Mahatma Gandhi, Rabindranath Tagore, Sir Syed Ahmad etc
- Study of Hybridisation of Architecture: Identifying the mixing of form, space, characteristic elements, material and construction from different architecture traditions and creation of a new and distinct style e.g. Indo- Islamic architecture of Akbar, Indo-Saracenic Architecture, Rajput and Sikh Architecture, Provincial Architecture, Nawabi Architecture of Lucknow, Bhopal etc.

Contradictions in Architecture History: (12 hrs)

- Understanding the anomalies and misnomers in defining architecture traditions e.g. Hindu, Mohammedan Architecture, Indo-Saracenic Architecture (Saracenic means a pre-islamic nomadic people of Syrian and Arabian Deserts), Mughal Architecture (Mughal is a derogatory corrupt form for Mongols and was never used by and during Mughal reign)
- Understanding the myths of characteristic and stylistic elements e.g. Arch and Dome are elements of Islamic Architecture (Arch and Dome are Roman invention and permeated to Islamic architecture in due course of time and are purely structural elements with no sacred relevance) etc

Study of Selected Work of Architecture History (Suggested list below) (16 hrs)

- The ten books of Architecture by Vitruvius
- Towards a New Architecture by Le Corbusier
- Essays in Architectural Criticism by Alan Colquhoun
- The seven lamps of Architecture by John Ruskin
- Analysing Architecture by Simon Unwin
- Timeless Way of Building by Christopher Alexander
- Complexity and Contradiction by Robert Venturi
- Space, Time and Architecture by Sigfried Giedon
- A World History of Architecture by Marian Moffett et al
- A History of Architecture by Spiro Kostof
- An Imperial Vision by Thomas R. Metcalf
- Asar us Sanadid by Sir Syed Ahmad Khan
- Modern Architecture by Manfredo Tafuri
- Modern Architecture Since 1900- William J.R. Curtis
- Modern Architecture- A Critical History by Kenneth Frampton
- A Concise History of Modern Architecture in India by John Lang
- Charles Correa by Hasan-Uddin Khan
- Chandigarh's Le Corbusier by Vikramaditya Prakash
- Modern Traditions: Contemporary Architecture in India by Klaus Peter Gast
- Habib Rahman- Prof. S.M. Akhtar
- Islamic Architecture by Prof. S.M. Akhtar
- Laurie Baker-Life Work Writings by Gautam Bhatia

Suggested Reading: As mentioned above in Sr. No. 5

PARH - 04 (D): Theory & Principles of Heritage Conservation

CLASSES/ WEEK		MARKS				EXAM HOURS	CREDITS
L	*ST*	*IA*	*WR*	*VV*	***TOT***		
2	2	80	120	-	**200**	3	4

Objectives:

- To introduce the students with definitions and theories of heritage and its conservation.
- To acquaint the students with framework and principles of conservation of heritage.

Method:

- Lectures, presentations, tutorials to introduce and inform the theories of topics contained in the syllabus.
- Students to augment the understanding through studying the topics and case studies in detail and presenting as a seminar. The same shall be evaluated for Internal Assessment.

Course Content:

1. **Definition and dimensions of Heritage: (08 hrs)**

- Definitions of Tangible & Intangible Heritage, Built & Cultural Heritage, Urban Heritage,
- Definition of Heritage Modern Heritage, Industrial Heritage, Vernacular Heritage, Natural Heritage, Living Heritage etc.

2. **Values and Significance of Heritage: (12 hrs)**

- Why should heritage be conserved?
- Cultural Values, Socio-Economic Values, Educational Values
- History, Identity, Rarity, Association, Artistic, Aesthetic, Technical, Scientific, Economic, Educational, Functional, Social, Political, Sacred, Spiritual, Ecological, Environmental

3. **Conservation Approach & Interventions: (12 hrs)**

- Material based Approach, Value based Approach, Living heritage based Approach.
- Restoration, Rehabilitation, Retrofitting, Reconstruction, Upgradation, Reuse, Revitalisation, Redevelopment, Regeneration etc.
- Heritage Listing, Inventorying, Mapping, Condition Assessment etc.
- Authenticity, Reversibility, Public Participation, Socio-Economic Relevance etc

4. **Heritage Framework & Legislative Provisions in India (16 hrs)**

- UNESCO, World Heritage Sites (WHS), Archaeological Survey of India, Centrally protected monuments, State Departments of Archaeology, State Lists of Protected Monuments, Locally protected structures by Municipal Agencies and their roles, INTACH listing, unprotected heritage etc.
- Ancient Monuments and Archaeological Sites and Remains Act (AMASR) 1958 and subsequent amendments, AMASR ACT 2010, AMASR rules 2011, State laws for heritage protection, Municipal and Panchayat provisions, Provisions in Master Plans and Development Authorities etc.
- Provisions for unprotected heritage like Modern Heritage, Industrial Heritage, Vernacular Heritage etc.

5. Charters, Resolutions, Declarations and Guidelines: (16 hrs)

Relevant International Charters and Guidelines like, Venice Charter 1964, Florence Charter 1981, Burra Charter 1981, Washington Charter 1987, Joint ICOMOS – TICCIH.

