Group No.	Course Code	Course Title	Unique code
1	20UDC 13	Theory of Urban Form	201AT001
1	20 UDS34	Infrastructure, Traffic and Transportation Planning	201AT002
1	20HDC12	Human Habitat: Studies and Design Thought	201AT003
1	20DAC1.3	Digital architecture process theories and history - I	201AT004
1	20ACM11	Project Management- 1	201AT005
1	20ACM12	Contract Management	201AT006
1	20LA203	Planting Design	201AT007
1	20LA102	Landscape construction techniques	201AT008
2	20 UDC 14	City Planning Process in India	202AT001
2	20 UDE36A	Urban Housing	202AT002
2	20HDE37B	Future of Habitat: Critical Issues	202AT003
2	20HDC13	Planning Theory and Techniques	202AT004
2	20DAS1.7	Digital fabrication-I	202AT005
2	20ACM13	Site Organization & Construction Environmental Management	202AT006
2	20ACM14	Project Appraisal & Project Finance	202AT007
2	20LA204	Landscape resources & management	202AT008
2	20LA304	**Impact Assessment of Environment**	202AT009
3	20 UDC 15	Social Theory and Urban Design	203AT001
3	20 UDC33	Contemporary Theories of Urbanism and Architecture	203AT002
3	20HDS25	Infrastructure Planning & Management	203AT003
3	20HDS14	Advanced Theory of Design: Architecture and Human Settlements, Theory of Urbanism	203AT004
3	20DAS1.6	Parametric soft wares	203AT005
3	20ACM21	Project Management -2	203AT006
3	20ACM22	Project Scope Schedule & Cost Management	203AT007
3	20LA103	Theory of Landscape design	203AT008
3	20LA104	Elements of Landscape Design	203AT009
4	20 UDE16A	Indian Urbanism	204AT001
4	20UDS35	Urban Governance and Project Finance	204AT002
4	20HDC32	Urban Development and Environmental Laws	204AT003
4	20HDS34	Ecology and Sustainable Habitat Systems	204AT004
4	20DAC2.3	Digital architecture process theories and history - II	204AT005
4	20ACM23	Project Resource Management	204AT006
4	20ACM24	Management Information System & Communication Management	204AT007

4	20LA106	Hydrology	204AT008
4	20LA403	Legal Aspects & Environmental legislation	204AT009
5	20UDE16B	Geographic Information Systems-I	205AT001
5	18UDE42B	Urban Economics	205AT002
5	20 UDS25	Ecology and Site Planning	205AT003
5	20HDS35	Project Planning, Analysis & Appraisal/Evaluation	205AT004
5	20HDE37A	Real Estate development and Finance	205AT005
5	20DAS3.3	Parametric Urbanism	205AT006
5	20ACM31	Conflict Management & Dispute Resolution	205AT007
5	20ACM32	Project Risk Management	205AT008
5	20LA105	Geology & Geomorphology	205AT009
5	20LA402	Landscape Conservation	205AT010
6	20 UDC 22	Urban Conservation	206AT001
6	20 UDE42A	Politics of Development	206AT002
6	20 UDS23	Urban Design Policy & Implementation	206AT003
6	20HDC22	Land Use Structure and Urban Morphology	206AT004
6	20HDC33	Housing and Community: Policy, Finance and Public Private Participation	206AT005
6	20DAC3.2	Parametric urban mapping	206AT006
6	20ACM33	Advanced Construction Techniques	206AT007
6	20ACM35	Construction Quality & Safety Management	206AT008
6	20LA107	Soil Science	206AT009
6	20LA303	Remote sensing	206AT010

PhD Coursework Courses under Group-1			
Sr No	**Course Code**	**Course Name**	**Page**
1	20UDC13	Theory of Urban Form	
2	20 UDS34	Infrastructure, Traffic and Transportation Planning	
3	20HDC12	Human Habitat: Studies and Design Thought	
4	20DAC1.3	Digital architecture process theories and history - I	
5	20ACM11	Project Management- 1	
6	20ACM12	Contract Management	
7	20LA203	Planting Design-I	
8	20LA102	Landscape construction techniques	

(Group-1): 20UDC13	**Theory of Urban Form**
Exam Hours: 3 hours	**Exam Marks(Maximum):100**

Module-1

Introduction to urban design (ideology/theory) and the various concerns (scope and objectives) of the discipline; components of urban design and their inter-dependencies.

Module-2

Introduction to city/urban form- morphology (significance of understanding Urban form and Urban Process).Various theoretical views associated with nature of city form (normative, positive, substantive and procedural theories); Cosmic, Machine and Organic Models; Descriptive and functional theories; Alternative theoretical postulations.

Module-3

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Study of urban form (Comparison between the various perspectives of studying and analyzing urban form- space; conservation and the life of urban form)

a. Urban space and form through history (overview)
   - Western context: The Early Cities (Neolithic, classical antiquity), Medieval Towns, Renaissance and Baroque Planning, Form of modern city and early cities of capitalism (industrialization and influences City beautiful movement, City and Garden, Camilo Sitte); Modern Movement (Tony Garnier, Corbusier, F L Wright, Arturo Soria Y Mata, Antonio Sant' Elia), post-World War II (Doxiades and Ekistics), Mega structure; Cites of sweat equity and highway; subsequent directions.

   - Indian Context: The Early Cities, Mughal and Medieval Towns, Temple Cities, Colonial influences, post-independence and modern cities (Chandigarh, Bhubaneswar, Gandhinagar) and further developments.

b. Approaches to reading urban form and space (western, Islamic cities and influences)
   - City as patterns; diagrams; spaces and ideas (organic; grid; political-functional-secularist-socialist diagrams; grand manner; skyline; city edge; urban division; public spaces- various typologies including street and parks); subsequent direction and further developments.

Module-4

1. **Understanding Urban Process**
   - Rise and fall of cities; disaster; destruction and reconstruction; Haussmanization; incremental changes; urban renewal; contemporary issues and phenomenon shaping urban form and space (sprawl, sustainable growth, transportation).

