INDIAN INSTITUTE OF TECHNOLOGY ROORKEE
NAME OF DEPTT./CENTRE**: ARCHITECTURE AND PLANNING**

1. Subject Code: **ARN-601** Course Title: **Design Studio I**

2. Contact Hours: **L: 1** **T: 0** **P: 10**

3. Examination Duration (Hrs): **Theory: 0** **Practical: 0**

4. Relative Weight: **CWS 0** **PRS 100** **MTE 0** **ETE 0** **PRE 0**

5. Credits **6** 6. Semester: **Autumn** 7. Subject Area: **PCC**

8. Pre-requisite: **Nil**

9. Objective: To develop architectural design for large scale projects with a focus on environmental sustainability.

10. Details of Course:

S. No.	Contents	Contact Hours
1.	Understanding of sustainability and built environment.	**4**
2.	Sustainable strategies and contextuality.	**3**
3.	Sustainable projects - case studies.	**4**
4.	Green Retrofitting.	**3**
	Total	**14**

Suggested Studio Exercises:

Analytical studies of sustainable practices in traditional and contemporary contexts of:

- low rise buildings,
- medium rise buildings,
- high rise buildings,
- campuses, neighbourhoods;

Responsive design solutions for the contexts; Green retrofitting.

11. Suggested Books:

S.No.	Name of Author /Book/Publisher	Year of Publication/ Reprint
1.	Yeang, K., "The Green Skyscraper", Prestel Publishing.	1999
2.	Steele, J., "Ecological Architecture- a critical history", Thames Hudson.	2005
3.	Building and Construction Authority, "Existing Building Retrofit", Singapore.	2010
4.	Kwok, A., "The Green Studio Handbook", Routledge.	2011
5.	Vassigh, S., Ozer, E. and Spiegelhalter, T., "Best Practices in Sustainable Building Design", J. Ross Publishing.	2012

INDIAN INSTITUTE OF TECHNOLOGY ROORKEE
NAME OF DEPTT./CENTRE**: ARCHITECTURE AND PLANNING**

1. Subject Code: **ARN-602** Course Title: **Design Studio II**

2. Contact Hours: **L: 1** **T: 0** **P: 10**

3. Examination Duration (Hrs): **Theory: 0** **Practical: 0**

4. Relative Weight: **CWS 0** **PRS 100** **MTE 0** **ETE 0** **PRE 0**

5. Credits **6** 6. Semester: **Spring** 7. Subject Area: **PCC**

8. Pre-requisite: **Nil**

9. Objective: To develop insight into issues of urban design contexts

10. Details of Course:

S. No.	Contents	Contact Hours
1.	Introduction to urban design practices.	**4**
2.	Techniques for analyzing urban contexts.	**6**
3.	Socio- cultural and economic aspects of Urban Design projects.	**4**
	Total	**14**

Suggested Exercises:

- Analytical studies of traditional and contemporary public places
- Street design
- Riverfront development
- Urban renewal
- Sustainable urbanism and urban retrofitting in different contexts; Design Solutions for the contexts.

11. Suggested Books:

S. No.	Name of Author /Book/Publisher	Year of Publication/ Reprint
1.	Farrelly, L.,"Drawing for Urban Design (Portfolio Skills: Architecture)", Laurence King Publishing.	2011
2.	Haas, T.,"Sustainable Urbanism and Beyond: Rethinking Cities for the Future", Rizzoli.	2012
3.	Massengale, J. and Dover, D., "Street Design: The Secret to Great Cities and Towns", Wiley.	2013
4.	Dixon, T., Eames, M., Hunt, M. and Lannon, S.,"Urban Retrofitting for Sustainability: Mapping the Transition to 2050", Routledge.	2014
5.	Hirsch, A. B., "City Choreographer: Lawrence Halprin in Urban Renewal America", University of Minnesota Press.	2014

INDIAN INSTITUTE OF TECHNOLOGY ROORKEE
NAME OF DEPTT./CENTRE**: ARCHITECTURE AND PLANNING**

1. Subject Code: **ARN-603** Course Title: **Contemporary Architecture-Theories and Trends**

2. Contact Hours: **L: 2** **T: 1** **P: 0**

3. Examination Duration (Hrs): **Theory: 2** **Practical: 0**

4. Relative Weight: **CW 25** **PRS 0** **MTE 25** **ETE 50** **PRE 0**

5. Credits: **3** 6. Semester: **Autumn** 7. Subject Area: **PCC**

8. Pre-requisite: **Nil**

9. Objective: To impart knowledge of contemporary theories and trends in architecture.

10. Details of Course:

S. No.	**Contents**	**Contact Hours**
1.	**Overview**: Contemporary world architecture, related theories and trends; Modernism and international style, Bauhaus school, De Stijl movement; Architectural works and philosophies of master architects.	**4**
2.	**Late Modernism**: Concepts, relationships to modernism, influences, debates on ornamentation, sculptural forms, slick tech architecture, late modern space, architectural works and philosophies of late modern architects.	**6**
3.	**Post Modernism**: Concepts, relationships to modernism, influences, double coding style, critical regionalism, neo vernacular, ad hoc urbanism, architectural works and philosophies of post modern architects.	**6**
4.	**Advanced Theories in Contemporary Architecture**: Deconstructivism, biommicry, blobitecture, parametric design, Möbius strip, trends in high rise structures, architectural works, emerging building typologies.	**6**
5.	**Indian Modernism**: Post independence modernist architecture; Architectural works and philosophies of modern Indian architects.	**6**
	Total	**28**

11. Suggested Books:

S. No.	Name of Author /Book/Publisher	Year of Publication
1	Frampton, K., "Modern Architecture-A Critical History", Thames and Hudson.	2002
2	Gossel, P. and Leuthauser, G., "Architecture in the 20th Century", Vol. 1&2, Taschen.	2005
3	Jencks, C., Kropf, K., "Theories and Manifestoes of Contemporary Architecture", Second Edition, Wiley Academy.	2005
4	Gossel, P., "The A-Z of Modern Architecture", Taschen GmbH.	2007
5	Mehrotra, R., "Architecture in India: Since 1990", Pictor Publishing Pvt. Ltd.	2011
6	Smith, K., "Introducing Architectural Theory", Routledge.	2012

INDIAN INSTITUTE OF TECHNOLOGY ROORKEE
NAME OF DEPTT./CENTRE**: ARCHITECTURE AND PLANNING**

1. Subject Code: **ARN-604** Course Title: **Sustainable Built Environment**

2. Contact Hours: **L -3** **T- 1** **P- 0**

3. Examination Duration (Hrs): **Theory: 3** **Practical: 1**

4. Relative Weight: **CWS 25** **PRS 0** **MTE 25** **ETE 50** **PRE 0**

5. Credits **4** 6. Semester **Spring** **7**. Subject Area: **PCC**

8. Pre-requisite: **Nil**

9. Objective: To understand impacts and issues of built environment and sustainability as a response.

10**.** Details of Course:

S. No	Contents	Contact Hours
1.	**Built Environment:** Definition, issues and impacts of built environment - physical impacts on water, air, land, noise, natural environment; social impacts (stress); environmental degradation.	**4**
2.	**Sustainability:** Sustainability and its various dimensions (economic, social and ecological); History of sustainability; Sustainable development; Global warming and climate change; Sustainable architecture and built environment; Culture and sustainability.	**6**
3.	**Traditional Sustainable Practices:** Elements and principles of sustainability in vernacular architecture, case studies.	**4**
4.	**Site and Buildings:** Interrelationship of site and buildings; Urban physics; thermal, visual and acoustical comfort; sustainable landscape.	**6**
5.	**Strategies and Technologies:** Assessment of existing resources; Solar architecture; Recycling/reuse strategies; Optimization techniques; Advances in HVAC, lighting, electrical and plumbing, active systems; Sustainable transport, walkability and last mile connectivity.	**10**
6.	**Sustainability Assessment Rating Systems:** Study of rating systems; Strategies to earn credits; Life Cycle Assessment- concept, terminologies, methodologies, tools and processes; Carbon footprint.	**8**
7.	**Net Zero Energy and Energy Positive Buildings:** Definition, concept, strategies, case studies.	**4**
	Total	**42**

11. Suggested Books:

S. No.	Name of Books/Authors	Year of Publication
1.	Mcharg, I. L., "Design with Nature", John Wiley and Sons Inc.	**1992**
2.	Suzuki, D., "The Sacred Balance: Rediscovering Our Place in Nature", Greystone Books, Doughlas and Mcintyre Publishing Group.	**2007**
3.	Speth, J. G., "The Bridge at the Edge of the World: Capitalism, the Environment, and Crossing from Crisis to Sustainability", Yale University Press.	**2008**
4.	Yudison, J., "The Green Building Revolution", Island Press.	**2008**
5.	Knight, A. and Ruddock, L., "Advanced Research Methods in Built Environment", Wiley-Blackwell.	**2008**
6.	Brugmann, J., "Welcome to Urban Revolution: How cities are changing the world", Bloomsbury Press.	**2009**

INDIAN INSTITUTE OF TECHNOLOGY ROORKEE
NAME OF DEPTT./CENTRE**: ARCHITECTURE AND PLANNING**

1. Subject Code: **ARN-605** Course Title: **Urban Design**

2. Contact Hours: **L: 2** **T: 0** **P: 2**

3. Examination Duration (Hrs): **Theory: 2** **Practical: 0**

4. Relative Weight: **CW 40** **PRS 0** **MTE 20** **ETE 40** **PRE 0**

5. Credits **3** 6. Semester: **Autumn** 7. Subject Area: **PCC**

8. Pre-requisite: **Nil**

9. Objective: To impart knowledge on various aspects, elements, concepts and principles of urban design.

10. Details of Course:

S. No.	Contents	Contact Hours
1.	**Introduction:** Various aspects of urban design; relationship of urban design to architecture, planning and landscape; Evolution of professional discipline; Role and types of urban design guidance.	**8**
2.	**Urban Form, Pattern and Spaces in History:** Review of urban forms, patterns and spaces in different periods of history viz. ancient river valley civilization, Greek, Roman, Medieval, Renaissance, Baroque, post industrial revolution period in Europe and India and their influencing factors.	**8**
3.	**Elements of Urban Environment:** Urban form, townscape, urban spaces, streetscapes, building forms and facades, public art.	**6**
4.	**Concepts of Urban Design:** Public perception; Imageability and townscape; Sense of place.	**6**
5.	**Concepts in Urban Design:** Modern examples of urban settlements, town centers and urban spaces in India and foreign countries.	**8**
6.	**Urban Design Principles and Techniques:** Salient urban design paradigms, principles, tools and techniques.	**6**
	Total	**42**

Suggested Studio Exercises:

Field studies – observational and analytical studies of important urban/ public spaces, roads; Imageability and townscape of selected areas/ settlements. Design evaluation/ analytical study of modern examples. Urban design proposal for improvement/ renewal/ redevelopment/ new development of an area.