Suggested Readings:

1. Conservation of Historic Buildings by Sir Bernard Feilden
2. A History of Architectural Conservation by Jukka Jokilehto
3. The seven lamps of Architecture by John Ruskin
4. The Conservation Movement: A History of Architectural Preservation: Antiquity to Modernity by Miles Glendinning.
5. Authenticity in Architectural Heritage Conservation -Discourses, Opinions, Experiences in Europe, South and East Asia Edited by Katharina Weiler and Neils Gutschow
6. Legal Frameworks for the Protection of Built Heritage in India by Vishakha Kawathekar
7. Acts, Charters etc mentioned in the syllabus above.

PARH - 04 (E): Seismic evaluation and retrofitting of heritage buildings

CLASSES/ WEEK		MARKS				EXAM HOURS	CREDITS
L	*ST*	*IA*	*WR*	*VV*	***TOT***		
2	2	80	120	-	**200**	3	4

Objectives:

- To introduce the students with definitions and theories of heritage and its conservation.
- To acquaint the students with framework and principles of conservation of heritage.
- To introduce the students with the practical and technical aspects of the methodical study of historic building systems and related conservation techniques. This includes details of the characterization and behavioural aspects of materials; structural performance of historic buildings, deterioration processes and conservation interventions.

Method:

- Lectures, presentations, tutorials to introduce and inform the theories of topics contained in the syllabus.
- Students to augment the understanding through studying the topics and case studies in detail and presenting as a seminar. The same shall be evaluated for Internal Assessment.

Course Content:

1. ***Definition and dimensions of Heritage: (08 hrs)***
   - Definitions of Tangible & Intangible Heritage, Built & Cultural Heritage, Urban Heritage,
   - Definition of Heritage Modern Heritage, Industrial Heritage, Vernacular Heritage, Natural Heritage, Living Heritage etc.
   - Why should heritage be conserved?

2. ***Conservation Approach & Interventions: (12 hrs)***
   - Material based Approach, Value based Approach, living heritage based Approach.
   - Restoration, Rehabilitation, Retrofitting, Reconstruction, Upgradation, Reuse, Revitalisation, Redevelopment, Regeneration etc.
   - Heritage Listing, Inventorying, Mapping, Condition Assessment etc.

3. ***Materials and defects: (16 hrs)***
   - Building materials used in India in heritage buildings: Earth, clay, stone, brick, timber, bamboo, lime, iron, metals and glass.
   - Materials used in structural, non – structural and decorative applications: mortars, renders, paints and plasters, additives and stabilizers.
   - Common binding materials, their properties and techniques of preparation.
   - Process of Identification of defects: Field investigations, field-tests, Standard test methods, equipment used for detecting and measuring common problems in historic buildings.
   - Diagnosis and assessment of defects and problems in historic building materials.
   - Remedial measures for material defects in historic structures.

4. ***Structural system, defects and conservation techniques (*****14 hrs)**

- Introduction to historic building technology, structure and construction systems.
- Problems in Historic buildings due to alteration in material properties and performance.
- Theory of structures and analysis of structural components of historic buildings : Load transfer systems, support systems, spanning systems, infill material , strength and weakness of traditional building technologies and composite structural systems (foundations, arches, domes, vaults, columns, beams, roofing etc).
- Common Structural defects in historic buildings, cause and nature of distress: types of cracks, differential settlement, geo-technical issues.
- Methodologies for inspection and diagnosis of structural defects: Introduction to various types of tests such as Destructive Tests (DT), Minor Destructive Tests (MDT), Non Destructive Tests (NDT). Monitoring techniques. Structural analysis techniques.

5. ***Diagnosis and Retrofitting (14 hrs)***

- Qualitative Methods of seismic Evaluation: Rapid visual screening procedure (RVSP) and simplified evaluation of buildings; visual inspection method and non-destructive testing (NDT) methods.
- Spatial and functional assessment of historic buildings. Identification of resilient systems in regions prone to earthquakes and extreme nature events.
- Rescue and conservation measures for distressed buildings.
- Methods of retrofitting, strengthening and upgradation for continued or adaptive reuse.
- Case studies of successes and failures in similar contexts.

Suggested Readings:

1. Conservation of Historic Buildings by Sir Bernard Feilden
2. A History of Architectural Conservation by Jukka Jokilehto
3. The seven lamps of Architecture by John Ruskin
4. The Conservation Movement: A History of Architectural Preservation: Antiquity to Modernity by Miles Glendinning.
5. Authenticity in Architectural Heritage Conservation -Discourses, Opinions, Experiences in Europe, South and East Asia Edited by Katharina Weiler and Neils Gutschow
6. Seismic Evaluation and retrofit of concrete buildings – Vol. I and Vol. II , Applied Technology Council, California, ATC 40
7. Earthquake resistant Concrete structures, Penelis, George G, and Kappos, Andrease J. E & FN Spon.
8. Rapid Visual Screening of buildings for Potential Seismic Hazards, FEMA 154/155

PARH - 04 (F): Circular Economy for Sustainable Habitat

CLASSES/ WEEK		MARKS				EXAM HOURS	CREDITS
L	*ST*	*IA*	*WR*	*VV*	***TOT***		
2	2	80	120	-	**200**	3	4

Overview

Countries that are running ecological deficits, using more resources than what their ecosystems can regenerate (www.footprintnetwork.org). This course offers to introduce students to the concept of Circularity as one of the promising solutions to this ever-increasing problem of consumption and waste generation.
The course offers to familiarize students with circularity as a systemic, multi-disciplinary approach, concerned with the different scales, from material to product, building, city, and region.