Module-5

2. **Theorizing urban form** (introduction to modern, post-modem perspectives and influences)
    - Utopias; ideas of Gordon Cullen, Jane Jacobs, William Whyte, Mumford, Kevin Lynch (Good City Form; Imageability and Memory), New Urbanism of Krier; Public and Private domains; Suburbs and periphery; Privacy, Territoriality and Proxemic theory; Defensible spaces; ideas of community through design; treatment of urban space; future of the city (contemporary practices and directions).

Question paper pattern:

- The question paper will have ten questions.
- Each full question is for 20 marks.
- There will be 2 full questions (with a maximum of four sub questions in one full question) from each module.
- Each full question with sub questions will cover the contents under a module.
- Students will have to answer 5 full questions, selecting one full question from each module. ■

Textbook/Reference Books

	Title of the book	Author Name	Publisher's Name	Publication year
1	The City Assembled,.	Spiro Kostof	Thames and Hudson	
2	The City Shaped	Spiro Kostof	Thames and Hudson	
3	Urban Design Typology and procedures,	Jon Lang	Architectural Press	
4	History of Urban Form	A.E.J. Morris	Longman Scientific and Technical	
5	Good City Form	Kevin Lynch	MIT Press	
6	Design of Cities	Edmund Bacon		
7	Emerging Concepts of urban Design	Geoffrey Broadbent		

(Group-1): 20UDS34	**Infrastructure, Traffic and Transportation Planning**
Exam Hours: 3 hours	Exam Marks(Maximum):100

Module-1

1. Urban Form - Elements of urban form-Growth of Urbanization- Impacts –Urban Design-

Transportation and Urban form-Functional Classification of Urban Roads.

2. Urban Infrastructures and city – Concepts, Physical and Social Infrastructure, History of infrastructure, Layout of urban area, siting of services and land use and efficiency. Basics of service network. - Water supply, sewerage/drainage and waste management.

Module-2

3 Urban Social infrastructure; Qualitative and Quantitative techniques of assessing requirements, planning amenities.

4 Smart Cities – Concepts- Goals- Proposals for Indian Cities.-Safe access and Street Design in Indian Cities

Module-3

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5 Urban Transportation Characteristics- Factors for need of Transportation – Demand-Modes- Urban Transport Scenario in India- Components of urban Transport System-Introduction to general Traffic Engineering.

6 Introduction: Scope of urban transport planning, interdependency of land use and traffic system, system approach to urban transportation Planning- Stages in Transport Planning, Climate change, Transit oriented development

Module-4

7 Transport Demand Modeling – Introduction- Transportation surveys- Definition of study area, zoning, types of surveys.

8 Four Step Modeling (FSM)- Trip generation- Trip production- Trip distribution-modal split and Trip assignment

Module-5

9 Public Transportation modes: Systems in India, problems and prospects, present practices in urban transportation. Metro, mono, and high capacity buses. System selection.

Question paper pattern:

- The question paper will have ten questions.
- Each full question is for 20 marks.
- There will be 2 full questions (with a maximum of four sub questions in one full question) from each module.
- Each full question with sub questions will cover the contents under a module.
- Students will have to answer 5 full questions, selecting one full question from each module. ■

Textbook/Reference Books

	Title of the book	Author Name	Publisher's Name	Publication year
1	Critical Urban Infrastructure Handbook	Hamada M	Taylor & Francis	2015
2	Transportation Engineering and Planning,	Papacostas and Prevendours	PHI Publication	2013
3	Transportation Engineering and Planning,	Kadiyali L.R	1. K ha	

4	Urban Transportation: Planning, Operation and Managemen	S. Ponnuswamy , Johnson Victor	Tata McGraw Hill- New	2014
5	Safe access manual:safe access to mass transit stations in Indian	shah, sonal,sahana	EMBARQ India	2014
6	Better Streets Better Cities : A Guide to Street Design in Urban	. Institute for Transport and	ITDP and EPC	2011
7	*Urbanism in the Age of Climate Change*	Peter Calthorpe	Island Press. Washington	2011
8	*The New Transit town: Best practices in Transit Oriented*	Hank Dittmar, Gloria Ohland	Island Press. Washington	2004
9	*Splintering Urbanism, Networked Infrastructure, Technological*	Stephen Graham, S M	London. Routledge	2001

(Group-1): 20HDC12	**Human Habitat: Studies and Design Thought**
Exam Hours: 3 hours	Exam Marks(Maximum):100

Module-1

HUMAN HABITAT AND ITS DETERMINANTS

Components of Human Habitat.
Socio economic, Cultural and Historic determinants of urban growth and urban form.
Idea as determinant –City as Patterns, Diagrams and Spaces.
Evolution of cities and towns in India.

Module-2

READING THE CITY

Urban design vocabulary. Urban grid, Grain, texture, scale and socio spatial schema.
Dimensions of reading the urban form.
Concept of Urban space, Place and Public realm.
Social Structure, Cognition, Experience and Urban form.

Module-3

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APPROACHES TO STUDY HUMAN HABITAT

Methods of Urban design surveys – Inventories and Techniques.
Visual survey, site studies and other tools to understand urban environment.
Qualitative and quantitative methods of analysis.

Module-4

CONCEPTS AND THEORIES OF URBAN FORM

Imageability, Perception, townscape and elements of urban design (Gordon Cullen, Kevin Lynch).
Utopian concepts.
Historical examples of Urban Design Projects.
Rise of Advocacy Planning, changing role of NGOs and Urban Social Movement in India.

Module-5

HABITAT DESIGN STUDIES

Habitat Design, Urban Design and their relation with planning and architecture.
Role of Habitat Designer.
Views of Design of Habitat as extension of architecture (mega architecture) and as architectural expression of planning.
Habitat Design at micro level: City Centers, Transportation Corridors, Residential Neighborhoods and Water Fronts.

