

**INDIAN INSTITUTE OF TECHNOLOGY ROORKEE****NAME OF DEPARTMENT/CENTRE:** Department of Architecture and Planning**Subject Code:** ARC-611**Course Title:** Sustainable Built Environment**L-T-P:** 2-1-0**Credits:** 3**Subject Area:** PCC

**Course Outlines:** Understanding issues and impacts of the built environment (environmental, economic and social impacts); Understanding Sustainability and Sustainable development - policies, theories and global debate around sustainability in built environment; Urban physics, thermal, visual and acoustic comfort; Sustainability assessment rating systems; Life cycle assessment; Net Zero energy and energy positive buildings.

# INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

**NAME OF DEPARTMENT/CENTRE:** Department of Architecture and Planning

**Subject Code:** ARC-613

**Course Title:** Advanced Building Technologies

**L-T-P:** 2-1-0

**Credits:** 3

**Subject Area:** PCC

**Course Outlines:** State-of-the-art technologies in building construction & Operations; Advanced construction materials & systems, Building envelopes; HVAC systems; Renewable energy systems, Building energy management systems; New building concepts such as Passive houses and Plus houses.

# INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

**NAME OF DEPARTMENT/CENTRE:** Department of Architecture and Planning

**Subject Code:** ARC-615

**Course Title:** Urban Design

**L-T-P:** 2-1-0

**Credits:** 3

**Subject Area:** PCC

**Course Outlines:** Urban Design as a discipline; Urban design process and methodologies; Participatory urban design approaches; The Urban, social perspective, socio-economic perspective, spatial perspectives, ecological/sustainability and happiness perspectives on urban design; Case studies from global contexts; The Indian urban landscape; Contemporary discourses such as placemaking in the digital age, urban design and health; Equity-centered urban design: Urban Design and the SDGs; AI Urbanism; Graphics for Urban Design

# INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

**NAME OF DEPARTMENT/CENTRE:** Department of Architecture and Planning

**Subject Code:** ARC-617

**Course Title:** Contemporary World Architecture

**L-T-P:** 2-1-0

**Credits:** 3

**Subject Area:** PCC

**Course Outlines:** Foundations of modern architecture; Rise of modernism and allied movements; Styles and movements in the 20<sup>th</sup> century; Late and post modernism; Evolution of the tall building; High Tech architecture; Emerging building typologies; Evolution of places to live, work and gather; Evolution of transportation hubs – airports, seaports and railway stations; New materials and technologies; Energy efficient building design; Sustainable and green built environment; New concepts in the 21<sup>st</sup> century.

# INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

**NAME OF DEPARTMENT/CENTRE:** Department of Architecture and Planning

**Subject Code:** ARC-619

**Course Title:** Architectural Design Studio-I

**L-T-P:** 1-0-8

**Credits:** 4

**Subject Area:** PCC

**Course Outlines:** Understanding various components of a large scale (architectural) project such as context, site analysis, natural topography and hydrology, soil conditions, climate, landscaping etc.; Understanding of sustainable strategies through theory and case studies for application in a large-scale project; Green retrofitting; Architectural design and implementation scheme.

# INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

**NAME OF DEPARTMENT/CENTRE:** Department of Architecture and Planning

**Subject Code:** ARS-501

**Course Title:** Architecture and Society

**L-T-P:** 2-0-0

**Credits:** 2

**Subject Area:** SSC

**Course Outlines:** Theoretical insights and scholarly understanding of architecture and its relationship with society; Brief theories of settlements and civilizations; Factors influencing architectural design, architectural elements in space and their studies through social functions, through historical, contemporary and futuristic perspectives; Architectural forms and social identity; The social landscapes of urban cultures; Introducing social sustainability and built environment; Inclusivity through architecture.

# INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

**NAME OF DEPARTMENT/CENTRE:** Department of Architecture and Planning

**Subject Code:** ARS-502      **Course Title:** Visual Narratives and Photo Essays in Built Environment

**L-T-P:** 2-0-0

**Credits:** 2

**Subject Area:** SSC

**Course Outlines:** Understanding visual narratives, photo essays and other modes of visual communication including drawings, maps, storyboarding, etc.; Narratives as a method of storytelling; Types of media and methods/tools for visual narratives; Visual methods for studying built environments; Developing a Photo Essay; Case Studies and Reviews of Photo essays by eminent scholars and professionals; Visual narratives in a digital world.

## INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

**NAME OF DEPARTMENT/CENTRE:** Department of Architecture and Planning

**Subject Code:** ARS-503

**Course Title:** Environment and Behavior Studies

**L-T-P:** 2-0-0

**Credits:** 2

**Subject Area:** SSC

**Course Outlines:** Need, Relevance and Meaning of Environment-Behavior Studies in Built Environment; Terminologies; Concepts and evolution in understanding the built environment-human interrelationships; Fundamental Theories and their Applied perspectives on behavior studies in space involving various human dimensions including physical, sensory, cognitive and cultural etc.; Methods and tools for conducting environment behavior studies; Case studies and examples.



# INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

**NAME OF DEPARTMENT/CENTRE:** Department of Architecture and Planning

**Subject Code:** ARC-621

**Course Title:** Planning Legislation and Governance

**L-T-P:** 2-1-0

**Credits:** 3

**Subject Area:** PCC

**Course Outlines:** Introduction to governance, planning and legislation; Scope and objectives of planning legislation; Evolution and growth of planning legislation worldwide and India; 73rd and 74th Constitutional Amendments; Municipal Acts, rules and regulations; Building bye laws, Development controls and zoning regulations; Land acquisition and related acts/laws; Town and Country Planning Act, SEZ Act, CRZ Act; Environmental Acts; Citizen participation in governance; Ladder of citizen participation; Institutional dynamics; Institutional analysis.

# INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

**NAME OF DEPARTMENT/CENTRE:** Department of Architecture and Planning

**Subject Code:** ARC-623

**Course Title:** Planning Theory

**L-T-P:** 2-1-0

**Credits:** 3

**Subject Area:** PCC

**Course Outlines:** Introduction to Planning; Urban Planning Principles; Evolution of Cities and Town Planning Practice; Indian Town Planning Theory; Centrality, Network and Urban Patterns; Central Place Theory; Growth Pole Theory; Concentric Zone Theory; Compact City; Neighbourhood Concept; Sector Theory; Multiple Nuclei Theory; Bid rent theory; Urban sprawl and satellite towns; Garden city concept; Core-periphery, Endogenous and Exogenous growth theory; Rational Choice Theory; Communicative Planning theory; Participatory Planning; Contemporary and emerging theories.

## INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

**NAME OF DEPARTMENT/CENTRE:** Department of Architecture and Planning

**Subject Code:** ARC-625

**Course Title:** Infrastructure Planning

**L-T-P:** 2-1-0

**Credits:** 3

**Subject Area:** PCC

**Course Outlines:** Introduction to Infrastructure Planning; Infrastructure Planning Process; Principles of Infrastructure Planning & Risk Assessment; Infrastructure and Sustainable Development Goals; Screening of Infrastructure Projects; Infrastructure Finance; Infrastructure Demand Forecasting; Transport Infrastructure; Water Supply Management; Sewage and Sanitation Management; Solid Waste Management; Power Infrastructure; Social Infrastructure; Facility Location Planning; Policies and Guidelines on Infrastructure Development.

## INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

**NAME OF DEPARTMENT/CENTRE:** Department of Architecture and Planning

**Subject Code:** ARC-627

**Course Title:** GIS and Remote Sensing Techniques

**L-T-P:** 2-1-0

**Credits:** 3

**Subject Area:** PCC

**Course Outlines:** Introduction to Geographic Information Systems and Remote sensing; Concept of remote sensing; Map projections; Resolutions – Spatial, Temporal, Spectral, Radiometric; Visual Image Interpretation; Raster data Analysis; Digital Image processing; Unsupervised classification; Supervised classification; Spatial Database Management Systems; Land use land cover change detection; Hydrological Analysis; Aerial photography; Application of Artificial Intelligence in RS and GIS; Python for GIS in Urban Planning.

# INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

**NAME OF DEPARTMENT/CENTRE:** Department of Architecture and Planning

**Subject Code:** ARC-629

**Course Title:** Planning Studio- I

**L-T-P:** 0-0-8

**Credits:** 4

**Subject Area:** PCC

**Course Outlines:** Introduction to planning concepts: Infrastructure, Environment, Land use, livelihood using various exercises; Appreciation of various planning reports and planning assessments; Sensitisation to development issues by Appraisal of any existing site using reconnaissance; Neighbourhood/Site Planning; Formulation of any Development/Master Plan through stakeholders' consultations and planning surveys, Proposal on Land Use and Development Controls; Synchronisation of planning proposal with programs/schemes.

# INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

**NAME OF DEPARTMENT/CENTRE:** Department of Architecture and Planning

**Subject Code:** ARS-504

**Course Title:** Socio Economic for Planning

**L-T-P:** 2-0-0

**Credits:** 2

**Subject Area:** SSC

**Course Outlines:** Relationship between human and environment; Socio-cultural and political profile of Urban life; Urbanisation; Industrialization, globalization and localization; Urban Social Problems; Demography and its elements; Economic growth vs development; Unemployment & Poverty; Infrastructure and economy; Public/Private sector and economy; Rural/Urban economy and finance; Natural resource management, Industrial restructuring and urban growth, Exogenous and endogenous growth, Location choice and regional growth; Economies of scale.

## INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

**NAME OF DEPARTMENT:** Department of Architecture and Planning

**Subject Code:** ARL-603

**Course Title:** Building Performance Evaluation

**L-T-P:** 2-1-0

**Credits:** 3

**Subject Area:** PEC

**Course Outlines:** Thermal Performance of Buildings; Operational Energy Performance; Building Performance Metrics & Benchmarks; Tools & Techniques; Whole Building Simulation; Thermal Performance of Building Envelope; Performance of HVAC Systems; Performance Gap; Remedial Strategies; Predictive & Preventive Maintenance; Embodied Energy & Life Cycle Assessment; Performance assessment for Daylight Effectiveness & Visual Comfort; Performance assessment for Acoustics & Noise Control; Whole Building Performance Audit; Post-Occupancy Evaluation.

## INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

**NAME OF DEPARTMENT:** Department of Architecture and Planning

**Subject Code:** ARL-611

**Course Title:** Architecture and Urban Conservation

**L-T-P:** 2-1-0

**Credits:** 3

**Subject Area:** PEC

**Course Outlines:** Fundamentals of architecture and urban conservation; sociological, anthropological and historical positions; relevant concepts - Place and Space, Cultural identity, Forms of Heritage, recognition of heritage, power and built heritage; conservation movements and global approaches; global cases towards safeguarding heritage; post war scenarios; Heritage Impact Assessment methods and tools; Building level assessments; traditional and innovative approaches in architectural conservation; Historic Cultural landscapes; Community participation; living heritage sites, heritage Byelaws, agencies in safeguarding urban heritage, Urban disasters and Heritage at Risk, Climate change and Heritage adaptation.



## INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

**NAME OF DEPARTMENT:** Department of Architecture and Planning

**Subject Code:** ARL-612

**Course Title:** Vernacular Architecture

**L-T-P:** 2-1-0

**Credits:** 3

**Subject Area:** PEC

**Course Outlines:** Vernacular architecture and traditional architecture; factors influencing vernacular architecture: evolution of development of shelter form and identity; physiography, ecology, culture and vernacular architecture; difference in rural and urban vernacular architecture; case Studies covering settlement pattern, architectural form and construction details of global and Indian vernacular architecture; contemporary examples addressing social and cultural needs and utilizing local technology and materials; vernacular Architecture in 21st Century; technological innovation in vernacular architecture; debates and discussions.

## INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

**NAME OF DEPARTMENT:** Department of Architecture and Planning

**Subject Code:** ARL-621

**Course Title:** Research Methods in Architecture and Planning

**L-T-P:** 2-1-0

**Credits:** 3

**Subject Area:** PEC

**Course Outlines:** Research Methods vs. Research Methodology; Research Writing; Bibliometric Analysis; Systematic Literature Review; Meta-Analysis; Referencing; Types of Data in Research; Measurement and Scaling Techniques; Surveys; Sample Size; Sampling Techniques; Sources of Data; Survey Questionnaire; Data Collection; Ethics in Data Management; Similarity vs. Plagiarism; Processing of Data and Database Management; Interpreting Data; Descriptive Statistics; Representation of Data and Inferences; Hypothesis; Parametric Tests; Non-parametric Tests; Quantitative & Qualitative Research; Simulation Research; Big Data Research; Role of AI-ML in Research; Programing Language; Emerging Research Potential in Planning and Architecture.

**INDIAN INSTITUTE OF TECHNOLOGY ROORKEE**

**NAME OF DEPARTMENT:** Department of Architecture and Planning

**Subject Code:** ARL-622

**Course Title:** Planning Studio-II

**L-T-P:** 0-0-8

**Credits:** 4

**Subject Area:** PEC

**Course Outlines:** Preparation of a Metropolitan plan/ Regional plan of a Metropolis/Rural/ Region/ District; Thematic planning exercise(s) on Demography, Land use, Socio-economy, Tourism, Infrastructure, Housing, Transportation, Environment & Ecology, Climate Change and Disaster Resilience etc.; Preparation of work plans, Feasibility reports, Financial models, and Detailed Project Reports.