Towns and cities use about two thirds of the world's energy, contribute up to 80% of greenhouse gas emissions, and generate 50% of the world's garbage As a catalyst for economic growth, employment opportunities, and environmental quality, the circular economy can offer a policy approach to address the aforementioned issues.

Objectives:

- Recognize the principles of circularity
- Identify the scales of the built environment from materials and products to cities and regions
- Identify the life-cycle phases of building products and how they can be circular
- Discuss the circular design and development approach for buildings/settlement and recognize the impact of such approach on society and the environment during its life- cycle

Method:

- Lectures, presentations, tutorials to introduce and inform the theories of topics contained in the syllabus.

Course Content:

The course is divided into following modules:

1. Introduction: Circular Economy concept, its roots and definitions
2. Circular Economy and Settlements: Buildings, infrastructure and resource flows (e.g., water, energy and waste)
3. Circular Economy and Climate change
4. Circular Economy and biodiversity
5. Tools and Techniques: Exploration of some of the popular tools and techniques used in different sectors pertaining to circularity (e.g., Circular cities by Holcim, LCA, Cradle to Cradle)
6. Policy perspective: Current status at National/sub national level on adoption of 'Circularity' in managing settlements including exploration of financial models
7. Case studies across different sectors

Books [Suggested list]:

- The Handbook to Building a Circular Economy (2021), David Cheshire, RIBA Publishing
- The Circular Economy: A User's Guide (2019), Walter R Stahel, Routledge
- Strategies for Circular Economy and Cross-sectoral Exchanges for Sustainable Building Products (2020), Marco Migliore, Cinzia Talamo and Giancarlo Paganin, Springer.
- Social and Cultural Aspects of the Circular Economy: Towards Solidarity and Inclusivity (2022), Ed. Viktor Pal, Routledge.
- Do better with less: Frugal Innovation for Sustainable Growth (2019), Navi Radjou and Jaideep Prabhu, Penguin Portfolio.
- Business Models in the Circular Economy: Concepts, Examples and Theory (2018), Roberta De Angelis, Palgrave Pivot, CBS Publishers & Distributors Pvt. Ltd.

Readings [Suggested links]:

- UNEP Annual Reports https://www.unep.org/annualreport/2021/index.php
- UNEP – Sustainable Development Report https://wedocs.unep.org/discover?filtertype=subject&filter_relational_operator=equals&filter=SUSTAINABLE+DEVELOPMENT
- UN Biodiversity Lab - https://map.unbiodiversitylab.org/
- UN Circularity Platform - https://buildingcircularity.org/
- Design and Planning for Circularity, UNECE - https://unece.org/circulareconomy/designing-and-planning-circularity

PARH - 04 (G): Seismic Vulnerability and Risk Assessment

CLASSES/ WEEK		MARKS				EXAM HOURS	CREDITS
L	*ST*	*IA*	*WR*	*VV*	***TOT***		
4	0	80	120	-	**200**	3	4

Objectives:

- To develop insights towards various aspects of Seismology.
- To impart basic knowledge of Earthquake Resistance Design of building structures
- To impart knowledge of basic steps and processes used for vulnerability and risk assessment due to earthquakes.

Method:

Lectures, presentations, tutorials to introduce and inform the theories of topics contained in the syllabus.

Course Content:

UNIT-I: Seismology and earthquakes (12hrs)

Seismological catalogues, Completeness of seismicity data, instrumental and historical data, intensity and magnitude, magnitude scales and their conversion. Body and surface waves; Characteristics of strong motion earthquake;

Seismic hazard and risk assessment, Identification of Sources, Deterministic and probabilistic seismic hazard analysis, Gutenberg Richter recurrence law, its characteristics, Seismic Zoning map of India, Seismic microzonation, Case study of Delhi

UNIT-II: Earthquake Resistance Design of structures (16hrs)

Behaviour of load bearing and RC frame buildings under earthquakes, Architectural considerations for seismic design of buildings, Philosophy of earthquake resistant design, capacity design concept, different structural systems; Seismic code provisions, Seismic evaluation and retrofitting strategies. Design considerations in infilled RC frames; Design and ductile detailing of components and joints in RC buildings; Failure mechanism of infills; Codal provisions; Seismic evaluation and retrofitting;

IS Code of Practice on Earthquake Resistant Design, IS: 1893 (Part I) 2016, IS: 13920 (2016), IS 15988 (2013): Seismic Evaluation and Strengthening of Existing Reinforced Concrete Buildings - Guidelines [CED 39: Earthquake Engineering],

UNIT-III: Concepts of Seismic Vulnerability (18hrs)

Representation of Hazard, Vulnerability and Risk, Methods of vulnerability assessment, Empirical, Experimental and Analytical methods, Post- earthquake Damage Surveys,

Representation of Vulnerability- DPMs and Fragility Functions, Intensity scales, Rapid Visual Screening (RVS) method,

UNIT-IV: Risk Assessment (18hrs)

Methods of risk assessment, HAZUS Approach, Classification of building stock, Casualty Rates, Direct and Indirect Economic Losses, Application of GIS and Remote Sensing, Field surveys for database preparation. Seismic Risk and its characteristics, Relationship of Seismic risk and vulnerability, Probable maximum loss, Ground shaking, Risk assessment tools.