Question paper pattern:

- The question paper will have ten questions.
- Each full question is for 20 marks.
- There will be 2 full questions (with a maximum of four sub questions in one full question) from each module.
- Each full question with sub questions will cover the contents under a module.
- Students will have to answer 5 full questions, selecting one full question from each module. ■

Textbook/Reference Books

	Title of the book	Author Name	Publisher's Name	Publication year
1	"Imageability of City"	Kevin Lynch	The MIT Press	1960
2	"City Planning according to Artistic principles"	Camillo Sitte	Phaidon Press 6th Edition	1965
3	"Good City Form"	Kevin Lynch	The MIT Press, Reprint Edition	1984
4	Urban street and Squares	Rob Krier	Architectural Press, 3rd Edition	2003
5	Townscapes	Gordon Cullen	Architectural Press, 1st Edition	1961
6	Time-Savers Standards for Urban Design	Donald Watson	McGraw Hill Education	2017

(Group-1): 20DAC1.3 Digital Architecture process theories and history-1

Exam Hours: 3 hours	**Exam Marks(Maximum):100**

The focus of the content will be on Readings and discussions that trace the sociocultural and technological ferment of Post modernism and DE constructivist movement, along with advancement in technical capabilities brought about a radical departure from traditional planning in architecture. The trajectory will trace the background of past 20 years that was crucial for the formation of Digital Culture in architecture.

The subject will also include Process based theoretical investigations through works of practitioners to understand their radical processes and parametric process trajectories which enabled architects to design and construct innovative buildings with more exacting qualitative

and quantitative conditions

Question paper pattern:

- The question paper will have ten questions.
- Each full question is for 20 marks.
- There will be 2 full questions (with a maximum of four sub questions in one full question) from each module.
- Each full question with sub questions will cover the contents under a module.
- Students will have to answer 5 full questions, selecting one full question from each module. ■

Textbook/Reference Books

	Title of the book	Author Name	Publisher's Name	Publication year
1	Digital Culture in Architecture	Antoine Picon		
2	Contemporary Processes in Architecture	Ali Rahim		
3	Architecture in the Digital Age: Design and Manufacturing	Branko Kolarevic		
4	Theories of the Digital in Architecture	Rivka Oxman, Robert Oxman		
5	Asymptote: Flux Hardcover	Lise Anne Couture , Hani Rashid		
6	Asymptote Architecture: Actualizations	Lise Anne Couture , Hani Rashid		
7	UN Studio UN Fold	Ban Van Berkel and Caroline Bos		

(Group-1): 20ACM11	**PROJECT MANAGEMENT - 1**
Exam Hours: 3 hours	**Exam Marks(Maximum):100**

Module-1

Introduction to Project, its Stages and Construction Project management: Project, Organisation, need for management of building/construction projects, Principles and Objectives of Project Management, brief understanding about study areas in Project Management. Types of Construction Projects. Project, program and portfolio management.

Module-2

BASICS OF PROJECT MANAGEMENT: Project Life Cycle, Types of project, Phase of project, project management and its relevance, stakeholders of a project, structure of project organization, management levels, Failures and success of a project

Module-3

Roles of Project Manager: Roles & Responsibilities of Project/ Construction Managers, Scope Management in Construction: Scope Planning, Definition, Verification and Control Project Management Stages: Project planning, project scheduling and project controlling

Module-4

PROJECT PLANNING& SCHEDULING: Introduction, Time Cost and Resource management, project planning, Work Breakdown Structure (W.B.S.), Planning terminologies, Network Theories -CPM, PERT, Project crashing

Module-5

PROJECT MONITORING AND CONTROL: Introduction, Scope verification & control, Schedule control, Cost control, Quality control, Performance reporting, Risk control and contract administration

Question paper pattern:

- The question paper will have ten questions.
- Each full question is for 20 marks.
- There will be 2 full questions (with a maximum of four sub questions in one full question) from each module.
- Each full question with sub questions will cover the contents under a module.
- Students will have to answer 5 full questions, selecting one full question from each module. ■

Textbook/Reference Books

	Title of the book	Author Name	Publisher's Name	Publication year
1	*APM body of knowledge*. Buckinghamshire	Association for Project Management	Association for Project Management	2012
2	*Project Management Body of Knowledge(PMBOK® GUIDE)*.	Guide, A	Project Management Institute	2017
3	*Construction and Project Management*	Dr.K.G. Krishnamurthy and S.V.		2008
4	*Project management for construction Fundamental concepts for owners, engineers, architects, and builders*	Hendrickson, C., Hendrickson, C.T. and Au, T	Chris Hendrickson	1989
5	Project Management for Construction: Fundamental Concepts for Owners, Engineers, Architects and Builders.	Chris Hendrickson	Department of Civil and Environmental Engineering	2003
6	*Project Planning and Control with PERT & CPM*	Punmia, B.C. and Khandelwal, K.K.	Firewall media.	2002
7	*Construction Project Management: Theory and Practice*	Jha, K.N	Pearson Education India	2015
8	*Construction project management*	Chitkara, K.K.,	Tata McGraw-Hill Education	1998

(Group-1): 20ACM12 CONTRACT MANAGEMENT

Exam Hours: 3 hours	**Exam Marks(Maximum):100**

Module-1

CONSTRUCTION CONTRACTS: Indian Contract Act (1872): Definition of the contract as per the ACT. Valid, Voidable, Void contracts, Objectives of the act.Clauses 1 to 75- Contract formation, contract performance, valid excuses for non-performance, Breach of contract, effects of breach- understanding the clauses and applying them to situations/scenarios on construction projects.

Module-2

CONTRACT FORMATION: Standard forms of contracts, methods of inviting tenders, pre-bid meetings, pre-qualification system, scrutiny of tenders and comparative statement.

Module-3

CONTRACT FORMATION: conditions of contracts, contracts with various stakeholders on a major construction projects, contract pricing by the client, project management consultants and the contractor, contract performance, contract correspondence and contract closure

Module-4

CONTRACT CONDITIONS: a) General condition and Particular conditions, b) Conditions of Ministry of Statistics and Program Implementation- Government of India. Model forms of contract.

Module-5

FIDIC: ICE conditions-Introduction, FIDIC conditions- evolution of FIDIC document, types based on whether design is of employer or contractor, Design & Build contract, EPC contract, short forms of contract- Colour Code. Various conditions of Red Book.