11. Suggested Books:

S.No.	Name of Author /Book/Publisher	Year of Publication/ Reprint
1	Spreiregen, P. D., "Urban Design: Architecture of Towns & Cities", McGraw Hill.	1965
2.	Broadbent, G., "Emerging Concepts of Urban Space Design", Van Nostrand Reinhold.	1990
3.	Punter, J. and Carnoma, M., "The Design Dimension of Planning-Theory, Content and Best Practices for Design Policies", E & FN Spon.	1997
4.	Cowan, R., "Urban Design Guidance by UD Group", Thomas Telford Publishing.	2002
5.	Watson D. et al. (ed), "Time Saver Standard for Urban Design", McGraw Hill.	2003

INDIAN INSTITUTE OF TECHNOLOGY ROORKEE
NAME OF DEPTT./CENTRE**: ARCHITECTURE AND PLANNING**

1. Subject Code: **ARN-606** Course Title: **Megastructures**
2. Contact Hours: **L: 2** **T: 1** **P: 0**
3. Examination Duration (Hrs) **Theory: 2** **Practica 0**
4. Relative Weight: **CWS 25 PRS 0 MTE 25 ETE 50 PRE 0**
5. Credits: **3** 6. Semester: **Spring** 7. Subject Area: **PCC**
8. Pre-requisite: **Nil**
9. Objective: To understand concepts and technologies for design and construction of megastructures.
10. Details of Course:

S. No.	Contents	Contact Hours
1.	**Introduction**: Evolution of Megastructures; physical planning considerations, novelty in materials and products in megastructures.	**4**
2.	**Design of Megastructures**: Architectural design considerations for tallest, biggest and largest buildings; Space planning and design standards, environmental considerations, building byelaws and codes.	**5**
3.	**Trends and Techniques**: New trends and techniques in application of structural principles, effect of various foundation settlements on the behaviour of super structure, concept of structure forms and their stability to various types of structures, RCC space frames and steel space structures and hyperboloid.	**6**
4.	**Building Services**: Mechanical, Electrical, Fire fighting and security, vertical transportation, HVAC, BAS and Parking; Codes for the services.	**6**
5.	**Construction Process**: Construction planning and management, equipments, materials and construction techniques, prefabrication.	**4**
6.	**Case Studies**: Types of megastructures across the globe.	**3**
	TOTAL	**28**

11. Suggested Books:

S. No.	Name of Authors/ Books/ Publishers	Year of Publication/ Reprint
1.	Viswanath, H. R., Tolloczko J.J.A. and Clarke J.N. , "Multi-purpose High Rise Towers and Tall Buildings", Taylor & Francis.	1997
2.	Lawarance, W. C. L. and Daniel, C.W.H, "Planning Buildings for a High Rise Environment", Hong Kong University Press.	2000
3.	Lin, C. F., "Construction Technology for Tall Buildings", Singapore University Press.	2001
4.	International Building Code 2009, International Code Council.	2009
5.	Mitchell, S. K., "Megastructures: The Tallest Buildings", Gareth Stevens.	2009
6.	Graham, I., "Megastructures: Tallest, Largest, Biggest, Deepest", Firefly Books Limited.	2012

INDIAN INSTITUTE OF TECHNOLOGY ROORKEE
NAME OF DEPTT./CENTRE**: ARCHITECTURE AND PLANNING**

1. Subject Code: **ARN-607** Course Title: **Advanced Building Technologies**

2. Contact Hours: **L: 2** **T: 1** **P: 0**

3. Examination Duration (Hrs): **Theory: 2** **Practical: 0**

4. Relative Weight: **CWS 25** **PRS 0** **MTE 25** **ETE 50** **PRE 0**

5. Credits **3** 6. Semester: **Autumn** 7. Subject Area: **PCC**

8. Pre-requisite: **Nil**

9. Objective: To impart knowledge about the advanced building technologies.

10. Details of Course:

S. No.	Contents	Contact Hours
1.	**Introduction**: Building Technologies- Structure, material, design communication, management, maintenance.	**2**
2.	**Structural Systems**: Categories, efficiency, new forms; Advancement and selection of material; Case studies.	**4**
3.	**Intelligent Buildings**: Intelligent Building concept; Technologies- microprocessor, sensors and actuators; BAS; Building Management System- integration of access control, fire security, thermal comfort, daylight and artificial light, HVAC, vertical circulation- lift, escalators.	**8**
4.	**Project Management and Maintainability:** Project management; Strategies and advancement; BIM, Lean construction- Toyota Production System, Just-in-time, value and waste; Maintenance of building elements; Facility Management.	**6**
5.	**Sustainable Technologies and Retrofitting**: Building infrastructure technologies; Integration of passive and active strategies and technologies, Retrofitting- Functional, structural and seismic, energy retrofit; Case studies.	**8**
	Total	**28**

11. Suggested Books

S. No.	Name of Author /Book/Publisher	Year of Publication/ Reprint
1.	Salvadori, M. and Heller, R. A., "Structure in Architecture", Prentice Hall.	1986
2.	Wang, S., "Intelligent Buildings and Building Automation", Spon Press.	2009
3.	Chew, Y. L. M., "Maintainability of Facilities: For Building Professionals", World Scientific Publishing Company.	2010
4.	Forbes, L., "Modern Construction: Lean Project Delivery and Integrated Practices", CRC Press.	2010
5.	Syed A., "Advanced Building Technologies for Sustainability", John Wiley and Sons.	2012

INDIAN INSTITUTE OF TECHNOLOGY ROORKEE
NAME OF DEPTT./CENTRE**: ARCHITECTURE AND PLANNING**

1. Subject Code: **ARN-609** Course Title: **Computer Applications in Architecture**

2. Contact Hours: **L: 0** **T: 0** **P: 3**

3. Examination Duration (Hrs): **Theory: 0** **Practical: 3**

4. Relative Weight: **CWS** 0 **PRS 50** **MTE 25** **ETE 0** **PRE 25**

5. Credits: **2** 6. Semester: **Autumn** **7**. Subject Area: **PCC**

8. Pre-requisite: **Nil**

9. Objective: To impart knowledge of computer applications in architecture.

10. Suggested Studio Exercises:
- Revit Architecture Suite: Auto Cad 2009 and 3DS Max for design studio problems.
- Building Information Modelling for a given project.
- Sketchup Pouching and E-view for a given design.
- Catia application for at least 2 design schemes.
- Primavera: Construction planning management applied to ongoing design studio project.
- Application of Design Builder and DOE2 for energy simulation modeling of one ongoing and one new project.
- M.S. Pro, Power Sim, MATLAB, Arc GIS application in planning / architectural design studio problem/s.

11. Suggested Books:

S.No.	Name of Author /Book/Publisher	Year of Publication
1.	Omura, G., “Mastering Revit 2009”, Sybex Publication.	2009
2.	OMura, G., “Bible 3D Max 2009”, Sybex Publication.	2009
3.	Manuals of Sketchup, Podium E-view, Catia and Primavera.	2012
4.	Manuals of Design Builder and Energy Simulation Modelling.	2012
5.	Manuals M.S. Pro and Power Sim.	2012
6.	Manuals of MATLAB and Arc GIS.	2012

INDIAN INSTITUTE OF TECHNOLOGY ROORKEE
NAME OF DEPTT./CENTRE**: ARCHITECTURE AND PLANNING**

1. Subject Code: **ARN-612** Course Title: **Energy and Sustainability**

2. Contact Hours: **L -2** **T- 1** **P- 0**

3. Examination Duration (Hrs): **Theory: 2** **Practical:** 0

4. Relative Weight: **CWS 2** **PRS 0** **MTE 25** **ETE 50** **PRE 0**

5. Credits **3** 6. Semester **Spring** **7**. Subject Area: **PEC**

8. Pre-requisite: **Nil**

9. Objective: To impart knowledge regarding role of energy for sustainable architecture.

10. Details of Course:

S. No	Contents	Contact Hours
1.	**Sustainable Architecture:** Definition**,** parameters and resources of sustainable architecture- land, energy, water, materials and environment; Introduction to rating schemes for sustainable architecture (LEED, GRIHA etc.)	**3**
2.	**Energy:** Energy cycle in built environment; Importance of energy; Sources of energy- grid and off grid (thermal, hydro, solar, gas, biomass) and uses of energy in buildings and settlements- lighting, ventilation, air conditioning, cooking, miscellaneous etc.	**3**
3.	**Technologies and Systems:** Energy consumption in luminaries, HVAC, plumbing, transportation, miscellaneous systems; Comparison of different technologies and systems for efficiency and performance.	**8**
4.	**Measurement and Verification –** Energy audit of buildings- tools and techniques; Measurement and verification techniques; Benchmarking.	**4**
5.	**Codes and Standards-** ECBC, Ashrae 90.1, Ashrae fundamentals, Energy credits under rating schemes, techniques to achieve credits.	**4**
6.	**Whole Building Simulation –** Simulation tools for Whole Building Simulation as per ASHRAE 90.1 and ECBC.	**6**
	Total	**28**

11. Suggested Books:

S. N o.	Name of Authors/ Books/ Publishers	Year of Publication
1.	MsDonough, W. and Braungart, M., “Cradle to cradle: remaking the way we make things”, North Point Press.	2002
2.	Scheer, H., “Energy Autonomy: The Economic, Social and Technological case for Renewable Energy”, Earthscan.	2007
3.	Friedman, T. L., “Hot, Flat and Crowded: Why we need a green revolution - and how it can renew America”, Picador.	2009
4.	ASHRAE 90.1 Energy Standard for buildings except low-rise residential buildings 2013	2013
5.	ASHRAE Handbook-Fundamentals 2013	2013

INDIAN INSTITUTE OF TECHNOLOGY ROORKEE
NAME OF DEPTT./CENTRE**: ARCHITECTURE AND PLANNING**

1. Subject Code: **ARN-614** Course Title: **Sustainable Materials and Techniques**

2. Contact Hours: **L -2** **T- 1** **P- 0**

3. Examination Duration (Hrs): **Theory: 2** **Practical: 0**

4. Relative Weight: **CWS 25 PRS 0 MTE 25 ETE 50 PRE 0**

5. Credits: **3** 6. Semester: **Spring** **7**. Subject Area: **PEC**

8. Pre-requisite: **Nil**

9. Objective: To impart knowledge about materials and technologies for sustainable architecture.

10. Details of Course:

S. No	Contents	Contact Hours
1.	**Fundamentals:** Embodied energy; Life cycle analysis; Operational energy; Cradle to grave approach; Recycling and reuse; Carbon crediting.	**4**
2.	**Sustainable Materials:** Structural materials– concrete, steel etc., thermal insulation materials- glass wool, EPS, XPS etc; Roofing materials- cool roof materials, metallic roofs etc., flooring material, miscellaneous material; Process of manufacturing; LCCA.	**8**
3.	**Sustainable Technologies and Systems:** HVAC systems- VFD, VSD, actuators, sensors, thermostat, high efficiency chillers with high COP and EER; High efficacy luminaries; Plumbing systems; Smart grid system, smart metering; miscellaneous systems.	**8**
4.	**Sustainable Construction Techniques and Methods:** CPM and PERT; BIM; 4D and 5D; Lean construction; Time management and scheduling; Construction waste management; Recycling and reuse.	**8**
	Total	**28**

11. Suggested Books:

S. No.	Name of Authors/ Books/ Publishers	Year of Publication
1.	Ross, S. and Dru, M., "Green Building Materials: A Guide to Product Selection and Specification", John Wiley and Sons.	2012
2.	Ari, M., "LEED Materials: A Resource Guide to Green Building", Princeton Architectural Press.	2010
3.	Tom, W. and Sam, K., "Green Building Handbook: Volume 2: A Guide to Building Products and their Impact on the Environment", Volume 2, Taylor & Francis.	2003
4.	BMTPC, "Production of Cost effective, Environment Friendly and Energy efficient Building Components", BMTPC and Ministry of Housing & Urban Poverty Alleviation, Govt. of India.	2009
5.	Spence, W. "Construction Materials, Methods, and Techniques: Building for a Sustainable Future", Delmar Publications.	2010