Role of planners and Architects in seismic risk mitigation

References

1. Reiter, L.(1990), Earthquake hazard analysis: Issues and insights, Columbia University Press, New York
2. Krammer, S.L. (1996), Geotechnical Earthquake Engineering, Prentice Hall.
3. Stein S. and Wysersion M.(2003), An introduction to seismology earthquakes and earth structure, Blackwell Publishing
4. Burrough, P.A. (1988), Principles of Geographic Information Systems for Land Resources Assessment, Monograph on Soil Resources Survey no. 12, Claredon Press, Oxford
5. Chopra, A.K. (2001), Dynamics of Structures, PHI.
6. IS 1893 (Part-I) -2016, Criteria for Earthquake Resistant Design of Structures, Part 1, General Provisions and Buildings, Bureau of Indian Standards, New Delhi
7. IS 4326-1993, Earthquake Resistant Design and Construction of Buildings, Code of Practice, Bureau of Indian Standards, New Delhi
8. IS: 13920 (2016). Ductile Design and Detailing of Reinforced Concrete Structures Subjected to seismic Force-Code of Practice, Bureau of Indian Standards, New Delhi
9. Park, R. and Paulay, T., Reinforced Concrete Structures, John Wiley & Sons
10. ASCE 2007 41-06
11. IS 13935 (2009): Seismic Evaluation, Repair and Strengthening of Masonry Buildings

- Guidelines [CED 39: Earthquake Engineering]

PARH - 04 (H): Environmental Governance and Jurisprudence

CLASSES/ WEEK		MARKS				EXAM HOURS	CREDITS
L	*ST*	*IA*	*WR*	*VV*	***TOT***		
2	2	80	120	-	**200**	3	4

Course Description:

The course introduces the student to the architecture of legislations and policies governing India's environment and ecological commons. The course is broadly structured in three broad areas. The first part of the course will discuss the normative and conceptual underpinnings of environmental law and jurisprudence. It will draw upon the Constitution of India as a living document and outline the ways in which the legislature and the judiciary have relied on it while trying to conserve the biophysical environment. It would discuss the general principles in environmental law such as precautionary principle, polluter pays principle, sustainable development and public trust doctrine.

The second area of the course would dwell on management and governance of ecological commons and environmental resources. It would discuss the role of State in management and governance, types of rights, common property resource and case examples of management of urban ecological commons in India and any relevant international example.

The third area of the course would go deeper into key legislations, policies and regulations of India for forest management, wildlife, biodiversity, air and water etc. It would also look at some key decisions and judgements that are now part of environmental jurisprudence. The course would highlight key principles and discussions at international level in the field of environmental law.

At the end of the course, it is expected that the students would be familiar with the overall Environmental Law and Policy regime of the country as well as its international obligations. It is expected that the case studies would equip them with basic knowledge and skills to understand environmental law issues.

Objectives:

The course is designed to expose students to various Indian environmental legal principles, regulations, policy framework and management methods that are applicable to the context of urban ecological commons. The key objectives of the course are:

- Understand the concepts of environmental protection, rights and justice within the constitutional framework of India
- Get an understanding of global environmental principles that would have applicability to manage the commons
- Understand the governance mechanism of ecological commons
- Study relevant environmental laws and policies in India, including their objectives, structure, method of regulation, court decisions and their limitation.
- Learn basic research in context of environmental governance and jurisprudence through case examples, nationally and internationally, if appropriate.

Methodology:

Lecture, discussions, library studies, secondary research, presentations and assignments

Course Content:

Module 1: Right to environment – Constitutional Law Perspective

- Comparative constitutional perspective
- Indian Constitutional perspective
- Article 21
- Judicial exposition on the right to environment and ecological commons

Module 2: Environment principles of Governance

- Sustainable development
- Precautionary principle
- Polluter pays principle
- Principle 21 – Stockholm
- Principle of Preventive Action
- Good neighborliness
- Public Trust Doctrine
- Recent conventions and cases decided
- Environment Policy framework in India

Module 3: State and Governance

- State structure in India
- Property: Private, Public and Common
- Institutions, Commons and Governance
- Scales of Governance: Community, Nation and Beyond

Module 4: Common Property Resources and the Law

- Introduction
- Common Concerns
- Common Property Resources (CPRs) meaning and definition
- Management of CPRs (with case examples) in urban and peri-urban areas

Module 5: Laws & Jurisprudence

- Forest management and conservation- law and policy
- Biodiversity Law and management
- Environment Protection Act
- Air and Water Act
- Land conservation and management
- Environmental decision-making process
- Courts and decisions

Module 6: International environmental law and interface with commons

- Case examples

Suggestive Reading

- Divan, Shyam and Armin Rosencranz. (2001). Environmental Law and Policy in India: Cases, Materials and Statutes. Delhi: Oxford University Press
- Sahasranaman, P.B. (2009). Handbook of Environmental Law. Delhi: Oxford University Press.
- PratapBhanu Mehta (Edited). (2016). The Oxford Handbook of the Indian Constitution. Delhi: Oxford University Press
- Schlosberg, David. (2007). Defining Environmental Justice: Theories, Movements, and Nature.
  Oxford: Oxford University Press.
- Handbook on biodiversity laws, access and benefit sharing, Centre for Environmental Law, Education, Research & Advocacy
- Bare Acts and Rules

PARH – 05: Seminar / Term Paper

CLASSES/ WEEK		MARKS				EXAM HOURS	CREDITS
L	*ST*	*IA*	*WR*	*VV*	***TOT***		
2	0	40	-	60	**100**	-	2

Intent:

- To gain insights into existing literature in a specific area of research
- To identify existing gaps and issues in the available literature
- To define the research problems and refine the research framework

Course Content

- Preparation of a term paper in relation to the area of research has to be done. The topic of paper shall be in coherence with the topic of research. For the term paper, literature review is to be carried out by studying research papers on your subject area, refereed journals and books.
- The framework of the term paper is to be structured with the objective of submitting it fully/partially in a publishable format to a peer reviewed journal.
- This paper shall not be very similar to 'Annotated Bibliography', but can have certain references to it.