Question paper pattern:

- The question paper will have ten questions.
- Each full question is for 20 marks.
- There will be 2 full questions (with a maximum of four sub questions in one full question) from each module.
- Each full question with sub questions will cover the contents under a module.
- Students will have to answer 5 full questions, selecting one full question from each module. ■

Textbook/Reference Books

	Title of the book	Author Name	Publisher's Name	Publication year
1	*Construction Contracting: A Practical Guide to Company Management.*	Clough, R.H., Sears, G.A., Sears, S.K., Segner, R.O. and Rounds, J.L	John Wiley & Sons	2015
2	Building and Engineering contracts Law and Practice	P.C.Makranda		
3	Digest of Indian Contract Act 1872			2011 onwards
4	Law of contract Part I and Part II,	Dr. R.K. Bangia	Allahabad Law Agency	2005
5	Standard General Conditions for Domestic Contracts		Ministry Of Statistics and Program Implementation, Government of India.	2001

6	• FIDIC Document			1999

(Group-1): 20LA203 Planting Design-I	
Exam Hours: 3 hours	**Exam Marks(Maximum):100**

Module-1

Introduction to planting design, Role of plant materials in Landscape Design**,** Functional Use of plants and Ecology. Classification of plant material for various uses in landscape design.

Module-2

To learn to draw the Master plan for the proposed design to help the client envisage the designed area. To learn to draw Planting Plan for the proposed design to enable the contractor to execute the design on site. To learn to do the Bill of Quantities for Site preparation and the softscape used in the proposed design

Module-3

Spatial characteristics of plants in design-ground covers, shrubs, trees, climbers. Visual characteristics of plants in design- form, line, texture, color. Plant material to be studied in detail with respect to the sun, soil, water quality.

Module-4

Design dynamics and design disciplines. Planting and setting out plan for a landscape design.
Design exercises oriented towards the use of plant material for specific design applications Plants for urban and rural roads, parks, open spaces, residential areas etc.

Module-5

Introduction to soft landscape compositions with plant materials and their specifications. Usage of plant materials for indoor and outdoor spaces of a Residence/ Spa inclusive of terrace gardens

Question paper pattern:

- The question paper will have ten questions.
- Each full question is for 20 marks.
- There will be 2 full questions (with a maximum of four sub questions in one full question) from each module.
- Each full question with sub questions will cover the contents under a module.
- Students will have to answer 5 full questions, selecting one full question from each module. ■

Textbook/Reference Books

	Title of the book	Author Name	Publisher's Name	Publication year
1	Landscape design with plants	Clouston, Brian		
2	Planting design	Hackett, Brian		
3	Tropical garden plants in colour: a guide to tropical ornamental plants	Bose & Chowdhary		
4	Some beautiful Indian Climbers & Shrubs	Bor & Raizada		
5	Residential Landscaping 1: planning, design, construction	Walker, Theodore D		

6	Home Gardening	Pratibha Trivedi		
7	Planting the Landscape	Nancy A. Leszczynski		
8	The Planting Design Handbook	Nick Robinson		
9	Stunning Gardens	N.M Ganesh Babu		
10	Plant taxonomy past, present and future	Gupta		

(Group-1): 20LA102 LANDSCAPE CONSTRUCTION TECHNIQUES	
Exam Hours: 3 hours	**Exam Marks(Maximum):100**
Module-1	
Design of Landforms - Contours- representation of landforms and landform design, interpretation of contours, slope analysis, uses and function. Grading – symbols and abbreviations, basic grading exercises, grading and alignment of paths/ roads, angle of repose and retaining walls.	
Module-2	
Earth work formation - Earthworks – principles of Earthwork, earthwork grading, cut and fill calculations- borrow pit method, average spot level method, precautions taken in cut and fill method in relation to soil conditions, amount of precipitation	
Module-3	
Drainage system –Design of Road and street details, street furniture. Drainage – Surface drainage, calculation of surface run-off, design of surface & storm water drainage, design of streets and gutters, site planning for efficient drainage. Water as a Resource –Sustainable storm water management, recharging techniques used in Indian and International context. Use of water in the appropriate context of time, political/religious power, way of thinking, technical advancements & influences from other regions. Qualities of water scope types of display, rain water harvesting and irrigation systems.	
Module-4	
Water Features - Design of water features such as swimming pools, cascades, fountains etc., and their functional requirements, considerations for design and detail. Water body's natural ponds. Maintenance of swimming pools and related areas (Pump, filtration, balancing tank etc.) Design of irrigation system: Landscape area types, objectives and design, water need and sources, maintenance. Application methods of installation, control systems, scheduling, and maintenance.	
Module-5	
Hardscape details related to sports fields - Playfield and buffer area dimensions, drainage patterns related to play fields, construction details related to play fields including fixtures and markings. Hardscape details related to planting like separators, root barriers, staking, materials to prevent soil consolidation, erosion control methods prevention of root damage during filling around trees etc.	

Question paper pattern:

- The question paper will have ten questions.
- Each full question is for 20 marks.
- There will be 2 full questions (with a maximum of four sub questions in one full question) from each module.
- Each full question with sub questions will cover the contents under a module.
- Students will have to answer 5 full questions, selecting one full question from each module. ■

Textbook/Reference Books

	Title of the book	Author Name	Publisher's Name	Publication year
1	Landscape Construction and Detailing	Blanc, Alan		1993
2	An Introduction to Landscape Design and Construction	James Blake.		
3	Site Design and Construction Details	Theodore D Walker		
4	Rainwater Harvesting	G.N Virupaksha		
5	Construction Detailing for Landscape and Garden Design: Surfaces, steps and margins	Paul Hensey		
6	Landscape Development Handbook	Dewberry and Davis		

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Ph.D Coursework Courses – 2020 in ARCITECTURE

PhD Coursework Courses under Group-2			
Sr No	**Course Code**	**Course Name**	**Page**
1	20 UDC 14	City Planning Process in India	2
2	20 UDE36A	Urban Housing	3
3	20HDE37B	Future of Habitat: Critical Issues	4
4	20HDC13	Planning Theory and Techniques	5
5	20DAS1.7	Digital fabrication-I	7
6	20ACM13	Site Organization & Construction Environmental Management	8
7	20ACM14	Project Appraisal & Project Finance	9
8	20LA204	Landscape resources & management	10
9	20LA304	Impact Assessment of Environmental	12

(Group-2): 20UDS 14 City Planning Process in India	
Exam Hours: 3 hours	Exam Marks(Maximum):100

Module-1

- **Introduction to city planning** - A historical overview of city planning in the Indian context and the goals of planning.