INDIAN INSTITUTE OF TECHNOLOGY ROORKEE
NAME OF DEPTT./CENTRE**: ARCHITECTURE AND PLANNING**

1. Subject Code: **ARN-616** Course Title: **Policies and Regulations for Sustainability**

2. Contact Hours: **L - 2** **T- 1** **P- 0**

3. Examination Duration (Hrs): **Theory: 2** **Practical: 0**

4. Relative Weight: **CWS 25** **PRS 0** **MTE 25** **ETE 50** **PRE 0**

5. Credits: **3** 6. Semester: **Spring** 7. Subject Area: **PEC**

8. Pre-requisite: **Nil**

9. Objective: To impart knowledge on sustainable policies and regulations.

10. Details of Course:

S. No	Contents	Contact Hours
1.	**Introduction:** Sustainability and its various dimensions (economic, social and ecological); Principles of sustainable development, policies and regulations.	**4**
2.	**Sustainable Development Policies:** Stockholm Declaration 1972, Brundtland Commission 1987, Earth Summit 1992- RIO Declaration, Convention on Climate Change and Convention on Biodiversity, Agenda 21, Earth Summit 2002.	**6**
3.	**Global Initiatives:** Millennium development goals; Corporate social responsibility; Global compact; Global environment facility**.**	**4**
4.	**Reporting Guidelines and Standards:** Global reporting initiative; Good corporation's standard; Green globe certification; Social accountability; International standard; International organization for standardization.	**5**
5.	**International Actions on Environmental Protection:** The Stockholm Convention on Persistent Organic Pollutants, Montreal Protocol, Rotterdam Convention, Marpol 73/78 International Convention, Long-range Transboundary Air Pollution convention, Kyoto Protocol, Climate Policy-IPCC; Carbon trading.	**5**
6.	**National Actions on Sustainability:** National missions-sustainability, climate change, solar; PAT**;** BEE, ECBC, MOEF guidelines; GRIHA, IGBC.	**4**
	Total	**28**

11. Suggested Books:

S. No.	Name of Authors/ Books/ Publishers	Year of Publication
1.	World Commission on Environment and Development, "Our Common Future", Oxford University Press, Oxford.	1987
2.	Deb, S., "Environmental Management", Jaico Publishing House.	2003
3.	Speth, J. G., "The Bridge at the Edge of the World: Capitalism, the Environment, and Crossing from Crisis to Sustainability", Yale University Press.	2008
4.	Jaswal, P. S., and Jaswal, N., "Environment Law", Pioneer Publications.	1999
5.	Kulkarni, V. and T. V. Ramchandra, "Environmental Management", Commonwealth of Learning, Canada and Indian Institute of Sciences.	2006

INDIAN INSTITUTE OF TECHNOLOGY ROORKEE
NAME OF DEPTT./CENTRE**: ARCHITECTURE AND PLANNING**

1. Subject Code: **ARN-618** Course Title: **Design Methodology**

2. Contact Hours: **L: 2** **T: 1** **P: 0**

3. Examination Duration (Hrs) **Theory: 2** **Practical: 0**

4. Relative Weight: **CWS 25 PRS 0 MTE 25 ETE 50 PRE 0**

5. Credits: **3** 6. Semester: **Spring** 7. Subject Area: **PEC**

8. Pre-requisite: **Nil**

9. Objective: To impart knowledge of various design methodologies in practice.

10. Details of Course:

S. No.	Contents	Contact Hours
1.	**Design Methodology:** Introduction; Definition; Importance; Scope.	**4**
2.	**Generic Design Process**: Understanding context and design requirements, human space relationship, preparing design brief, development and evaluation of design; Conceptual and working framework; Observations; Synthesis; Evaluation and presentation, Brainstorming; User Testing; Iteration and alteration; Validation; Implementation.	**8**
3.	**Methodologies in Design:** Qualitative and quantitative; User centric design approach (ethnography, voice of customer, focus group, persona, scenario); Historiography; Quality function deployment.	**6**
4.	**Design Methodologies for Different Design Disciplines:** Design methodologies for architectural design, interior design and urban design; Industrial design methodology (product life cycle, TRIZ) etc.	**6**
5.	**Best Practices:** Examples of existing established design methodologies adopted by different designers.	**4**
	TOTAL	**28**

6. Suggested Books:

S. No.	Name of Authors/Book/Publisher	Year of Publication
1.	Cross, N., "Developments in Design Methodology", Wiley.	1984
2.	Jones, J., "Design Methods (Architecture)", Wiley.	1992
3.	Birkhofer, H(Ed.)., "Future of Design Methodology", Springer .	2011
4.	Cross, N., "Design Thinking", Berg.	2011
5.	Martin, B., "Universal Methods of Design: 100 ways to research complex problems, develop innovative ideas, and design effective solutions", Rockport.	2012

INDIAN INSTITUTE OF TECHNOLOGY ROORKEE
NAME OF DEPTT./CENTRE**: ARCHITECTURE AND PLANNING**

1. Subject Code: **ARN-620** Course Title: **Urban Public Spaces**
2. Contact Hours: **L: 2** **T: 0** **P: 2**
3. Examination Duration (Hrs) **Theory: 2** **Practical: 0**
4. Relative Weight: **CWS 0** **PRS 40** **MTE 20** **ETE 40** **PRE 0**
5. Credits: **3** 6. Semester: **Spring** 7. Subject Area: **PEC**
8. Pre-requisite: **Nil**
9. Objective: To impart understanding of urban public spaces in different context.
10. Details of Course:

S. No.	Contents	Contact Hours
1.	**Introduction to Urban Public Spaces:** Their need and socio-cultural economic and environmental relevance.	**3**
2.	**History of Urban Public Spaces:** Urban public spaces in traditional and historical settlements.	**4**
3.	**Types of Urban Spaces:** Classification based on functions, morphological characteristics etc.; Examples.	**3**
4.	**Case Studies:** Examples of important public spaces in India and abroad in contexts of small, medium and large settlements in plains and hills.	**7**
5.	**Public Spaces in Contemporary Indian Cities:** Their characteristics, problems and issues.	**5**
6.	**Place Making:** Concept; Sense of Place; Guiding principles; Case examples.	**3**
7.	**Public Space Management:** Need and different approaches to public space management.	**3**
	TOTAL	**28**

11. Suggested Books:

S. No.	Name of Authors/Book/Publisher	Year of Publication
1.	Tucker, P., "Town and Space", Columbia University Press.	1959
2.	Broadbent, G., "Emerging Concepts in Urban Space Design", Van Nostrand Reinhold.	1995
3.	Gehl, J. and Gemzee, L., "Public Spaces, Public Life, Copenhagen", The Royal Danish Academy.	1996
4.	Department of Environment and Association of Town Centre Managers. "Managing Urban Spaces in Town Centres: Good Practice Guide", Stationery Office.	1997
5.	Carnova, M., "Public Places – Urban Spaces: A Guide to Urban Design", Architectural Press.	2003
6.	Krier, R., "Town Spaces", Birkhauser Publishers for Architecture.	2003

INDIAN INSTITUTE OF TECHNOLOGY ROORKEE
NAME OF DEPTT./CENTRE**: ARCHITECTURE AND PLANNING**

1. Subject Code: **ARN-622** Course Title: **Theory of City Form**

2. Contact Hours: **L - 2** **T- 1** **P- 0**

3. Examination Duration (Hrs): **Theory: 2** **Practical: 0**

4. Relative Weight: **CWS 25 PRS 0 MTE 25 ETE 50 PRE 0**

5. Credits: **3** **6**. Semester: **Spring** 7. Subject Area: **PEC**

8. Pre-requisite: **Nil**

9. Objective: To impart knowledge on traditional and contemporary theories of city form.

10. Details of Course:

S. No	Contents	Contact Hours
1.	**Introduction**: Visions of city form; Patterns of human settlement through history; Contemporary theories of urbanity & urban design; Spatial & social structure; Elements of urban form.	**3**
2.	**The Nature of City Form Theory**: Normative theories- the city as supernatural, the city as machine, the city as organism.	**6**
3.	**Current Theory and Practice**: City form and process; Spatial and social structure; Theory- bipolarity, colony and post colony; Modern and post modern urbanism.	**7**
4.	**Cities of the Developing World:** Contemporary issues- sprawl, infill, redevelopment, gentrification.	**4**
5.	**Indian City Form:** Evolution of city form and process; Land; Landscape and townscape; Contemporary urban form issues; Case studies.	**4**
6.	**Current Debates and Rethinking City Form:** Contemporary urbanization; New urbanism; Urban growth, density and sustainability; Inequality, segregation and diversity; Informality; Environment and infrastructure.	**4**
	TOTAL	**28**

11. Suggested Books:

S. No.	Name of Authors/Book/Publisher	Year of Publication
1.	Lynch, K., "Good City Form", Cambridge, MA: MIT Press.	1981
2.	Kostoff, S., "The City Shaped: Urban Patterns/Meanings Through History", Boston: Little Brown.	1991
3.	Jacobs, J., "The Death and Life of Great American Cities", New York: The Modern Library.	1993
4.	Lawrence, J.V., Warner, "Imaging the City: Continuing Struggles and New Directions" ,Centre for Urban Policy Research.	2001
5.	Pierce, Johnson, "Century of the city: No time to Loose", The Rockefeller Foundation.	2008
6.	Tonkiss, F., "Cities by Design: The Social Life of Urban Form", Polity.	2014

INDIAN INSTITUTE OF TECHNOLOGY ROORKEE
NAME OF DEPTT./CENTRE**: ARCHITECTURE AND PLANNING**

1. Subject Code: **ARN-624** Course Title: **Research Techniques in Architecture**

2. Contact Hours: **L: 2** **T: 1** **P: 0**

3. Examination Duration (Hrs) **Theory: 2** **Practical: 0**

4. Relative Weight: **CWS 25 PRS 0 MTE 25 ETE 50 PRE 0**

5. Credits: **3** 6. Semester: **Spring** 7. Subject Area: **PEC**

8. Pre-requisite: **Nil**

9. Objective: To impart knowledge about research design, methods and techniques relevant to architecture.

10. Details of Course:

S. No.	Contents	Contact Hours
1	**Introduction:** Research in architecture- its importance and scope; Areas of research and types of research in architecture; Research process- identification of problem, formulation of research questions and hypothesis, collection of evidences and data analysis; Methods of inquiry.	**4**
2	**Literature Review:** Need and process of literature review, style of referencing, bibliography, writing literature review.	**3**
3	**Research Paradigms and Strategies**: Various systems of inquiry- Dichotomous, Continuous, Tripartite Frameworks- their ontological and epistemological assumptions and standards of quality; Overview of different research strategies relevant to research in built environment.	**4**
4	**Research Methods:** Qualitative; Historic-interpretive; Co-relational; Logical Argumentation methods and case studies and combined strategies - their basic assumptions; Strengths and weaknesses of different methods.	**6**
5	**Experimental and Simulation Research Methods**: Their basic assumptions, techniques used and strength and weaknesses.	**3**
6	**Tools and Techniques**: Used for collecting data (observational studies, surveys, interviews) and analyzing data (quantitative, qualitative, multivariate analysis and software applications) for different research methods.	**6**
7	**Technical report writing**	**2**
	TOTAL	**28**

11. Suggested Books:

S. No.	Name of Books/Authors	Year of Publication
1.	Ross, R., "Research: An Introduction", Barnes and Noble Books.	1974
2.	Gibbs, J.F., "Urban Research Methods", (Rev. Ed.) Von Nostrand.	1988
3.	Khanzode, V. V., "Research Methodology – Techniques and Trends", APH Publishing.	1995
4.	Groat, L. and Wang, D., "Architectural Research Methods", john Wiley & Sons.	2002
5.	Kothari, C. R., "Research Methodology – Methods and Techniques", New Age International.	2004
6.	Knight, A. and Ruddock, L., "Advanced Research Methods in Built Environment", John Wiley & Sons.	2008

INDIAN INSTITUTE OF TECHNOLOGY ROORKEE
NAME OF DEPTT/ CENTRE: **ARCHITECTURE AND PLANNING**

1. Subject Code: **ARN-626** Course Title : **Vernacular Architecture**

2. Contact Hours : **L: 2** **T:1** **P:2**

3. Examination Duration (Hrs): **Theory: 2** **Practical: 0**

4. Relative Weight : **CWS 25** **PRS 0** **MTE 25** **ETE 50** **PRE 0**

5. Credits: **3** 6. Semester : **Spring** 7. Subject Area : **PEC**

8. Pre-requisite : **NIL**

9. Objective: To develop capacity to understand and appreciate vernacular architecture.

10. Details of Course

S. No.	Contents	Contact Hours
1.	**Introduction to Vernacular Architecture**: Definition and characteristics; Vernacular architecture and traditional architecture.	**4**
2.	**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.	**6**
3.	**Case Studies**: Examples covering settlement pattern, architectural form and construction details of global and Indian vernacular architecture.	**6**
4.	**Contemporary Case Studies**: Contemporary examples addressing social and cultural needs and utilizing local technology and materials.	**6**
5	**Vernacular Architecture in 21st Century**: Technological innovation in vernacular architecture; Debates and discussions	**6**
	Total	**28**