Guidance:

- Based on the broad area of research, the candidate is required to do a thorough review of the literature with the aim of identifying gaps, problems, or questions that the candidate's work could address.
- Focus should be on reviewing published works with a higher h-index (25 or more).
- Referring unpublished work or work intended for non-scientific audience should be avoided.

Submission:

The submission of the Term Paper would include the following:

1. Mid semester presentation in the RAC
2. Final presentation in the RAC
3. Submission of final report

PARH - 06 (A): Tribal Jurisdiction and Institutional Framework for sustainable development

CLASSES/ WEEK		MARKS				EXAM HOURS	CREDITS
L	*ST*	*IA*	*WR*	*VV*	***TOT***		
4	0	80	120	-	**200**	3	4

Overview

Tribal jurisdictions and institutional frameworks play a critical role in promoting sustainable development and safeguarding the rights and interests of indigenous communities. This course comprehensively examines the legal, social, and environmental aspects of tribal governance and sustainable development. Students will explore the unique challenges faced by tribal communities and the institutional mechanisms available to support their sustainable development efforts.

The course provides students with a deep understanding of the legal frameworks, policies, and practices related to tribal jurisdictions and sustainable development. It explores the interface between indigenous rights, traditional knowledge, and community empowerment within sustainable development.

Objectives:

- Understand the concept of tribal jurisdictions and their importance in sustainable development.
- Analyze the historical, social, and legal factors influencing tribal governance and institutional frameworks.
- Examine the relationship between indigenous rights, traditional knowledge, and sustainable development.
- Evaluate the challenges and opportunities faced by tribal communities in pursuing sustainable development.
- Critically assess the role of institutional mechanisms in promoting sustainable development in tribal contexts.

Methodology:

- Lectures, presentations, and tutorials to introduce and inform the theories of topics contained in the syllabus.
- Students augment their understanding by studying the topics and case studies in detail and presenting them as a seminar. The same shall be evaluated for Internal Assessment

Course Content:

Course outline

Module 1: Introduction to Tribal Jurisdictions and Sustainable Development

Module 2: Indigenous Rights and Traditional Knowledge

Module 3: Legal Frameworks and Policies

Module 4: Institutional Mechanisms for Sustainable Development Module 5: Case Studies and Best Practices.

Suggested readings

Asian Development Bank, 1997. Governance: Promoting Sound Development Management. Manila: ADB. Barber, B., 1998. A Place for Us: How to Make Society Civil and Democracy Strong, New York: Hill and Wang.

Crook, R. and Manor, J., 1995. Democratic Decentralisation and Institutional Performance: Four Asian and African Experiences Compared, Journal of Commonwealth and comparative Politics, Vol. 33, No. 3, pp. 19-25

Gupta, B., 1996. India: Problems of Governance, Governing South Asia. Vol. 5, New Delhi: Konark Publishers UNDP, 1997. Public Private Partnership for the Urban Environment. New York: UNDP.

UNDP, 1999. Human Development Report- Globalisation with a Human Face. New York: UNDP. UNDP, 2002. Urban Governance: A sourcebook on indicators, New York: UNDP.

PARH - 06 (B): Land Use and Transportation Planning

CLASSES/ WEEK		MARKS				EXAM HOURS	CREDITS
L	*ST*	*IA*	*WR*	*VV*	***TOT***		
2	2	80	120	-	**200**	3	4

Intent:

To understand the interrelationship between transport infrastructure projects and the land use surrounding it.

Course Content:

Unit-I: LAND USE AND TRANSPORTATION PLANNING

Comparative Land Use and Transportation Planning - Metropolitan Forces, Patterns and Trends, Concerns - Accessibility: The Land Use-Transportation Link - Basics of Travel Demand: Persons and Firms - Effects of land use on travel - The Influence of Land Use on Mobility and Accessibility - The Land Use Effects of Transportation Policies, The Transportation Effects of Land Use Policies Accessibility:

Unit-II: CONTEMPORARY LIVING PATTERN OF MOBILITY

Historic and contextualized travel practices; Travel in technological culture; ICT based mobility innovations; Social features of smart transportation and smart mobility.

Unit-III: THE LAND USE TRANSPORT MODEL

Partial and general models – The general structure of the Lowry model – The economic base mechanism – The location of activities – The integration of the economic base and allocation mechanisms – Problems and limitations – Discrete choice model theoretical framework - The multinomial logit model (MNL) - The hierarchical logit model (HL)

Unit-IV: MANAGING TRANSPORT AND SOCIETY

Rise and decline of public transport; Restructuring traffic facilities; Use of social research; Ideology and policy perspective of urban transportation; User friendly design of places for safe mobility and travel for all; Efficient transport plan; Management and control of the environmental impacts of transport systems in communities and cities.

Unit-V: CASE STUDIES OF LAND USE TRANSPORT INTEGRATION

Public Transportation and Metropolitan Growth: Case Studies Singapore - Roadways and Metropolitan Growth: São Paulo - Land Use Mobility, Accessibility in Metropolitan China

Unit VI: METROPOLITAN FUTURES

Pulling It All Together: Land Use, Mobility, Accessibility; Back to the Future? Land Use Mobility, Accessibility in Metropolitan Cities; The Future of the Metropolis: Theoretical Speculations; The Future of the Metropolis: Tools and Models.