Scope and purpose of various plan types - Perspective plans, regional plans / structure plans, and master plans / comprehensive development plans, local are plans, special purpose plans, annual plans, projects / schemes

Module-2

- **Planning legislations in India** - A review of national, state and local level policies, programmes, acts and regulations used to monitor, aid, manage and design the growth and transformations in cities.
- **Plan making process** – Case studies and articles on a) Planning in the regional

Module-3

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- **Land use zonal regulations** I – Land use zones; sub classification, permissible and prohibited activities, types of zoning, drawbacks of zoning;
- **Land use zonal regulations** II – Issues and limitations; FAR, TDR and floating FSI, incentive zoning and other regulatory mechanisms

Module-4

- **Emerging planning strategies and concepts** - A review of a) the land pooling, urban renewal, conservation and redevelopment processes; and b) Concepts of smart growth, transit oriented design, growth management strategies, transit metropolis, new urbanism, advocacy planning, smart city etc.
    - **Violations and informal development** - Appeals, appellant authority, and issues related to unauthorized and informal developments

Module-5

- **Implementation and monitoring modalities** - Public private and people partnerships; resource mobilization; plan monitoring and review; public participation; and zonal / ward level plans.
- **Critical review**– Discussion of alternatives to the master planning process in India.

Question paper pattern:

- The question paper will have ten questions.
- Each full question is for 20 marks.
- There will be 2 full questions (with a maximum of four sub questions in one full question) from each module.
- Each full question with sub questions will cover the contents under a module.

- Students will have to answer 5 full questions, selecting one full question from each module. ■

Textbook/Reference Books

	Title of the book	Author Name	Publisher's Name	Publication year
1	1. URDPFI Guidelines (http://moud.gov.in/URDPFI).		MOUD - GOI	
2	UDPFI Guidelines		Institute of Town	
3	The Karnataka Town and Country		GOK	
4	The Constitution (74th Amendment) Act, 1992.			
5	. *Urban Planning Practice in Developing Countries*	Taylor, John L and Williams,	Pergamon Press	1982. ISBN: 978-

(Group-2): 20UDE36A Urban Housing	
Exam Hours: 3 hours	**Exam Marks(Maximum):100**

Module-1

Evolution of housing policies in India, introduction to housing need; demand and supply process; estimation of housing need and demand

Module-2

review of housing policies in various planning periods in India; Basic concepts in understanding housing markets; market price and valuation; policies which affect the housing market

Module-3

Review of existing housing finance and institution of housing finance. Concepts of housing layouts; issues of density, open spaces, community spaces and accessible open areas

Module-4

House types and their implication on layout. Technology and delivery of housing; private and public role in housing market

Module-5

Low income and marginal income housing schemes and institutions involved in the production. Design guidelines for marginal housing schemes for varied socio economic groups

Question paper pattern:

- The question paper will have ten questions.
- Each full question is for 20 marks.
- There will be 2 full questions (with a maximum of four sub questions in one full question) from each module.
- Each full question with sub questions will cover the contents under a module.
- Students will have to answer 5 full questions, selecting one full question from each module. ■

Textbook/Reference Books

	Title of the book	Author Name	Publisher's Name	Publication year
1	Housing Finance in developing countries	Kavita Datta and G.A.Jones	Routledge, London.	
2	Housing and Urbanization	Cedric Pugh	Sage Publications, New Delhi.	

(Group-2): 20HDE37B	**Future of Habitat: Critical Issues**
Exam Hours: 3 hours	**Exam Marks(Maximum):100**

Module-1

EVOLUTION OF URBAN SETTLEMENTS

Economic systems, political power structure and city formations.
Industrial Revolution and Urbanization.

Module-2

CONTEMPORARY CITIES

New Urbanism, Infrastructuralism, Everyday urbanism, Adhoc urbanism as futures.
Cities within Cities.

Module-3

NEW TECHNOLOGIES AND CITY FORM

Wired Cities, globalized cities and controlled districts, pricing, exclusion, information highway and the breakdown of National boundaries. Neo-nomadism.

Module-4

URBAN FUTURE

Search for identities by globalized communities -Neo classicism, vernacular architecture and regionalism.
The future of people, Parallels in human development and urban development.

Module-5

URBAN IDENTITY

Loss of place, breakdown of identities and formation of new class structure.
Biotechnology and the loss of rural identities.
The fusion of town and country.

Question paper pattern:

- The question paper will have ten questions.
- Each full question is for 20 marks.
- There will be 2 full questions (with a maximum of four sub questions in one full question) from each module.
- Each full question with sub questions will cover the contents under a module.
- Students will have to answer 5 full questions, selecting one full question from each module. ■

Textbook/Reference Books

	Title of the book	Author Name	Publisher's Name	Publication year
1	A Pattern Language	Christopher Alexander, Sara	Oxford University	1977
2	Emerging concepts in Urban Space Design	Geoffrey Broadbent	Taylor & Francis, 1stEdition	1995
3	Master Planning - The Adaptive City - Computational Urbanism in the Twenty-First Century	Tom Verebes	Routledge, 1st Edition	2013
4	Insights of 3D Digital Cities: The Past, Present and Futures." In *CAAD Talks*, 13-36. Vol. 4. CAAD Talks 4. Taipei, Taiwan	Chiu, Mao-Lin, and ChengzhiPeng	Archidata Co., Ltd	2005
5	The Heart of our Cities - The Urban Crisis: Diagnosis and Cure	Victor Gruen	Simon and Schuster; 1st Edition	1964

(Group-2): 20HDC13 Planning Theory and Techniques

Exam Hours: 3 hours	**Exam Marks(Maximum):100**

Module-1

INTRODUCTION TO PLANNING

Planning terms and definitions. Basic principles of settlement planning. Components of settlement structure. Theories of Urban structure and Urban Sub-systems.

Module-2

PHYSICAL PLANNING

Aims and Objectives of Physical Planning, Levels of Planning in India, Models of the Planning Process.

Concepts of Urban Land use, Systems affecting land uses and rationale for land use planning. Locational attributes of urban land uses.

Module-3

DEVELOPMENT PLANS AND LEGAL FRAMEWORK

Urban Development Plans: Types, scope, purpose and content.