11. Suggested Books

S. No.	Name of Authors / Books / publishers	Years of Publication /Reprint
1	Rudfosky, B., " Architecture without Architects", University of New Mesvilo Press.	1964
2	Wells, C., "Perspectives in Vernacular Architecture", University of Missouri Press.	2007
3	Oliver, P., "Encyclopaedia of Vernacular Architecture of the World", Cambridge University Press.	1997
4	Cooper, G. and Dawson, B., "Traditional Building of India", Thames and Hudson.	1998
5	Glassie, H. H., "Vernacular Architecture", Indiana University Press.	2000

INDIAN INSTITUTE OF TECHNOLOGY ROORKEE
NAME OF DEPTT./CENTRE**: ARCHITECTURE AND PLANNING**

1. Subject Code: **ARN-628** Course Title: **Architecture and Urban Conservation**

2. Contact Hours: **L - 2** **T - 1** **P – 0**

3. Examination Duration (Hrs): **Theory: 2** **Practical: 0**

4. Relative Weight: **CWS 25 PRS 0 MTE 25 ETE 50 PRE 0**

5. Credits**: 3** 6. Semester: **Spring** **7**. Subject Area: **PEC**

8. Pre-requisite: **Nil**

9. Objective: To enable the students to address appropriately challenges confronting historic cities, natural and built heritage, and the cultural resource base.

10. Details of Course:

S. No.	Contents	Contact Hours
1.	**Introduction**: Understanding conservation; Preservation and restoration; Socio-cultural-economic and environmental significance of conservation; Various aspects of built and natural heritage; Conservation practice; Glossary- understanding redevelopment, revitalization, regeneration, rehabilitation and renewal.	**4**
2	**History of Conservation Movement**: Evolution of architectural and urban conservation; Restoration of historic contexts; Salient early examples of conservation of building and sites in Italy, UK and other countries.	**4**
3	**Basic Principles of Conservation and Degrees of Interventions**: Conservation principles; Conservation conventions and practices adopted at International, National and local levels for heritage buildings, sites and cities; Charters from Venice to Mexico.	**4**
4	**Architectural Conservation**: Research, documentation, analysis and interpretations related to historic buildings and sites; Technical aspects covering traditional building materials; Structural repairs, maintenance and upgradation of historic structures.	**6**
5	**Urban Conservation**: Heritage development within the context of continuity and change; Study of context and processes of urban conservation projects in India and other countries; Critical regionalism; Conservation policies, laws and professional norms; Cultural heritage strategies in the context of urban development.	**6**
6	**Conservation of Cultural Heritage**: Forms of cultural heritage;	**4**

	Crafts, traditions and their role in conservation; Cultural landscapes in conservation; Culture based planning; Creative cities concept; Selected examples of cultural heritage strategies for conservation.	
	TOTAL	**28**

11. Suggested Books:

S. No.	**Name of Authors / Books / publishers**	**Year of Publication**
1.	Cohen, N., “Urban Conservation”, MIT Press.	1999
2.	Jokilehto, J., “History of Architectural Conservation (Conservation and Museology)”, Routledge.	2002
3.	Fielden, B. “Conservation of Historic Buildings”, Architectural Press.	2003
4.	Orbasli, A., “Architectural Conservation: Principles and Practice”, Wiley Blackwell.	2007
5.	Croci, J., “The Conservation and Structural Restoration of Architecture Heritage: Theory and Practice”, Computational Mechanics Publications.	2008
6.	Aygen, Z., "International Heritage and Historic Building Conservation: Saving the World's Past", Routledge.	2012

INDIAN INSTITUTE OF TECHNOLOGY ROORKEE
NAME OF DEPTT./CENTRE**: ARCHITECTURE AND PLANNING**

1. Subject Code: **ARN-630** Course Title: **Construction Project Management**
2. Contact Hours: **L: 2** **T: 1** **P: 0**
3. Examination Duration (Hrs): **Theory 2** **Practical 0**
4. Relative Weight: **CWS 25 PRS 0 MTE 25 ETE 50 PRE 0**
5. Credits: **3** 6. Semester: **Spring** 7. Subject Area: **PEC**
8. Pre-requisite: **Nil**
9. Objective: To provide exposure to the trends in construction project management.
10. Details of Course:

S. No.	Contents	Time
1	**Introduction:** Construction and manufacturing industry; Construction project management concepts; Standards and services; Organizational hierarchy for project management services; Project life cycle.	**4**
2	**Strategic Issues:** Lean construction and process mapping; Management strategies for clients and stakeholders; Management issues related to construction project design process; Capital Budgeting.	**6**
3	**Project Evaluation and Monitoring:** Project management evaluation; Tools/techniques for construction project planning (PERT & CPM) and control of costs, time, risk and quality; TQM, health and safety.	**6**
4	**Project Management and Implementation:** Project Implementation – methods, hurdles, facilitating factors; Line management, role of project manager.	**4**
5	**Project Formulation and Appraisal:** Relationship between projects and planning issues: market analysis, technical analysis; Supporting infrastructure requirements; Social cost benefit analysis.	**4**
6	**Regulatory Frameworks & Guidelines:** Contracts Act; Labour Regulations; Arbitration act; Developers bill; Environmental Management Plan (EMP); ISI standards and its application to Indian context.	**4**
	TOTAL	**28**

11. Suggested Books:

S. No.	Name of Authors / Books / publishers	Year of Publication
1	Lock, D., "Project Management in Construction", Gower Publishing Ltd.	2004
2	Peurifoy, R. L., Ledbetter, W. B. and Schexnayder, C., "Construction Planning, Equipment and Methods" McGraw Hill.	2006
3	Sankar, S. K. and Saraswati, S., "Construction Technology", Oxford University Press.	2008
4	Chandra, P., "Projects Planning, Analysis, Financing, Implementation & Review" Tata McGraw Hill.	2009
5	Plotnick, F. L., O'Brien, J. J., "CPM in Construction Management", McGraw-Hill Professional.	2010
6	The Charter ed Institute of Building, "Code of Practice for Project Management for Construction and Development", Wiley-Blackwell.	2010

INDIAN INSTITUTE OF TECHNOLOGY ROORKEE
NAME OF DEPTT./CENTRE**: ARCHITECTURE AND PLANNING**

1. Subject Code: **ARN-632** Course Title: **Universal Design and Accessibility Planning**

2. Contact Hours: **L: 2** **T: 1** **P: 0**

3. Examination Duration (Hrs): **Theory 2** **Practical 0**

4. Relative Weight : **CWS 25** **PRS 0** **MTE 25** **ETE 50** **PRE 0**

5. Credits: **3** 6. Semester: **Spring** 7. Subject Area: **PEC**

8. Pre-requisite: **Nil**

9. Objective: To impart a sense for inclusive design through development of human centric approach.

10. Details of Course:

S. No.	Contents	Contact Hours
1.	**Understanding Disability:** Definitions; Types; Models of disablement (WHO); National and international disability policies, American Disability Act (ADA), UN Convention for Rights of Persons with Disabilities (UNCRPD), persons with disabilities act, India; Biwako millennium framework; Sensitization on disabling experiences.	**4**
2.	**Theory of Universal Design:** Barrier free environment; Trans-generational design; Physical and social barriers; Principles of universal design and applications in built environments; Assistive technology; Inclusive design strategies; Best Practices.	**6**
3.	**Universal Design for India:** Universal design India principles and their applications in diverse socio-cultural environments, rural and low income contexts.	**4**
4.	**Access Audits:** Role of access audits; Designing access audit toolkits; Access audit checklists; Conducting access audits on live sites; Access audit report preparation.	**4**
5.	**Accessibility Standards and Design Guidelines:** Accessibility codes of various architectural and design elements like parking, entrance, ramps, toilets, signage, staircase, corridors, etc.; Review of national & international accessibility codes & guidelines.	**6**
6.	**Research Methods in Accessibility Planning:** Ethnographic research methods; Trace Study; Precedent analysis; Evidence based research methods; Reliability and validity; Scaling techniques; Usability Rating Scale (URS), Functional Independence Measure (FIM), Functional Performance Measure (FPM); Analysis.	**4**
	Total	**28**

11. Suggested Books:

S. No.	Name of Authors / Book / Publisher	Year of Publication / Reprint
1.	Steinfeld, E. and Danford, G. (Eds.), "Enabling Environments - Measuring the Impact of environments" Spon Press.	1999
2.	Imrie, R. and Hall, P., "Inclusive Design - designing and developing accessible environments", Spon Press.	2001
3.	Barnes, C., Mercer, G. and Shakespeare, T., "Exploring Disability - A Sociological Introduction", Polity Press.	2003
4.	Bednar, M. J., "Barrier Free Environments", Dowden, Hutchinson & Ross.	2007
5.	Preiser, W. F. E., "Universal Design Hand Book", Ostroff.	2011
6.	Steinfeld, E. and Maisel, J., "Universal Design: Designing Inclusive Environments", John Wiley & Sons.	2012

INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

NAME OF DEPTT. /CENTRE: **ARCHITECTURE AND PLANNING**

1. Subject Code: **ARN-651** Course Title: **Planning Studio-I**

2. Contact Hours: **L: 1** **T: 0** **P: 10**

3. Examination Duration (Hours)- **Theory:** 0 **Practical:** 0

4. Relative Weight: **CWS** 0 **PRS** 100 **MTE** 0 **ETE** 0 **PRE** 0

5. Credits 6 6. Semester: **Autumn** 7. Subject Area: **PCC**

8. Pre-Requisite: Nil

9. Objective: To incubate understanding with contemporary planning issues, appreciate the development of urban/rural areas and prepare spatial plan of different scale (community, neighbourhood, and city)

10. Details of Course:

S.No	Contents	Contact hours
1	**Introduction:** Introduction to contemporary planning issues using various planning tools; Introduction to planning report and assessment writing	2
2	**Site Appraisal:** Assessment of any existing site for its overall development using reconnaissance survey and primary field surveys	2
3	**Neighbourhood/Site Planning:** Planning for community, neighbourhood, township, and sector	2
4	**City Development Plan**: Different planning techniques; Survey, analysis, and proposal for future spatial development.	8
	Total	**14**

Suggested exercises: Major projects such as development plan of existing or new towns, outline City Development Plan, landuse plan etc
Minor: Planning for a small/medium neighbourhood, preparation of area appreciation report

11. Suggested Books:

S.No.	Name of Authors/Book/Publisher	Year of Publication
1	Building Byelaws, Development Control Rules (DCR) of metropolitan Cities	2002
2	Urban and Regional Development Plans Formulation and Implementation" (URDPFI) Guidelines, TCPO Publication. (draft)	2014
3	Chiara, J.D. and Lee K., "Time Saver Standards for Site Planning", McGraw Hill	2007
4	Chiara, J. D., Julius, P. and Zelnik, M., "Time Saver Standards for Housing and Residential Development", McGraw Hill.	2007
5	National Building Code (NBC), Bureau of Indian Standards.	2006
6	Kostof, S. and Tobias, R., "The City Shaped- Urban Pattern and meanings through History" Thames & Hudson.	2010
7	Government of India, Guidelines of Preparation of City Development Plan	2010

INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

NAME OF DEPTT. /CENTRE: **ARCHITECTURE AND PLANNING**

1. Subject Code: **ARN-652** Course Title: **Planning Studio-II**

2. Contact Hours: **L: 1** **T: 0** **P: 10**

3. Examination Duration (Hours)- **Theory:** 0 **Practical:** 0

4. Relative Weight: **CWS** 0 **PRS** 100 **MTE** 0 **ETE** 0 **PRE** 0

5. Credits 6 6. Semester: **Spring** 7. Subject Area: **PCC**

8. Pre-Requisite: Nil

9. Objective: To impart the knowledge and skills for preparation of rural/regional plan and formulation of city scale housing strategy

10. Details of Course:

S.No	Contents	Contact Hours
1	**Metropolitan/regional plan:** Survey, analysis, and proposal for perspective/structure plans at block / taluka /district /regional scale	7
2	**City level Housing and land Strategy:** Studying housing subsystems, estimation of housing shortage, project housing and land requirement, prepare alternative scenario's for housing development and formulate strategy	7
	Total	**14**

Suggested Exercise:

Major projects – Metropolitan region plan; Development plans for block/taluka, district or other region with respect to spatial development, ecological enhancement and networks; Long term housing strategy and policy at city /regional scale

Minor projects - Planning of facilities and amenities within a settlement or region, development and redevelopment of urban and rural communities, urban regeneration projects

11. Suggested Books:

S.No.	Name of Authors/Book/Publisher	Year of Publication
1	Urban and Regional Development Plans Formulation and Implementation" (URDPFI) Guidelines, TCPO Publication. (draft)	2014
2	Plans for National Capital Region , New Delhi	1985
3	District Development plans for selected districts	
4	Rural development Plans prepared under centrally sponsored schemes	
5	Various State housing policies	
6	Government of India, National Housing and Habitat Policy, (Urban)	1998, 2007

INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

NAME OF DEPTT. /CENTRE: **ARCHITECTURE AND PLANNING**

1. Subject Code: **ARN-653** Course Title: **Socio-economics, Demographics and Quantitative Techniques**

2. Contact Hours: **L: 2** **T: 0** **P: 0**

3. Examination Duration (Hours)- **Theory:** 2 **Practical:** 0

4. Relative Weight: **CWS** 25 **PRS** 0 **MTE** 25 **ETE** 50 **PRE** 0

5. Credits 2 6. Semester: **Autumn** 7. Subject Area: **PCC**

8. Pre-Requisite: Nil

9. Objective: To understand the basics of socio-economics, demography and quantitative techniques in planning

10. Details of Course:

S.No	Contents	Contact Hours
1	**Introduction:** Sociological concepts, relationship between human and environment; Socio-cultural profile of Indian society	4
2	**Community and Settlement:** Social problems of slums and squatters communities, social transformation and their impact on life, safety, security	4
3	**Elements of Micro and Macro Economics:** Demand and supply, elasticity and consumer markets; Economies of scale; introduction to production and factor market	4
4	**Growth and Development:** Development economics and lessons from Indian experiences, economic growth and development, quality of life; HDI, poverty and income distribution, employment and livelihood	6
5	**Demography:** Fundamental concepts of demography and its elements for planning	4
6	**Quantitative techniques:** Analytical and Quantitative techniques and its application in town planning	6
	Total	**28**

11. Suggested Books:

S.No.	Name of Authors/Book/Publisher	Year of Publication
1	Bhende, A.A. and Kanatkar T., "Principles of Population Studies", Himalaya Publishing	2006
2	Spiegel, M.R., "Probability and & Statistics", Schaum's Series	2002
3	Land, K.(ed.), "Demographic Methods and Population Analysis", Dordrecht- Springer	2009
4	Willemain, R., "Statistical Methods for Planners", MIT Press.	1980
5	Urban and Regional Development Plans Formulation and Implementation" (URDPFI) Guidelines, TCPO Publication. (draft)	2014

INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

NAME OF DEPTT. /CENTRE: **ARCHITECTURE AND PLANNING**

1. Subject Code: **ARN-654** Course Title: **Infrastructure Planning**

2. Contact Hours: **L: 3** **T: 1** **P: 0**

3. Examination Duration (Hours)- **Theory:** 3 **Practical:** 0

4. Relative Weight: **CWS** 25 **PRS** 0 **MTE** 25 **ETE** 50 **PRE** 0

5. Credits 4 6. Semester: **Spring** 7. Subject Area: **PCC**

8. Pre-Requisite: Nil

9. Objective: To understand the importance of infrastructure planning and managing appropriate development schemes.

10. Details of Course:

S. No	Contents	Contact Hours
1	**Introduction:** Elements of infrastructure (physical, social, utilities and services), definitions, concepts, significance and importance; norms and standards	3
2	**Transportation:** Types of transport systems, transport problems and mobility issues; Urban form and Transport patterns, land use – transport cycle; Transport planning process, environment and safety issues; principles of traffic management	10
3	**Water and storm water management**: Sources of water, treatment and storage, transportation and distribution, quality; Storm water – rainfall data interpretation, storm water collection and disposal, water harvesting, recycling and reuse	8
4	**Sanitation**: Points of generation, collection, treatment, disposal, grey water disposal, institutional arrangements, planning provisions and management issues.	6
6	**Solid and other wastes**: Generation, typology, quantity, collection, storage, transportation, treatment, disposal, recycling and reuse; Sustainability issues	6
7	**Power**: Sources of power procurement, distribution networks, Fire – Protections	3
8	**Social infrastructure**: Typologies, Planning for educational, health, recreational and Socio-cultural facilities. amenities for urban and rural settlements	6
	Total	**42**

11. Suggested Books:

S.No.	Name of Authors/Book/Publisher	Year of Publication
1	Dragan, S., “Sustainable Water Management Solutions for Large Cities”, IAHS Publication. □.	2005
2	Tchobanoglous, G., “Integrated Solid Waste Management: Engineering Principles and Management Issues”, McGraw Hill.	1993
3	Goodman, A.S. and Hastak, M., “Infrastructure Planning Handbook: Planning Engineering and Economics”, New York: ASCE Press.	2006

4	"Solid Waste Management in Class I Cities in India". Report of the expert Committee constituted by Hon. Supreme Court of India.	1999
5	Baum, V., "Energy Planning in Developing Countries", Australian Govt. Publishing Service.	1994
6	Zaini, U. and Mogens, H., " Municipal Wastewater Management in Developing Countries", Elsevier.	2006

INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

NAME OF DEPTT. /CENTRE: **ARCHITECTURE AND PLANNING**

1. Subject Code: **ARN-655** Course Title: **Ecology and Sustainable Development**

2. Contact Hours: **L: 2** **T: 1** **P: 0**

3. Examination Duration (Hours)- **Theory:** 2 **Practical:** 0

4. Relative Weight: **CWS** 25 **PRS** 0 **MTE** 25 **ETE** 50 **PRE** 0

5. Credits 3 6. Semester: **Autumn** 7. Subject Area: **PCC**

8. Pre-Requisite: Nil

9. Objective: To understand functioning of ecosystems and application of relevant ecological principles and processes in man-made systems for developing sustainable development and settlement system.

10. Details of Course:

S.No	Contents	Contact Hours
1	**Introduction:** Fundamental concepts of ecology, importance and relation of ecology to human civilization, ecologic terms and their significance, ecosystem	4
2	**Biodiversity and human settlement:** Ecological pyramids, energy flows and productivity in eco-system, biogeochemical cycles, bio magnification; Species and interspecies interactions; Biodiversity and ecological equilibrium	6
3	**Ecology and habitation:** Ecological cybernetics, Human settlement and man-made ecosystems, alternative development approaches, guiding environmental principles, technologies and values, sustainable lifestyles	6
4	**Climatology:** Climatology as a component of manmade ecosystem, macro-, meso- and microclimate; Ecosystem-atmosphere interactions; Urban heat island; Urban wind pattern, aerosols and air pollution, Simulation tools	6
5	**Eco city and sustainable development:** Eco city, eco-communities and eco buildings; Design of eco-systems, communities, and settlements; Scenarios for sustainable future; Sustainable urban development strategies, Case studies	6
	Total	**28**

11. Suggested Books:

S.No	Name of Authors / Books/Publishers	Year of Publication
1.	Odum E.P. and Barrett G.W, “Fundamentals of Ecology” (fifth ed.), Cengage Learning publisher	2005
2.	Paolo, S; “Arcology: The City in the Image of Man”; Revised Edn., MIT Press	2001
3.	Register,R; “Eco cities: Building Cities in Balance with Nature”, New Society Publishers	2006
4.	Todd, N.J, and Todd,J; “ Principles of Ecological Designs”, North Atlantic Book	2004
5.	Oke, T.R., "Boundary Layer Climates", Routledge.	1987
6.	Bonan, G., "Ecological Climatology", Cambridge University Press	2002

INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

NAME OF DEPTT. /CENTRE: **ARCHITECTURE AND PLANNING**

1. Subject Code: **ARN-656** Course Title: **Rural Planning and Development**

2. Contact Hours: **L: 2** **T: 1** **P: 0**

3. Examination Duration (Hrs) Theory: 2 Practical: 0

4. Relative Weight: **CWS** 25 **PRS** 0 **MTE** 25 **ETE** 50 **PRE** 0

5. Credits: **3** 6. Semester: **Spring** 7. Subject Area: **PCC**

8. Pre-requisite: **Nil**

9. Objective: To understand socio-economic, physical and institutional framework for rural planning and development.

10. Details of Course:

S. No	Contents	Contact Hours
1	**Introduction:** Rural planning and development; Rural planning methodology, data and sources, schedule and questionnaire preparation, execution of surveys	3
2	**Rural development:** Indicators of rural development, district level planning, village studies	3
3	**Rural system analysis:** Rural system and its analysis process, application of statistical techniques in rural planning	4
4	**Rural economics and growth:** Rural growth pattern; Rural land economics, livestock development; Rural industrialization, impact of rural industrialization in the rural socio-economic system.	4
5	**Rural economics:** Economic theories, demand - supply, investment, production function in agriculture / rural planning	4
6	**Rural infrastructure:** infrastructure planning (physical social infrastructure), and economic infrastructure; Science and technological programs in integrated rural development	4
7	**Institutional framework:** Institutions for rural development, community development; DRDA; Local self-governments, district planning office; state planning boards; state rural development institutions; NIRD and SIRD	4
8	**Case studies**	2
	Total	**28**

11. Suggested Books:

S. No.	Name of Authors/ Books/ Publishers	Year of Publication
1	Singh, S. P., “Planning and Management for Rural Development”, Mittal Publisher	2003
2	Ramchandran, H., “Integrated Rural Development in Asia”, Concept Publishers.	1991
3	Kumar U., “Science and Technology for Rural Development”, Deep and Deep Publishers.	1997
4	Siddiqui, N. A., “Natural Resource and Environmental Management Systems”, Khanna Publishers.	2008
5	Patnayak, R., “ Rural Development in India”, Vikas Publishers.	1990
6	Arora, R.K., “Indian Public Administration”, Wishwa Prakashan Ltd.	1996

INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

NAME OF DEPTT. /CENTRE: **ARCHITECTURE AND PLANNING**

1. Subject Code: **ARN-657** Course Title: **Planning Theories and Techniques**

2. Contact Hours: **L: 2** **T: 1** **P: 0**

3. Examination Duration (Hours) **Theory:** 2 **Practical:** 0

4. Relative Weight: **CWS** 25 **PRS** 0 **MTE** 25 **ETE** 50 **PRE** 0

5. Credits 3 6. Semester: **Autumn** 7. Subject Area: **PCC**

8. Pre-requisite: **Nil**

9. Objective: To understand basic principles, various theories and techniques of planning.

10. Details of Course:

S. No	Contents	Contact Hours
1	**Introduction:** Introduction to town planning, Planning terminologies, evolution of cities and town planning practice	3
2	**Survey methods:** Planning surveys, data bank, data processing; Demographic data and presentation techniques, correlation between spatial and non spatial data	3
3	**Urban theories and models:** Overview of Theories: Sector, multiple nuclei, concentric zone, garden city, central place, growth pole; Contemporary urban and spatial models	6
4	**Techniques of urban planning:** Identification of planning problems; Future growth trends; Various techniques for development and redevelopment; Appraisal of proposals.	4
5	**Spatial planning:** Planning as social and physical activity; Identifying objectives, setting goals and their relationship in planning schemes	4
6	**Planning Process and levels:** Comprehensive planning; Planning as interdisciplinary process; Public participatory planning; Techniques of gaming and simulation; Integrated planning and development at various levels	6
7	**Research in planning:** Planning research and methods to write article, report	2
	Total	**28**