Suggested Readings:

1. Integrated Land-Use and Transportation Models Behavioral Foundations. Martin LeeGosselin (Universite Laval, Quebec, Canada), Sean Doherty, 2005
2. The Geography of Transport Systems by Jean-Paul Rodrigue, Claude Comtois, Brian Slack. Published by Routledge, 2009.
3. Koppelman, F. S., & Bhat, C. R. (2006). A Self Instructing Course in Mode Choice Modelling: Multinomial and Nested Logit Models.
4. Ortuzar, J. D., &Willumsen, L. G. (2011). Modelling Transport, 4th Edition. Wiley.
5. Papacostas, C. S., &Prevedouros, P. D. (2015). Transportation Engineering and Planning, 3rd Edition. Pearson.
6. Wee, B. V. (2015). Viewpoint: Toward a new generation of land use transport interaction models. Journal of Transport and Land Use, 1-10
7. Mieszkowski, P., and E. Mills. "The Causes of Metropolitan Suburbanization." *Journal of Economic Perspectives* 7, no. 3 (1993): 135-147.
8. Ingram, G. "Patterns of Metropolitan Development: What Have We Learned?" *Urban* Studies 35, no. 7 (1998): 1019-1035.
9. Glaeser, E. "Are Cities Dying?" The Journal of Economic Perspectives 12, no. 2 (1998): 139-160.
10. Miller, Mervyn. "Garden Cities and Suburbs: At Home and Abroad." *Journal of Planning History* 1, no. 1 (2002): 6-28.
11. Tiebout, C. "A Pure Theory of Local Public Expenditures." *Journal of Political Economy* 64 (1956): 416-24.
12. Porter, D. "Regional Governance: The Missing Link in Relating Land Use and Transportation." Transportation, Urban Form, and the Environment. Transportation Research Board, Special Report 231, 1991, pp. 63-80.
13. Geurs, K. T., and B. van Wee. "Accessibility Evaluation of Land-use and Transport Strategies: Review and Research Directions." Journal of Transport Geography 12 (2004): 127-140.
14. Handy, S. L., and K. J. Clifton. "Evaluating Neighborhood Accessibility: Possibilities and Practicalities." Journal of Transportation and Statistics 4, no. 2/3 (2001): 67-78.
15. Handy, S. "Methodologies for Exploring the Link between Urban Form and Travel Behavior." *Transportation Research D* 1, no. 2 (1996): 151-165.
16. Crane, R. "The Influence of Urban Form on Travel: An Interpretive Review." *Journal of Planning Literature* 15, no. 1 (2000): 3-23.

PARH - 06 (C): Gamification in Education

CLASSES/ WEEK		MARKS				EXAM HOURS	CREDITS
L	*ST*	*IA*	*WR*	*VV*	***TOT***		
4	0	80	120	-	**200**	3	4

Intent:

The intent of this course is to comprehend the concept of gamification and its use in architectural education. The topics listed below provide a general overview of gamification.

Course Content:

1. Introduction to Gamification
   - 1.1. Definition of Gamification
   - 1.2. Objective and Purpose of Gamification
   - 1.3. Example of Gamification in Various Field
   - 1.4. Example of Gamification in Education
   - 1.5. Example of Gamification in Architecture education / field

2. Games, Play & Learning
   - 2.1. Understanding the Essence of Games
   - 2.2. Games & Education
   - 2.3. Journey of Game Design Course
   - 2.4. Various Examples of game designs for students

3. Theories, Elements and principle of games
   - 3.1. Terminology of games
   - 3.2. Game Elements
   - 3.3. Theories Behind Gamification of Learning and Instruction
   - 3.4. Different Analysis on games learning
4. Game Design Process
   - 4.1. Introducing game design process
   - 4.2. Resource: Game and problem solving
   - 4.3. Revisiting educational goals
   - 4.4. Design process: Building a game
   - 4.5. Revising game dynamics
   - 4.6. Resource: On play testing
   - 4.7. Infrastructure
   - 4.8. Major project: Discussion and brain storming
   - 4.9. Resource: levels of identity, Redesign and design of games

PARH - 06 (D): Emerging Practices of 'Commoning' in Global South

CLASSES/ WEEK		MARKS				EXAM HOURS	CREDITS
L	*ST*	*IA*	*WR*	*VV*	***TOT***		
4	0	80	120	-	**200**	3	4

Course Description:

'Commoning' represents a new way for citizens to take action in shaping the future of their communities and urban commons. The course, through a seminar-based approach, focuses on the intersection of urban and social design practices and act of communing, for urban commons, especially ecological commons, in Global South. Students will engage in an in-depth exploration of how emerging practices and interventions are being leveraged to foster citizen engagement and participation to address and manage ecological urban commons. Through extensive literature review, case studies, and critical analysis, students will develop a comprehensive understanding of the potential of design and inter-disciplinary approaches and interventions for nurturing ecological commons in the Global South.

Objectives:

- Understand the concepts of ecological commons, commoning practices, and their significance in addressing socio-environmental challenges in urban areas of the Global South.
- Analyze the potential of interdisciplinary design interventions for nurturing and enhancing ecological commons in the Global South.
- Explore emerging trends and future perspectives in communing practices, especially technology- enabled design practices
- Foster an understanding of the interdisciplinary nature of commoning and the importance of collaboration between different stakeholders, including communities, designers, policymakers, and technologists.