Approaches to preparation of Interim and Comprehensive Plans: Structure Plan, Master Plan, Zonal Development Plan and Strategic Planning.

Legal frame work, Regulations, Byelaws, Standards and Norms and their basis.

Module-4

TECHNIQUES FOR DATA COLLECTION AND ANALYSIS

Techniques of understanding aspects of cities and towns: spatial structure, traffic and transportation, roads and networks, demography, socio-economic, environmental, institutional and finance.

Methods of collecting various data through primary and secondary sources. Sources of various data in India.

Familiarization of techniques- Field Surveys, Questionnaire Design,Sampling and digital mode of data collection.

Data Analysis and presentation techniques.

Module-5

INTRODUCTION TO TOWN PLANNING ACT

Town Planning Acts in different states of India; Study of different state Acts and its implications; Town Planning Schemes.

Implementation techniques – Financial planning, schemes and programs, organizational structure.

Provisions of the plan implementation through the Act.

Question paper pattern:

- The question paper will have ten questions.
- Each full question is for 20 marks.
- There will be 2 full questions (with a maximum of four sub questions in one full question) from each module.
- Each full question with sub questions will cover the contents under a module.
- Students will have to answer 5 full questions, selecting one full question from each module. ■

Textbook/Reference Books

	Title of the book	Author Name	Publisher's Name	Publication year

1	Urban Pattern	Arthur Gallion	John wiley& Sons ; 5th Edition	2003
2	Cities -Urbanization and Urban System	Siddhartha N.Mukherjee	KitabMahal, 12th Edition	2017
3	Urban and Regional Planning	Peter Hall	Routledge, 5th edition	2010
4	Encyclopedia of Economic Planning and Development (Vol	K.P.Yadav	Ivy Publishing	
5	Text Book of Town Planning	AbirBandyopadhyay	Books and Allied Ltd	2000

(Group-2): 20DAS1.7 DIGITAL FABRICATION - I	
Exam Hours: 3 hours	**Exam Marks(Maximum):100**

Different manufacturing processes like Additive, Subtractive & Consolidatory processes will be introduced to the students as under

- CNC cutting
- CNC milling
- Laser Cutting
- 3D Printing (SLS & FDM) • 3D Scanning
- 3 Axis CNC cutting & milling on non-planar surfaces

Data conversion for design production will be emphasised upon details for file Conversions, Meshing, etc. that is required for realising the proto-types from digital files of the models will be emphasized upon. Students will be exposed to emerging theories pertaining to smart materials and alloys

Question paper pattern:

- The question paper will have ten questions.
- Each full question is for 20 marks.
- There will be 2 full questions (with a maximum of four sub questions in one full question) from each module.
- Each full question with sub questions will cover the contents under a module.
- Students will have to answer 5 full questions, selecting one full question from each module. ■

Textbook/Reference Books

	Title of the book	Author Name	Publisher's Name	Publication year
1	Digital Fabrications: Architectural and Material Techniques	Lisa Iwamoto		
2	Digital Fabrication in Architecture, Engineering and Construction	Luca Caneparo		
3	Material Strategies in Digital Fabrication	Christopher Breorkram		
4	Soft Shells: Porous and Deployable Architectural Screens	Sophia Vyozviti		
5	Folding Architecture	Sophia Vyozviti		
6	Gaudi: Unseen	Mark Burry Jordi BonetiArmengol, Jos Tomlow, Antoni Gaudi		

(Group-2): 20ACM13	**SITE ORGANISATION & CONSTRUCTION ENVIRONMENTAL MANAGEMENT**
Exam Hours: 3 hours	**Exam Marks(Maximum):100**

Module-1

Demolition. The site (Layout and Organisation). Site inputs planning. Site works planning, Temporary construction lighting. Electricity on building site. Winter and Monsoon Construction.

Module-2

Site cost control techniques. Site quality control operations, Quality control of concreting and steel. Improving site productivity. Site accounts.

Module-3

An integrative methodology & Effective prevention at pre-construction stage: Local regulation of CEM. Qualitative analysis of construction pollution. Construction pollution measurements. Project scheduling together with EM using CPI. A pseudo-resource approach for CPI levelling. CPI levelling using GA. Introduction to DEMAP and DEMAN. CEM reports. Site waste material management plan

Module-4

Effective control at construction stage: General construction waste. CEM construction technologies. CEM materials. Management methods. Incentive reward programs. Barcoding technologies in CEM. Addressing air quality in the CEMP. Addressing noise in the CEM. Site contamination. Addressing water quality in the CEM. Implementation of environmental report during construction.

Module-5

Effective reduction at post-construction: Contaminated land remediation. Salvaging, Recycling. Disposing of non-hazardous demolition and construction waste. Wastage audit at site. Online waste exchange approach plan.

Question paper pattern:

- The question paper will have ten questions.
- Each full question is for 20 marks.
- There will be 2 full questions (with a maximum of four sub questions in one full question) from each module.
- Each full question with sub questions will cover the contents under a module.
- Students will have to answer 5 full questions, selecting one full question from each module. ■

Textbook/Reference Books

	Title of the book	Author Name	Publisher's Name	Publication year
1	*Industrial safety, health and environment management systems*	Jain, R.K. and Rao	RomeshChander Khanna	2008
2	*Introduction to health and safety in construction: For the NEBOSH national certificate in construction health and safety*	Ferrett, E. and Hughes, P	Routledge	2015
3	*Industrial Safety, Health Environment and Security*	Basudev Panda	Laxmi Publications	2013
4	Environmental Management in Construction: A Quantitative Approach	Li, H. and Chen, Z		2007

5	*Environmental management in construction*. Macmillan International Higher Education	Griffith, A		1994
6	*Environmental management in construction*	Uren, S. and Griffiths, E		2000
7	*Construction Site Planning and Logistical Operations: Site-Focused Management for Builders.*	Rapp, R.R. and Benhart, B.L. eds	Purdue University Press	2015
8	*Construction and Project Management*.	Dr.K.G. Krishnamurthy and S.V. Ravindra		2008
9	*Professional construction management*	Barrie, D.S. and Paulson, B.C	New York: McGraw-Hill	1984
10	*Total construction project management*	Ritz, G.J		1994
11	Construction site safety roles	Toole, T.M	*Journal of Construction Engineering and Management*, *128*(3), pp.203-210.	2002
12	*Advanced construction Technology*	Roy Chudley, Roger Greeno, mike Hurst, Simon Topliss		

(Group-2): 20ACM14	**PROJECT APPRAISAL & PROJECT FINANCE**
Exam Hours: 3 hours	**Exam Marks(Maximum):100**
Module-1	
Introduction to project appraisal. SWOT analysis. Process: Initial assessments, define problems and long-list, Consult and short-list, evaluate alternates, Compare and select appraisal. Types of appraisal - Technical, Project, Legal, Environmental, Commercial & marketing, organizational or management (cost benefit analysis), Economical – (Cost effective analysis, scoring & weighing	
Module-2	

Project budgeting.