11. Suggested Books:

S. No	Name of Authors/ Books/ Publishers	Year
1	Roberts M, "An introduction to town planning techniques", Hutchinson Educational	1974
2	Keeble, L., "Principles and Practice of Town Planning and Country Planning" Rev.Ed. London: Estates, Gazette 1964.	1989
3	Lynch, K., "Good City Form", MIT Press.	1995
4	Taylor, N., "Urban Planning Theory since 1945", London Sage	2006
5	"National Five Year Plans", Planning Commission, Govt. of India, Publication.	2010
6	Campbell S., and Faiustein, S.S., " Readings in Planning Theory", Blackwell Publishing.	2003

INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

NAME OF DEPTT. /CENTRE: **ARCHITECTURE AND PLANNING**

1. Subject Code: **ARN-658** Course Title : **Environmental Planning**
2. Contact Hours : L: 2 T:1 P:0
3. Examination Duration (Hrs): Theory : 2 Practical: 0
4. Relative Weight : **CWS** 25 **PRS:** 0 **MTE :** 25 **ETE:** 50 **PRE:** 0
5. Credits: 3 6. Semester : **Spring** 7. Subject Area : **DEC**
8. Pre-requisite : **Nil**
9. Objective : To understand the basics of environmental planning, policies, management and technological evolution

10. Details of Course

Sr. No	Contents	Contact Hours
1	**Evolution, Concept and Theory:** History of environmental planning, relations and debates related with environmental planning; Concept and theories	6
2	**Environmental Zoning and regulation:** Environmental Zones, problems, potential, regulating mechanism for development	4
3	**Environmental policy:** Policies and their implication in urban/rural planning, international and national policies and related interventions	4
4	**Environmental protection:** Protection techniques, overview of legal and legislative provisions for protection, case studies and best practices	6
5	**Environmental management:** Role of various authorities and institutions, practices at regional, city and local level	4
6	**Appropriate environmental technologies and its applications:** Case studies and ongoing practices	4
	Total	**28**

8) Suggested Books / journals

Sr. No	Name of Authors / Books / publishers	Years of Publication
1	Urban and Regional Development Plans Formulation and Implementation" (URDPFI) Guidelines, ITPI Publication. (draft)	2014
2	Catlin, R. A, "Land use Planning , Environmental Protection and Growth Management", Ann Arbor Press	1997
3	Campbell, G.S. and Norman, J.M., "An Introduction to Environmental Biophysics", Springer.	1998
4	Randolph J., "Environmental Land Use Planning and Management", Island Press	2003
5	Government of India, Guidelines for EIA	2011

INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

NAME OF DEPTT. /CENTRE: **ARCHITECTURE AND PLANNING**

1. Subject Code: **ARN-659** Course Title: **Housing**

2. Contact Hours: **L: 2** **T: 1** **P: 0**

3. Examination Duration (Hours)- **Theory:** 2 **Practical:** 0

4. Relative Weight: **CWS** 25 **PRS** 0 **MTE** 25 **ETE** 50 **PRE** 0

5. Credits 3 6. Semester: **Autumn** 7. Subject Area: **PCC**

8. Pre-Requisite: Nil

9. Objective: To understand the basics of housing policy, strategy, legal and economic dimensions and their implications in planning

10. Details of Course:

S. No	Contents	Contact Weeks
1	**Introduction:** Importance, need, problems and issues in housing	2
2	**Policy and Strategy:** Housing policy, existing strategy and programs; Chronological evolution of National and state housing; Contemporary housing programs	4
3	**Housing Finance and legislation:** Laws and acts on housing, development controls and building regulations; Housing finance and its importance; Financing options	4
4	**Cooperative housing:** Concept, evolution, structure of cooperative housing	2
5	**Rural housing:** Category, characteristics of rural housing, materials, techniques and approach to rural housing, application vernacular methods in housing	4
6	**Industrialised mass housing:** Modular and dimensional coordination, open and closed system, linear, panel and box system, mass customised home, future of mass housing	4
7	**Affordable, low income and informal housing:** Concept and issues of affordable housing; Slums and squatter typology; Improvement models, rental housing	4
8	**Special housing:** Housing for hilly areas, disasters prone areas, rehabilitation, single/aged persons, working persons; Night shelters, service apartments	4
	Total	**28**

11. Suggested Books:

S.No.	Name of Authors/Book/Publisher	Year of Publication
1	Balaji V. & Rajmanohar, "Housing Sector in India; Issues, Opportunities and Challenges", ICFAI University Press.	2008
2	Christian Schittich(ed), "High Density Housing; Concepts, Planning, Construction", Birkhauser.	2004
3	French H., "Key Urban Housing of the Twentieth Century", Lawrence King	2008
4	Reeves P., "Introduction to Social Housing", Elsevier.	2005
5	Davis S., "The Architecture of Affordable Housing", University of California Press.	1995
6	National Housing and Habitat Policies, 1998, 2007 (urban), Govt of India	1998,2007

INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

NAME OF DEPTT. /CENTRE: **ARCHITECTURE AND PLANNING**

1. Subject Code: **ARN-660** Course Title :**Environmental Law and Economics**
2. Contact Hours: L: 2 T: 1 P: 0
3. Examination Duration (Hrs.): Theory : 2 Practical: 0
4. Relative Weight : **CWS** 25 **PRS:** 0 **MTE:** 25 **ETE:** 50 **PRE:** 0
5. Credits: 3 6. Semester : **Spring** 7. Subject Area : **DEC**
8. Pre-requisite : **Nil**
9. Objective: To understand the legal and legislative provisions to safeguards environment and understand its application in planning and development.
10. Details of Course

Sr. No	Contents	Contact Hours
1	**Legal, Legislative framework and Environmental regulations:** Environmental protection acts in India, related rules and regulations, implications in town and country planning	6
2	**Environmental agreements:** National and international treaties and agreements its basic contents and outcomes, mandates at various level	4
3	**Introduction to environmental economics:** Interface between livelihood, economy and environment, sustainable strategies	4
4	**Built and natural environment:** according to economists, Basic economic problem in shared spaces	4
5	**Market forces Affecting Environment:** demand and supply, cost benefit analysis and discounting , macroeconomic considerations, proactive measure to address market forces	6
6	**Interface with Environmental policies:** Policies and contemporary challenges	4
	Total	**28**

8) Suggested Books / journals

Sr. No	Name of Authors / Books / publishers	Years of Publication
1	Rawat, R. S, "Bhartiya Van Adhiniyam", Natraj Publishers	1927
2	Stuart, B., Donald McGillivray, "Environmental Law". Oxford University Press	2005
3	Holder, L. , "Environmental Protection, Law and Policy", Cambridge University Press	2007
4	Leelakrishnan P., "Environmental Law In India", LexisNexis India	2008
5	Sahasranaman P. B., "Handbook Of Environmental Law", Oxford University Press	2012
6	Squire G, Urban and Environmental Economics, Routledge	2012

INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

NAME OF DEPTT/CENTRE: **ARCHITECTURE AND PLANNING**

1. Subject Code: **ARN-661** Course Title: **Planning Legislation and Governance**
2. Contact Hours: **L: 2** **T: 1** **P: 0**
3. Examination Duration (Hours)- **Theory:** 2 **Practical:** 0
4. Relative Weight: **CWS** 25 **PRS** 0 **MTE** 25 **ETE** 50 **PRE** 0
5. Credits 3 6. Semester: **Autumn** 7. Subject Area: **PCC**

8. Pre-Requisite: Nil

9. Objective: To understand all relevant planning legislation, its implementation and local self governance applicable to urban and rural settlements.

10. Details of Course:

Sl. no	Contents	Contact hours
1	**Introduction:** Scope and objectives of planning legislation; Constitutional framework of democratic republic, fundamental rights, duties and directive principles.	4
2	**Governance in historical perspective:** Evolution and growth of planning legislation and institutional framework in India, study of important legislations	4
3	**Existing legislative framework:** Contemporary legislation and institutional framework and its execution process, economic reforms and its consequence	4
4	**Legislative reform:** 73rd and 74th Constitutional Amendments, mechanisms for urban and rural local bodies; Municipal act, rules, regulations	4
5	**Planning regulations:** Building byelaws, development controls and zoning regulations, alternative land and finance management methods, issues	4
6	**Land acquisition**: Land acquisition and related acts/laws, case studies, related court judgements, innovative land assembly	4
7	**Planning law and act:** Other contemporary laws including Town and Country Planning Act, SEZ Act, CRZ Act; Environmental Acts	4
	Total	**28**

11.SuggestedBooks:

S.No.	Name of Authors / Books/Publishers	Year of Publication
1	Subhash C. Kashyap, "Our Constitution" , National Book Trust, India Fourth revised Edn.	2005
2	"Constitutional Amendments 73rd and 74th of 1992", Dept. of Publications, Govt. of India	1993
3	"Urban and Regional Development Plans Formulation and Implementation" (URDPFI) Guidelines, TCPO Publication. (draft)	2014
4	Master Plan Reports and Building bye laws of various states/ cities	2006
5	"The Delhi Laws (Special Provisions) Act, 2006" Govt. of India	
6	Various Acts of City and Regional Development Authorities of India	

INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

NAME OF DEPTT. /CENTRE: **ARCHITECTURE AND PLANNING**

1. Subject Code: **ARN-662** Course Title :**Environmental Impact Assessment**

2. Contact Hours: L: 2 T:1 P:0

3. Examination Duration (Hrs): Theory : 2 Practical: 0

4. Relative Weight : **CWS** 25 **PRS:** 0 **MTE :** 25 **ETE:** 50 **PRE:** 0

5. Credits: 3 6. Semester : **Spring** 7. Subject Area : **PEC**

8. Pre-requisite : **Nil**

9. Objective: To provide a basic understanding of the EIA process as it is used for research, planning, project or program evaluation, monitoring, and regulatory enforcement

10. Details of Course

Sr. No	Contents	Contact Hours
1	**Introduction:** Brief history of Environmental Impact Analysis, role of EIA in Planning and global affairs; EIA as decision making process, legal basis for EIA and process	6
2	**EIA typology:** definition, evaluation, types of EIA document preparation, Contents and scope, EIA Process.	4
3	**Methods of EIA**: Various methods of EIA Interaction Matrices, Impact prediction, Decision analysis methods, Ad hoc method, Systematic sequential approach, Economics analysis, Experts system, Networks, Sectoral guidelines, Simulation and modelling, Rapid assessment techniques, advantages and limitations	8
4	**EIA and resource assessment:** Assessment of impacts on resources (including air, water, flora and fauna), land-use, social and health	6
5	**Public Participation in EIA**: Need , legal aspect, various methods and process	4
	Total	**28**

8) Suggested Books / journals

Sr. No	Name of Authors / Books / publishers	Years of Publication
1	Wathern P., "Environmental Impact Assessment: Theory and Practice", Routledge Publishers	1990
2	Marriott B., "Environmental Impact Assessment: A Practical Guide", McGraw-Hill Publication	1997
3	Shrivastava A.K., Baxter Nicola, Grimm Jacob, "Environmental Impact Assessment", APH Publishers	2003
4	Anjaneyulu Y., Manickam Valli, "Environmental Impact Assessment Methodologies", CRC Press	2011
5	Glasson J., Therivel Riki, Chadwick Andrew, "Introduction to Environmental Impact Assessment", Oxford Brookes University	2012/ 4th edition

INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

NAME OF DEPTT. /CENTRE: **ARCHITECTURE AND PLANNING**

1. Subject Code: **ARN-664** Course Title: **Affordable and Cost Effective Housing**

2. Contact Hours: **L: 2** **T: 1** **P: 0**

3. Examination Duration (Hours)- **Theory:** 2 **Practical:** 0

4. Relative Weight: **CWS PRS** 25 0 **MTE** 25 **ETE** 50 **PRE** 0

5. Credits 3 6. Semester: **Spring** 7. Subject Area: **PEC**

8. Pre-Requisite: Nil

9. Objective: To understand concept of low cost and affordable housing, basic principles and strategies.

10. Details of Course:

S.No	Contents	Contact Hours
1	**Introduction:** Influencing factors in building cost, building cost control approaches	2
2	**Low Income and informal housing**: Characteristics of low income and informal housing; Improvement models for planning and development of informal settlements; Use of innovative, low-cost building techniques, policy and strategies	6
3	**Poverty and Community Participation in Housing:** Dimensions of poverty, programmes on slums and the urban poor, shelter less population; Understanding concept of inclusion, community based organizations	6
4	**Affordable housing:** Concept of affordable housing, criteria for housing affordability; factors influencing housing affordability; Role of public, private sectors in affordable housing; Policy and strategy for affordable housing	8
5	**Building systems approach:** Stages in industrialisation of housing, open and closed system, evolution of system building, dimensional and modular coordination, prefabrication - partial and full, employment factors, mass customised homes	6
	Total	**28**

11. Suggested Books:

S.No.	Name of Authors/Book/Publisher	Year of Publication
1	Davis, S., “Architecture of Affordable Housing”, University of California Press	1995
2	Ruiz, F.P., “Building an Affordable House”, Taunton Press	2005
3	Nunan, J., “The Complete Guide to Alternative Home Building Materials and Methods”, Atlantic Publishing.	1980
4	Lal, A.K., “A Handbook of Low Cost Housing ”, New Age International.	1995
5	Mathur, G.C., “Low Cost Housing in Developing Countries”, South Asia Book.	1999
6	Sowman, M. and Urquhart, P., “A Place called Home: Environmental Issues and Low-Cost Housing”, Juta Academic.	1998

INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

NAME OF DEPTT. /CENTRE: **ARCHITECTURE AND PLANNING**

1. Subject Code: **ARN-666** Course Title: **Land and Real Estate Management**

2. Contact Hours: **L: 2** **T: 1** **P: 0**

3. Examination Duration (Hours)- **Theory:** 2 **Practical:** 0

4. Relative Weight: **CWS PRS** 25 0 **MTE** 25 **ETE** 50 **PRE** 0

5. Credits 3 6. Semester: **Spring** 7. Subject Area: **PEC**

8. Pre-Requisite: Nil

9. Objective: To understand basic concepts of land and real estate development and management.

10. Details of Course:

S.No	Contents	Contact Hours
1	**Land Economics and Land Markets:** Land and land use, demand forecasting, factors affecting land supply and demand; Market & financial instruments	4
2	**Supply management:** Property rights, user and exchange rights, regulation in land markets; Social justice and land distribution; Master plan, zoning and other planning regulations and their impact on supply; Land management techniques	6
3	**Demand management:** Income elasticity of land, business cycles and its impact on demand for land; Preferential dynamics; Physical, fiscal, financial and legal incentives for land dynamics; Big scale investments and its effect on land	6
4	**Introduction to real estate:** Definition, principles of real estate value concepts, real property ownership, leasing succession, methods of sale/ purchase; Real estate investment and portfolio management, FDI, role of NRIs and PIOs	4
5	**Land pricing and real estate markets:** Land valuation techniques, land pricing, subsidies, auctions; type of development, land price index; Market conditions; Real estate regulations, land Information System (LIS), land records	6
6	**Case study:** Real estate project formulation	2
	Total	**28**

11. Suggested Books:

S.No.	Name of Authors/Book/Publisher	Year of Publication
1	Card R, Mardoch J, Mardock S, “Real Estate Management Law”, OUP Oxford	2001
2	“Sustainable Land Management: Challenges, Opportunities, and Trade-offs”, World Bank Publications	2006
3	CREDAI, resources on all relevant court judgements	
4	Shivramkrishnan K C, “Revisioning Indian Cities”, SAGE	2011
5	Banerjee D. N, “Principles and Practice in valuation”, Eastern Law House	1998

INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

NAME OF DEPTT. /CENTRE: **ARCHITECTURE AND PLANNING**

1. Subject Code: **ARN-668** Course Title: **Urban Risk and Disaster Management**

2. Contact Hours: **L: 2** **T: 1** **P: 0**

3. Examination Duration (Hours)- **Theory:** 2 **Practical:** 0

4. Relative Weight: **CWS PRS** 25 0 **MTE** 25 **ETE** 50 **PRE** 0

5. Credits 3 6. Semester: **Spring** 7. Subject Area: **PEC**

8. Pre-Requisite: Nil

9. Objective: To understand causes and consequences for urban risks and disaster and to understand principles for planning and management for it's mitigation.

10. Details of Course:

S.No	Contents	Contact Hours
1	**Introduction:** Natural and man-made disasters, meaning, factors and significance, causes and effects, global and local disaster profile, risks, vulnerability, hazard	4
2	**Disaster preparedness and planning:** Disaster management cycle and helix, planning for disaster prone areas, disaster mapping, vulnerability analysis, vulnerability atlas, predictability, forecasting and warning, relief measures, reconstruction and rehabilitation, disaster preparedness plan,	8
3	**Incidence response and mitigation:** Typology of disasters in India, human behaviour and response; Disaster mitigation / preparedness and response; structural and non structural interventions, action plans and procedures, training issues	6
4	**Disaster resistant housing:** Disaster resistant housing construction practices and codes, engineered and non-engineered structures, preparedness for climate change, architectural and structural requirement in the design of housing, case studies	6
5	**Institutional role and responsibilities:** Role of national and state level organisations and Urban Local Bodies for urban risk and disaster preparedness	4
	Total	**28**

11. Suggested Books:

S.No.	Name of Authors/Book/Publisher	Year of Publication
1	Fabrice G. Renaud, Karen Sudmeier-Rieux and Marisol Estrella, "The Role of Ecosystems in Disaster Risk Reduction", United Nations University Press	2013
2	K. J. Anandha Kumar & Ajinder Walia, "India Disaster Report 2012", NIDM	2013
3	Bandyopadhyay C, "Training Module on Urban Risk Mitigation", NIDM	2013
4	Jain S K, Murty C V R, and Rai D C, "Engineering Response to Hazards of Terrorism", National Information Centre of Earthquake Engineering, Kanpur	2003

INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

NAME OF DEPTT. /CENTRE: **ARCHITECTURE AND PLANNING**

1. Subject Code: **ARN-670** Course Title: **Urban System Dynamics**

2. Contact Hours: **L: 2** **T: 1** **P: 0**

3. Examination Duration (Hrs) Theory: 2 Practical: 0

4. Relative Weight: **CWS 25** **PRS 0** **MTE 25** **ETE 50** **PRE 0**

5. Credits: 3 6. Semester: Spring 7. Subject Area: **PEC**

8. Pre-requisite: **Nil**

9. Objective: To impart knowledge on dynamic functions of the urban system.

10. Details of Course:

S. No	Contents	Contact Hours
1	**Introduction:** Define urban, urbanization, destabilization, and stabilization; Factors responsible for urbanization	3
2	**Urban system and subsystem:** Define system, system characteristics, classification of systems, Urban system and various subsystems of urban system, urban dynamics, and functions of urban system	6
3	**Urban system theory and Models:** system theories (general system theory, cybernetics, systems approach, and system dynamics approach); Models, classification of models, system dynamics model, merits of system dynamics model, urban dynamics model, model validation, forecasting, application of urban dynamics model (simulation)	8
4	**Urban Dynamics:** Urban dynamics in India, urban crisis (spread and backwash effects with reference to housing, slums, and all other infrastructure(include physical infrastructure, social infrastructure and economics infrastructure crisis)	6
5	**Advanced urban dynamics:** Special problems - based on current issues and field studies, case studies	5
	Total	**28**

11. Suggested Books:

S. No.	Name of Authors/ Books/ Publishers	Year of Publication
1.	Mc Loughlin J. B. “Urban & Regional Planning-A systems approach”, Faber and Faber.	1962
2.	Mohapatra, P.K.J., Mandal, P. and Bora, M.C., “Introduction to System Dynamics Modelling”, Orient Longman.	1994
3.	Sterman J. D. “Business Dynamics”, Irwin McGraw Hill.	2000
4.	Forrestor, W.J., “Urban Dynamics”, MIT Press.	1969
5.	Chardwick, G., “A Systems View of Planning”, Pergamon Press	1987
6.	Ranganath, B. J., Rodrigues, L.L.R., “System Dynamics: Theory and Case Studies”, I. K. International Publishing House, New Delhi	2008

INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

NAME OF DEPTT. /CENTRE: **ARCHITECTURE AND PLANNING**

1. Subject Code: **ARN-672** Course Title: **Urban Transport Planning**

2. Contact Hours: **L: 2** **T: 1** **P: 0**

3. Examination Duration (Hrs) Theory: 2 Practical: 0

4. Relative Weight: **CWS 25** **PRS 0** **MTE 25** **ETE 50** **PRE 0**

5. Credits: 3 6. Semester: Spring 7. Subject Area: **PEC**

8. Pre-requisite: **Nil**

9. Objective: To understand transportation system and traffic system in urban and rural setting.

10. Details of Course:

S. No	Contents	Contact Hours
1	**Introduction:** Introduction, characteristics and problems of traffic and transportation	2
2	**Road:** Types of roads and planning standards; Road design and layout; Road intersections; Road cross sections; Street furniture; Design for road safety	4
3	**Transportation survey:** Traffic and transportation surveys; Traffic zones, cordon lines and control stations; O and D surveys, home interviews and travel pattern data; Inventory of existing transportation facilities including parking	6
4	**Traffic management:** Management and traffic control systems, traffic signs, signals, speed regulations etc; Design for traffic segregation; Planning for parking	4
5	**Traffic forecast:** Traffic planning and forecasting, trip generation and methods of predicting trip generation; Models of traffic assignments.	4
6	**Transportation network:** Roads and transport services in urban and rural settlement; Mass transportation in urban environment; relation of urban form and transportation; Environmental considerations	6
7	**Case study:** Best practices from India and abroad; New innovations and concepts	2
	Total	**28**

11. Suggested Books:

S. No.	Name of Authors/ Books/ Publishers	Year of Publication
1	Bohlinger, M., “Planning Traffic Management”, Springer	2010
2	Bruton, M.J., “Introduction to Transportation Planning”, Amazon Co	2009
3	Burton E. and Mitchell, L., “Inclusive urban design: streets for life”, Elsevier.	2006
4	Tiwari G., “The Way Forward Transportation Planning and Road Safety”, IITD Publication	2003
5	Kadiyali, L.R “Traffic Engineering and Transport Planning”, Khanna Publisher	2007

INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

NAME OF DEPTT. /CENTRE: **ARCHITECTURE AND PLANNING**

1. Subject Code: **ARN-674** Course Title: **Public Policy and Urban Management**

2. Contact Hours: **L: 2** **T: 1** **P: 0**

3. Examination Duration (Hours)- **Theory:** 2 **Practical:** 0

4. Relative Weight: **CWS PRS** 25 0 **MTE** 25 **ETE** 50 **PRE** 0

5. Credits 3 6. Semester: **Spring** 7. Subject Area: **PEC**

8. Pre-Requisite: Nil

9. Objective: To understand basics of public policy and its interrelation with urban management.

10. Details of Course:

S. No.	Contents	Contact Hours
1	**Nature and constitution of public policy:** Nature of public problems, planning as a public issue, policy analysis and process, limitations in public and private Sector.	4
2	**Public policy analysis and strategic policy planning:** Overview of policy process, models, policy initiation; Strategic decisions and evaluation, strategic leadership.	4
3	**Public policy & urban management:** E-governance, transparency, accountability, land, environment, health, water and other policies; Integration and disintegration of policies, Frequency and commitments, global commitments	6
4	**Urban management:** Components of urban management, powers and responsibility of ULBs for urban management, urban reform, managing municipal infrastructure and services, development of systems and processes, peoples interface	8
5	**Role of city managers:** Councillors as city mangers, role and competencies of elected representatives; Involvement of people in city management, best practices, peer experiences and continuous learning, training and capacity building	6
	Total	**28**

11. Suggested Books:

S. No.	Name of Authors/Book/Publisher	Year of Publication
1	Urban Management Programme 1997-2001, UN-HABITAT	2001
2	Y. V. Reddy, “Economic Policies and India's Reform Agenda: New Thinking 1st Edition (Hardcover)” , Orient	2003
3	Karen Coelho, Lalitha Kamath , M. Vijayabaskar, Participolis, “Consent and Contention in Neoliberal Urban India (Cities and the Urban Imperative)”, Routledge	2013
4	Sivaramakrishnan. K C, “Re-Visioning Indian Cities”, Sage Publications	2011

INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

NAME OF DEPTT. /CENTRE: **ARCHITECTURE AND PLANNING**

1. Subject Code: **ARN-676** Course Title: **Regional Planning**

2. Contact Hours: **L: 2** **T: 1** **P: 0**

3. Examination Duration (Hrs) **Theory: 2** **Practical: 0**

4. Relative Weight: **CWS 25** **PRS 0** **MTE 25** **ETE 50** **PRE 0**

5. Credits: **3** 6. Semester: **Spring** 7. Subject Area: **PEC**

8. Pre-requisite: **Nil**

9. Objective: To understand the basic concepts of regions, regional development issues, various theories and methods, and overall process of regional planning.

10. Details of Course:

S. No.	Contents	Contact Hours
1	**Introduction:** Definition and delineation of region, need for regional planning	2
2	**Regional growth:** Regional long run growth, aggregate growth models, growth from inside and outside, economic models, industrial structure analysis.	4
3	**Regional economics:** Economics of regional development; creative economy, regional analysis; Five year plans and their impacts in urban/rural system	4
4	**Regional inequality:** Regional imbalance and inequalities in India, development of backward areas, decentralized planning; Multilevel planning	4
5	**Regional analysis:** Location analysis, leading industries and propulsive firms, polarization effects and agglomeration economies, network analysis, spread effects, and backwash effects	6
6	**Regional plan in India:** Planning in India an overview; Development Programs in urban and rural systems; Case Studies	4
7	**Metropolitan planning:** City and metropolitan planning, trends in urban growth and urbanization in India, Comprehensive regional planning, Cse studies	4
	Total	**28**

11. Suggested Books:

S. No.	Name of Authors/ Books/ Publishers	Year of Publication
1.	Unaeghu, G. C., "Issues in Urban and Regional Planning", Washington House.	2005
2.	Glasson, J., "An Introduction to Regional Planning" Rev. Ed. Routledge.	1995
3.	Calthorpe P. and Fulton, W.B., "The Regional City: Planning for the End of Sprawl", Island Press.	2001
4.	Hall, P., "Urban and Regional Planning", 4th Ed. Routledge.	2002
5.	Regional Plan-2021-NCR/11th Five Year Plan, Govt. of India.	2007
6.	Urban and Regional Development Plans Formulation and Implementation" (URDPFI) Guidelines, ITPI Publication. (draft)	2014

INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

NAME OF DEPTT. /CENTRE: **ARCHITECTURE AND PLANNING**

1. Subject Code: **ARN-678** Course Title: **Inclusive Urban Planning**

2. Contact Hours: **L: 2** **T: 1** **P: 0**

3. Examination Duration (Hrs) **Theory: 02** **Practical: 0**

4. Relative Weight: **CWS 25** **PRS 0** **MTE 25** **ETE 50** **PRE 0**

5. Credits: **3** 6. Semester: **Spring** 7. Subject Area: **PEC**

8. Pre-requisite: **Nil**

9. Objective: To understand the basic principles of inclusive growth and to apply in the urban planning process.

10. Details of Course:

S. No.	Contents	Contact Hours
1	**Introduction:** Understanding inclusive growth, definitions and components, essential dimensions of inclusive planning	4
2	**Dimensions of inclusive planning:** Stakeholders profile and needs, access to shelter, services and livelihoods, urban poor, informal sector, gender, children, elderly, disabled, displaced people; Causative factors, determinants, location characteristics of settlements, growth of informal sector, characteristics, functions, economic contributions, linkages with formal sector, impact on urban development	10
3	**Participatory planning process and policies, programmes and legislation:** Methods, role of stakeholders (including civil society organizations); Related acts, five year plans, policies and programmes	8
4	**Planning interventions:** Inclusive zoning, development and building regulations, slum improvement	6
	Total	**28**

11. Suggested Books:

S. No.	Name of Authors/ Books/ Publishers	Year of Publication
1	Regional Plan-2021-NCR/11th Five Year Plan, Govt. of India.	2005
2	Urban and Regional Development Plans Formulation and Implementation" (URDPFI) Guidelines, ITPI Publication. (draft)	2014
3	Jain, AK, "Inclusive Planning and Social Infrastructure", Bookwell Publications	2010
4	Creighton. James L., "The Public Participation Handbook: Making Better Decisions Through Citizen Involvement", Wiley publishers	2005

INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

NAME OF DEPTT. /CENTRE: **ARCHITECTURE AND PLANNING**

1. Subject Code: **ARN-680** Course Title: **Futuristic and Creative City Planning**

2. Contact Hours: **L: 2** **T: 1** **P: 0**

3. Examination Duration (Hrs) **Theory: 02** **Practical: 0**

4. Relative Weight: **CWS 25** **PRS 0** **MTE 25** **ETE 50** **PRE 0**

5. Credits: **3** 6. Semester: **Spring** 7. Subject Area: **PEC**

8. Pre-requisite: **Nil**

9. Objective: To understand futuristic planning concepts and principles of planning for creative cities

10. Details of Course:

S. No	Contents	Contact Hours
1	**Introduction:** The realm of futurology and visionary planning; Utopias and visionary plans of the past centuries, contents of futuristic ideas of settlements and living	4
2	**Linkages between contemporary and future planning:** Present planning horizons and future visions, understanding of future man and society; Planning for future habitats in relation to technology and resource development	4
3	**Planning strategies:** Strategies and utopian city structure; Alternative future scenarios; Contributions from famous futurologists	4
4	**Concepts for future settlements:** Concepts, planning and design parameters; Growing needs of sustainable and ecologically appropriate developments	4
5	**Case study:** Futuristic and visionary projects related with human aspirations, needs and technological developments	4
6	**Creative city:** Introduction , definitions, principal and historical perspective of creative cities, identification of creative economy, industry and creative base for planning guidelines, vision, development strategies, mechanism in creative city planning	6
7	**Creative city planning process:** Stakeholder involvement, financing; Case studies	2
	Total	**28**

11. Suggested Books:

S. No.	Name of Authors/ Books/ Publishers	Year of Publication
1.	Toffler, A., “Future Shock”, Bantam Books Rev.	2005
2.	Alison, J., “ Future City: Experiment and Utopia in Architecture”, Thames & Hudson	2007
3.	Jenks, M. and Dempsey, N., “Future Forms and Design for Sustainable Cities”, Elsevier	2005
4.	Grant J, “Seeking Talent for Creative Cities: The Social Dynamics of Innovation”, University Of Toronto Press	2014
5.	Terry (Edt) Flew , “Creative Industries Urban Development : Creative Cities In 21 Century”, Routledge	2012
6.	Landry Charles, “The Creative City: A Toolkit for Urban Innovators”, Routledge	2008

INDIAN INSTITUTE OF TECHNOLOGY ROORKEE
NAME OF DEPTT./CENTRE**: ARCHITECTURE AND PLANNING**

1. Subject Code: **ARN-703** Course Title: **Design Studio - III**

2. Contact Hours: **L: 1** **T: 0** **P: 10**

3. Examination Duration (Hrs): **Theory: 0** **Practical: 0**

4. Relative Weight: **CWS 0** **PRS 100** **MTE 0** **ETE 0** **PRE 0**

5. Credits **6** 6. Semester: **Autumn** 7. Subject Area: **PCC**

8. Pre-requisite: **Nil**

9. Objective: To develop the creative dimensions in architectural design with a focus on technology and innovation.

10. Details of Course:

S. No.	Contents	Contact Hours
1.	Innovation, Design and Technology	**4**
2.	Design Process	**3**
3.	Innovative Design practices	**4**
4.	Material and form based innovation	**3**
	Total	**14**

Suggested Exercises:

Design of innovative structures for diverse contexts and requirements.
Design of Research buildings, Knowledge environments, Industrial design systems, Mega structures.

11. Suggested Books

S. No.	Name of Author /Book/Publisher	Year of Publication/ Reprint
1.	Royal Society of Arts, On Design and Innovation (RSA lecture series), Gower Publishing Ltd.	1999
2.	Brookes, A. J. ans Pool, D., "Innovation in Architecture: A Path to the Future", Taylor & Francis.	2003
3.	Studios Architecture, "Buildings: Innovation + Technology: STUDIOS Architecture", Images Publishing group.	2009
4.	Park, J.H., "Graft in Architecture: Recreating Spaces", Images Publishing.	2013
5.	Mazzoleni, I., "Architecture Follows Nature-Biomimetic Principles for Innovative Design (Biomimetics)", CRC Press.	2013

INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

NAME OF DEPTT. /CENTRE: **ARCHITECTURE AND PLANNING**

1. Subject Code: **ARN-753** Course Title: **Planning Studio-III**

2. Contact Hours: **L: 1** **T: 0** **P: 10**

3. Examination Duration (Hours)- **Theory:** 0 **Practical:** 0

4. Relative Weight: **CWS PRS** 0 100 **MTE** 0 **ETE** 0 **PRE** 0

5. Credits 6 6. Semester: **Autumn** 7. Subject Area: **PCC**

8. Pre-Requisite: Nil

9. Objective: To impart basic skills for preparation of Environmental Plan and Assessment and formulate Project/scheme.

10. Details of Course:

S.No.	Contents	Contact Hours
1	**Environmental Plan and Assessment** Planning and Design Studio exercises pertaining to: Environmental Status, Environmental Impact Assessment, Environmental Improvement/ Conservation /Safe and Healthy City	8
2	**Project Formulation and Design** Site selection, site analysis, feasibility studies, to formulate the project and design of selected area, Greenfield or redevelopment, development options concept for dwellings, plans and layout, costing, pricing, financing, phasing, implementation and management and post occupancy estate management, financial feasibility.	4
3	**Application of GIS and Remote Sensing**	2
	Total	14

Suggested Exercise:

Environmental Impact Assessment of region/city/project level
Project formulation in urban scale pertaining to government schemes and/or privately developed
Preparation of base and thematic maps and their correlation with data and analysis

11. Suggested Books:

S.No.	Name of Authors/Book/Publisher	Year of Publication
1	Building Byelaws, Development Control Rules (DCR) of metropolitan Cities	2002
2	Urban and Regional Development Plans Formulation and Implementation" (URDPFI) Guidelines, TCPO Publication. (draft)	2014
3	Peter Wathern, Environmental Impact Assessment: Theory and Practice, Routledge Publishers	1990
4	Betty Marriott ,Environmental Impact Assessment: A Practical Guide, McGraw-Hill Publication	1997