Methodology:

Lecture, discussions, library studies, secondary research, presentations and assignments

Course Outline:

- Introduction to Ecological Commons and Commoning
- Theoretical Frameworks and Conceptual Perspectives on commoning and design practices in urban and peri-urban contexts
- Case Studies of Inter-disciplinary Design Practices for 'Commoning' in the Global South
- Critical Analysis of Design Approaches and Methodologies for Ecological Commoning
- Policy and Governance for Ecological Commoning
- Synthesis and Analysis

Suggestive Reading

- Hardin, G. (1968). The Tragedy of the Commons. Science, 162(3859), 1243-1248.
- Ostrom, E. (1990). Governing the Commons: The Evolution of Institutions for Collective Action.
  Cambridge University Press.
- Helfrich, S. and Bollier, D. (2015). Commons and Commoning: A Primer.
- Harvey, D. (2012). Rebel Cities: From the Right to the City to the Urban Revolution. Verso.
- Stavrides, S. (2016). Common Space: The City as Commons. Zed Books.

PARH - 07 (A): Resource Management and Material Ecology for homogeneous regions

CLASSES/ WEEK		MARKS				EXAM HOURS	CREDITS
L	*ST*	*IA*	*WR*	*VV*	***TOT***		
4	0	80	120	-	**200**	3	4

Overview

Resource management and material ecology play crucial roles in sustainable development and the preservation of natural resources. This course offers an in-depth exploration of resource management strategies and material ecology principles specifically designed for homogeneous regions. Homogeneous regions refer to areas with similar environmental, economic, and socio-cultural characteristics.

The course provides students with a comprehensive understanding of the challenges and opportunities associated with resource management in homogeneous regions. Students will examine various strategies and techniques aimed at optimizing resource utilization, reducing waste generation, and promoting ecological balance.

Methods:

Lectures, presentations, tutorials to introduce and inform the theories of topics contained in the syllabus. Case study analyses

Students augment their understanding by studying the topics and case studies in detail and presenting them as a seminar. The same shall be evaluated for Internal Assessment

Objectives:

Comprehend the concept of homogeneous regions and their relevance to resource management and material ecology.

Analyse the socio-cultural, economic, and environmental factors influencing resource management in homogeneous regions.

Critically analyze case studies of successful resource management initiatives in homogeneous regions.

Course outline

Module 1: Introduction to Homogeneous Regions

Module 2: Resource Extraction and Consumption Patterns Module 3: Sustainable Resource Management Strategies Module 4: Policy for Resource Management

Module 5: Technological Innovations and Best Practices

Suggested Reading

Bruce E. Johansen (Ed.), 2003. Indigenous Peoples and Environmental Issues: An Encyclopedia, Bloomsbury Publishing. Jon Erickson, 2022. The Progress Illusion: Reclaiming Our Future from the Fairytale of Economics. Island Press

EF Schumacher, 1973. Small is Beautiful: Economics as if People Mattered. Vintage Books, London.

Peter G. Brown and Peter Timmerman (Eds),2015. Ecological Economics for the Anthropocene, , eds., Columbia University Press.

PARH - 07 (B): GIS and Remote Sensing Techniques for Transport Planning

CLASSES/ WEEK		MARKS				EXAM HOURS	CREDITS
L	*ST*	*IA*	*WR*	*VV*	***TOT***		
2	2	80	120	-	**200**	3	4

Intent:

To understand the various applications of Geo informatics systems and its current development in transportation planning and management in various cities.

Course Content:

Unit-I: INTRODUCTION TO GEO-INFORMATICS

Definitions – Geoinformatics, Remote Sensing, Geographic Information Systems (GIS), Spatial Data Infrastructure; the concept of earth surface projections and geoids; limitations of Database management system (DBMS), engineering drawings and CADD packages – the need for GIS, Spatial and nonspatial data, raster and vector data, spatial thematic models.

Unit–II: GEOGRAPHIC INFORMATION SYSTEMS FOR TRANSPORT PLANNING

Spatial data analysis - buffer, overlay, 3D analysis and modelling; Emerging and advanced technology - web-enabled GIS, GPS tracking and monitoring, model builder, transparency through GIS, community participation through GIS, monitoring and management, mobile geo-spatial data collection, aerial mobile mapping, emergency response planning.

Unit–III: INFORMATION MANAGEMENT SYSTEMS FOR TRANSPORTATION

Transportation Information Systems (TIS), geo-spatial standards, data sources, issues, guidance and services for transportation and infrastructure planning; Intelligent Transport Systems (ITS); Executive information system; Pavement management system, bridge management, maintenance management, safety management; Transportation System Management (TSM), toll modelling, travel demand forecasting and freight movements, simulation models.

Unit-IV: APPLICATIONS IN TRANSPORTATION & INFRASTRUCTURE PLANNING

Preparation of transportation network, infrastructure maps, etc.; Planning and design for transport networks; Planning for hazardous material release incidents, risk analysis and decision making; Evacuation planning, development of new traffic analysis zones.