Project cost analysis.

Project cash flow.

Joint ventures and BOOT projects

Module-3

Definition of project finance. Reasons for project finance. Types and sponsors of project finance. Overview of the features of project finance. The Role of Advisors in a Project Finance Deal - The Role of Legal Advisors in Project Finance Deals, The role of the independent engineer in project finance deals.

Module-4

The market for project finance - applications and sectors.

Project Characteristics, Risk Analysis, and Risk Management. Identifying project risks, Risk allocation with contracts stipulated by the SPV.

Module-5

Valuing the project and project cash flow analysis. Financing the deal. Credit Risk in Project Finance Transactions and the. New Basel Capital Accord. Project Accounting.

Question paper pattern:

- The question paper will have ten questions.
- Each full question is for 20 marks.
- There will be 2 full questions (with a maximum of four sub questions in one full question) from each module.
- Each full question with sub questions will cover the contents under a module.
- Students will have to answer 5 full questions, selecting one full question from each module. ■

Textbook/Reference Books

	Title of the book	Author Name	Publisher's Name	Publication year
1	*Project and Infrastructure Finance*	Vikas Srivastava, V. Rajaraman		
2	*Construction Management and Finance*	Dinku, A		2003
3	*Construction Accounting and Financial Management*.	Coombs, W.E		2019
4	*Financial Management Essentials You Always Wanted To Know: (Self-Learning Management Series): 3*- 2nd edition		Vibrant Publishers	2017
5	*Financial management*	Chandra, P	Tata McGraw-Hill Education.	2011
6	*Project finance in theory and practice: designing, structuring, and financing private and public projects*.	Gatti, S	Academic Press.	2012

(Group-2): 20LA204 **LANDSCAPE RESOURCES & MANAGEMENT-I**	
Exam Hours: 3 hours	**Exam Marks(Maximum):100**

Module-1

Introduction to Environment. Regional levels to Microclimate levels. Microclimate: Definition and characteristics. Evolution of cities

The role of landscape components in modifying microclimate with respect to temperature, humidity, precipitation, air corridors, heat islands, wind speed etc., in cities. Threats to the environment. Research on Impacts and Mitigation methods adopted

Module-2

Introduction to Landscape Resources-Types and values in Urban context. Need for Conservation landscape resources. Public Participation as a method of Landscape conservation

Module-3

Introduction to Landscape Management. Urban Forests- Need and Values of Urban Forests Role of Urban Forests, Threats and management techniques. Tree establishment and issues in maintenance related to urban vegetation, its role in urban landscapes

Module-4

Introduction to Urban Water bodies and Urban Land, Need and values, Threats, mitigation and management techniques of Urban land and water bodies

Module-5

Definition of sustainable Landscape, Types of sustainable Landscape and its techniques. Application in Urban and Regional context. Vertical Garden and Terrace Garden procedures and applications.

Question paper pattern:

- The question paper will have ten questions.
- Each full question is for 20 marks.
- There will be 2 full questions (with a maximum of four sub questions in one full question) from each module.
- Each full question with sub questions will cover the contents under a module.
- Students will have to answer 5 full questions, selecting one full question from each module. ■

Textbook/Reference Books

	Title of the book	Author Name	Publisher's Name	Publication year
1	Project Management for the Design Professional	Burstein		
2	Environmental Management	T.V Ramchandra		
3	Landscape Ecology & Resource Management	John A. Bissonette, IlseStorch		

4	Responsive Environments	Sue McGlynn, Graham Smith, Alan Alcock and Paul Murrain		
5	The Landscape Urbanism Reader	Charles Waldheim		
6	Cultural Landscapes of South Asia: Studies in Heritage Conservation and Management	Routledge Research		
7	Sustainable Urbanism: Urban Design with Nature	Douglas Farr		
8	Projective Ecologies	Chris Reed		

(Group-2): 20LA304 IMPACT ASSESSMENT OF ENVIRONMENTAL	
Exam Hours: 3 hours	**Exam Marks(Maximum):100**

Module-1

Introduction to environmental management; concepts of ecosystem; ethics and environment; environmental management tools. Environmental movements in the world. Environmental pollution and environmental concerns in India. Impact of human settlements, industries, dams, national parks, etc. on environment. Evolution of EIA across the world and India.

Module-2

Environmental Impact Assessment - Definitions, purpose, steps, hierarchy, impact indicators and forecasting environmental changes. Strategic environmental assessment (SEA): Rationale and scope, process, benefits and constraints. Environmental clearance procedure in India

Module-3

EIA documentation and processes: Stages; impact prediction, evaluation, and mitigation; impact on decisions; public participation; requisites and review of EIS

Module-4

Environmental management plan – strategies, approaches of environmental protection. Environmental monitoring. Environmental auditing: Objectives and scope, types, methodology.

Module-5

EIA notifications by MoEF CC. Environmental and town planning legislations dictating the EIA procedures: (Air act; Water act, EPA act). Role of a landscape architect in EIA.