**INDIAN INSTITUTE OF TECHNOLOGY ROORKEE**

**NAME OF DEPARTMENT:** Department of Architecture and Planning

**Subject Code:** ARL-623

**Course Title:** Sustainable Urban Transport Planning

**L-T-P:** 2-1-0

**Credits:** 3

**Subject Area:** PEC

**Course Outlines:** Introduction to Sustainable Development Goals and transport; Urban mobility challenges and opportunities; E-mobility; Types of roads and planning standards; Type of traffic surveys; Traffic stream characteristics; Traffic and Road Safety; Parking management; Public transportation systems; Transport and land-use integration; First and last-mile connectivity; Active transportation strategies; Walkability and cyclability principles; Travel demand forecasting (Trip generation, trip distribution, Modal split, Trip assignment); Transportation economics; Service level benchmarks; Comprehensive Mobility Plan; Transport policies and schemes; Emerging trends in sustainable urban mobility.

## INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

**NAME OF DEPARTMENT:** Department of Architecture and Planning

**Subject Code:** ARL-629

**Course Title:** Urbanization and Globalization

**L-T-P:** 2-1-0

**Credits:** 3

**Subject Area:** PEC

**Course Outlines:** Understanding globalisation and its evolution; urbanisation as a global phenomenon; theories of globalisation; neoliberal urbanism; rise of global cities; role of transnational migration in urban growth; informal urbanisation; Critical urban theory and globalisation; planetary urbanisation and southern urbanism; digital infrastructures and data driven solutions - Smart cities in India; environmental impacts of globalization; impact of urbanisation on the environment; governance models in globalised cities; global response to environment and climate crises; managing urban transitions; imagining future urbanisation in a globalised world; case studies of cities.

## INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

**NAME OF DEPARTMENT:** Department of Architecture and Planning

**Subject Code:** ARL-630

**Course Title:** Regional Planning

**L-T-P:** 2-1-0

**Credits:** 3

**Subject Area:** PEC

**Course Outlines:** Basic concepts and need for regional planning; typology of regions; Rural-Urban spatial relationship; Regional growth theories and models; Emergent issues in regional planning - scale, complexity, convergence and divergence, leading and backward regions; Regional economy—industrialization—disparities; Migration; role of infrastructure in regional development; future perspectives and methods - concepts and cases; regional planning theories, techniques and analytical approaches; Regional Planning in India; regional governance; decentralization in India; District level planning in India; Case studies of district and village development plans/policies/schemes/programmes in India.

**INDIAN INSTITUTE OF TECHNOLOGY ROORKEE**

**NAME OF DEPARTMENT:** Department of Architecture and Planning

**Subject Code:** ARL-631

**Course Title:** Rural Planning and Development

**L-T-P:** 2-1-0

**Credits:** 3

**Subject Area:** PEC

**Course Outlines:** Rural planning and development; Rural planning methodology; Rural development and Indicators; Rural economics and growth pattern; Economic theories - demand and supply; Rural Infrastructure planning; Institutional framework; Rural Finance; Case studies.

## INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

**NAME OF DEPARTMENT:** Department of Architecture and Planning

**Subject Code:** ARL-633

**Course Title:** Environmental Impact Assessment

**L-T-P:** 2-1-0

**Credits:** 3

**Subject Area:** PEC

**Course Outlines:** Introduction to Environment Management & EIA; Legal, Policy & Regulatory Framework; EIA Procedure - Scoping & Screening and Establishing Baseline Conditions; EIA Methodologies; EIA Methods, Tools and Techniques; Public Involvement in EIA; Impact Management - Mitigation & Preparation of Environment Management Plans (EMP); EIA Reporting & Review of EIA Quality; Decision Making & Project Management; Implementation & Follow up; EIA Case Examples.



**INDIAN INSTITUTE OF TECHNOLOGY ROORKEE**

**NAME OF DEPARTMENT:** Department of Architecture and Planning

**Subject Code:** ARL-640

**Course Title:** Public Policy Analysis

**L-T-P:** 2-1-0

**Credits:** 3

**Subject Area:** PEC

**Course Outlines:** Definition and significance of Public Policy; Policy-planning continuum; Policy, public systems, and governance; Global-historical perspective; Policy and Legal interface, Indian Constitution, policy-politics interface; Theories in public policy analysis, Policy appraisal, Policy as a process; Policy Advocacy-Analysis-Management continuum; Policy advocacy methods, writing policy papers; Policy Management: Land, people, Change management and Leadership; Case studies.