Suggested Readings:

1. Singleton, A.D., Spielman, S. and Folch, D. Urban Analytics (Spatial Analytics and GIS), Sage, Thousand Oaks, California, 2018.
2. Jamwal, A.K., Remote Sensing and GIS, Jnanada Prakashan, Delhi, 2008.
3. Lillesand, T.M. and Kiefer, R.W., 1987. Remote sensing and Image Interpretation, John Wiley.
4. Jensen, J. R. Introductory digital image processing a remote sensing perspective, Prentice Hall series in geographic information science.
5. Schowengerdt, R. A., 2007. Remote Sensing: Models and Methods for Image Processing, Academic Press.
6. Campbell, J.B., 1996. Introduction to Remote Sensing, Taylor & Francis, London.
7. Cracknell, P. and Hayes, L. Introduction to remote sensing,

8. Jensen, J.R., 2003. Remote Sensing of the Environment an Earth Resource Perspective, Pearson Education, Delhi.
9. Joseph, G., 2003. Fundamentals of Remote Sensing, University press.
10. Gupta, R. P., 2005. Remote Sensing Geology, Springer.

PARH - 07 (C): The Art and Psychology of Engagement in Gamification

CLASSES/ WEEK		MARKS				EXAM HOURS	CREDITS
L	*ST*	*IA*	*WR*	*VV*	***TOT***		
4	0	80	120	-	**200**	3	4

Objectives:

To explore the psychology and engagement theory of gamification. The subjects listed below provide a broad summary of this topic.

Course Content:

1. Psychology behind Gamification
    - 1.1. Introduction
    - 1.2. Principles of psychology behind gamification
    - 1.3. Plato's Tripartite Theory of the Soul: Definition & Parts
    - 1.4. Dualism and Early Psychological Thought
2. Motivation as an engagement component for gamification
    - 2.1. What is Motivation? - Theories & Examples
    - 2.2. The Grand Theories of Psychological Motivation
    - 2.3. Types of motivation: Intrinsic and extrinsic
3. Goal Setting & Motivation
    - 3.1. Personal Goal Setting: Definition & Ideas
    - 3.2. Locke's Goal-Setting Theory: Using Goals to Advance Motivation
    - 3.3. Fixed vs. Growth Mindset
    - 3.4. Cognitive Dissonance: Definition, Theory & Examples
    - 3.5. Effort Justification: Aronson & Mills Study, Examples & Applications
    - 3.6. Self-Perception Theory: Definition and Examples
    - 3.7. How Goals Contribute to Well-Being
    - 3.8. Wrosch's Principle of Goal Disengagement
4. Engagement process
    - 4.1. Theory of engagement
    - 4.2. Autonomy
    - 4.3. Community
    - 4.4. Building of engagement plan
5. Managing the Gamification Design Process
    - 5.1. Development Process: ADDIE vs. Scrum
    - 5.2. Design Document
    - 5.3. Paper Prototyping
    - 5.4. Case studies
6. Practical application of engagement theory and motivational concept in gamification
    - 6.1. Case studies
    - 6.2. Identification of key component which boost motivation and engagement in students

PARH - 07 (D): Economics of Managing Urban Commons

CLASSES/ WEEK		MARKS				EXAM HOURS	CREDITS
L	*ST*	*IA*	*WR*	*VV*	***TOT***		
4	0	80	120	-	**200**	3	4

Course Description:

The course on provides an in-depth exploration of the economic dimensions of managing urban commons, especially stewarding ecological commons. Students will examine the theoretical foundations, practical applications, and policy implications of economic principles in the context of ecological commons. Through lectures, case studies, and interactive discussions, students will gain a comprehensive understanding of the economic considerations and strategies for effective management and conservation of ecological commons.

Objectives:

- Explore the economic theories and frameworks relevant to the management of ecological commons.
- Examine the role of property rights, market mechanisms, and economic incentives in the conservation and sustainable use of ecological commons.
- Analyze the economic valuation methods for assessing the benefits and costs associated with ecological commons.
- Explore case studies from diverse ecological contexts to understand the practical challenges and successful approaches in managing ecological commons.
- Discuss the role of community engagement, stakeholder participation, and social entrepreneurship in the management of ecological commons.
- Foster critical thinking and analytical skills through the application of economic principles to real- world scenarios related to ecological commons.

Methodology:

Lecture, discussions, library studies, secondary research, presentations and assignments

Course Outline:

- Economic Theories and Frameworks
- Methods of Economic Valuation of Ecological Commons
- Economic Drivers and Externalities towards management of commons and climate change
- Case Studies in Ecological Commons Management with PPP, private models and community engagement
- Synthesis

Suggestive Reading

- Poteete, A. R., Janssen, M. A., & Ostrom, E. (2010). Working together: Collective action, the commons, and multiple methods in practice. Princeton University Press.
- De Groot, R. S., Wilson, M. A. and Boumans, R. M. (2002). A typology for the classification, description and valuation of ecosystem functions, goods and services. Ecological Economics, 41(3), 393-408.
- Berkes, F. (2010). Sacred ecology: Traditional ecological knowledge and resource management.

Taylor & Francis.

- Esty, D. C., & Winston, A. S. (2009). "Green to Gold: How Smart Companies Use Environmental Strategy to Innovate, Create Value, and Build Competitive Advantage." Yale University Press.
- Hahnel, R. (2011). "Green Economics: Confronting the Ecological Crisis." Routledge.
- Daly, H. E., & Farley, J. (2010). "Ecological Economics: Principles and Applications." Island Press.
- Bollier, D., & Helfrich, S. (Eds.). (2012). "The Wealth of the Commons: A World Beyond Market & State." Levellers Press