Question paper pattern:

- The question paper will have ten questions.
- Each full question is for 20 marks.
- There will be 2 full questions (with a maximum of four sub questions in one full question) from each module.
- Each full question with sub questions will cover the contents under a module.
- Students will have to answer 5 full questions, selecting one full question from each module. ■

Textbook/Reference Books

	Title of the book	Author Name	Publisher's Name	Publication year
1	Our National Park Policy	John Ise		
2	Parks and Recreational Needs in Urban area	Elinor C. Guggenheimer		
3	Landscape Planning & Environmental Impact Design	Tom Turner		
4	Environment Assessment Methodologies	Y. Anjaneyulu and Valli Manickam		
5	Environmental Impact Analysis	R. K Jain et.al Van Nostrand		
6	Environmental Impact Analysis	Larry. W. Canter		

7	Guidelines for EIA of Developmental Projects		Ministry of Environment and Forests, GOI.	

PhD Coursework Courses under Group-3			
Sr No	**Course Code**	**Course Name**	**Page**
1	20UDC15	Social Theory and Urban Design	2
2	20UDC33	Contemporary Theories of Urbanism and Architecture	3
3	20HDS25	Infrastructure Planning & Management	4
4	20HDS14	Advanced Theory of Design: Architecture and Human Settlements, Theory of Urbanism	6
5	20DAS1.6	Parametric soft wares	7
6	20ACM21	Project Management -2	8
7	20ACM22	Project Scope Schedule & Cost Management	10
8	20LA103	Theory of Landscape design	11
9	20LA104	Elements of Landscape Design	12

(Group-3): 20UDS15	**Social Theory and Urban Design**
Exam Hours: 3 hours	Exam Marks(Maximum):100

Module-1

Classical Theoretical Perspectives-

Karl Marx; (Capitalism and class); Friedrich Engels (Living conditions of the urban working class in post-industrialized towns); Ferdinand Tonnies (Community and Association), Emile Durkheim (Social solidarity); Georg Simmel (Urban experience, Social distance, Philosophy of money);Max Weber (Social structure of city and urban community).

Module-2

Contemporary Theoretical Perspectives-1

Robert Park (Human ecology, Symbiotic versus Societal organization, Dynamics and processes of human community: population, material culture (technological development), nonmaterial culture(customs and beliefs), Natural resources of the habitat, Societal pyramid

Module-3

Contemporary Theoretical Perspectives-2

Differences between ecology and human ecology); Louis Wirth (urban theory on urbanism as a function of population density, size and heterogeneity); Ernest Burgess (Concentric Zone Theory); Homer Hoyt (Sector Theory); Harris and Ullman: Multiple Nuclei Theory).

Module-4

Political Economy:

Political and economic forces in a society with reference to works of Henri Lefebvre; Michael Storper and David Walker; Manuel Castells; David Harvey;Logan and Molotch(City as Growth Machine);Saskia Sassen (Global City); John Friedmann (World City Hypothesis); Michael Dear (Los Angeles School/ Chicago School).

Module-5

Social Life inthe Public Realm (Discourses in the West):

Michel de Certeau (Everyday life in the city); Fredrick Law Olmsted (The civilizing effect of park space in cities); Richard Sennet (Fall of the Public Man); Wilson &Kelling (Broken Windows Theory); Carr et al. (The Nature of Public Life); Mike Davis (The Fortress LA: The Militarization of Public Space); William Whyte (Social life in small urban public spaces), Jane Jacobs (eyes on the street; sidewalk ballet).

Question paper pattern:

- The question paper will have ten questions.
- Each full question is for 20 marks.
- There will be 2 full questions (with a maximum of four sub questions in one full question) from each module.
- Each full question with sub questions will cover the contents under a module.
- Students will have to answer 5 full questions, selecting one full question from each module. ■

Textbook/Reference Books				
	Title of the book	Author Name	Publisher's Name	Publication year
1	*The City Cultures Reader*	Borden, Iain, Tim Hall and	Routledge	2003
2	*City, Class and Power (Sociology, politics & cities*	Castells, Manuel	Palgrave Macmillan	1978
3	*City of Quatrz: Excavating the Future in Los Angeles*	Davis, Mike	Verso	1990
4	*Spaces of Capital: Towards a Critical Geography*	Harvey, David	Blackwell/Wiley	2001
5	*Spaces of Hope*	Harvey, David	University of California Press	2000
6	The Death and Life of Great American Cities	Jacobs, Jane	Vintage	1961
7	*The Urban Sociology Reader*	Lin, Jan and Christopher	Routledge	2012

(Group-3): 20UDC33 Contemporary Theories of Urbanism and Architecture	
Exam Hours: 3 hours	**Exam Marks(Maximum):100**
Module-1	
Post Modernism and post functionalism. Post script to the modern movement. Semiotics and structuralism. Post structuralism and Deconstruction. (Eg. Works of Robert Venturi, Robert Stern, Charles Moore, Peter Eisenman, Bernard Tschumi, Zaha Hadid, Daniel Libeskind and similar architects with examples.)	
Module-2	
Urban theory after Modernism, Contextualism, Main street and beyond. Collage city and towards the contemporary city.	
Module-3	
. School of Venice, territory and architecture, an analogical architecture. Political and ethical agenda, the ethical function of architecture. (Vittorio Gregotti, Aldo Rossi)	
Module-4	

Heidegger's thinking on architecture, a look at the phenomenology of architecture, Phenomenology and meaning of place. (Christian Norberg-Schulz, Juhani Pallasmaa, Spirit of Place and Indian temple towns and

Module-5

Critical regionalism, local culture and universal civilization. Tectonic expression. Brief review of the issues of Gender in architecture.

City design examples such as Lutyens Delhi, Chandigarh, Bhubaneswar, Shantiniketan and Relevance of Postmodern theory in India

Question paper pattern:

- The question paper will have ten questions.
- Each full question is for 20 marks.
- There will be 2 full questions (with a maximum of four sub questions in one full question) from each module.
- Each full question with sub questions will cover the contents under a module.
- Students will have to answer 5 full questions, selecting one full question from each module. ■

Textbook/Reference Books

	Title of the book	Author Name	Publisher's Name	Publication year
1	Theorizing a new agenda for architecture,	Kate Nesbit	Architectural Press	1996
2	Architecture Theory since 1968	Michael Hayes	MIT Press, London	
3	Good City Form	Kevin Lynch	MIT Press, London	
4	Architectural Theory From Renaissance to the Present	Bernd Evers	Taschen, Cologne	2002.
5	Emerging Concepts in Urban Space Design	Geoffrey Broadbent	Taylor & Francis	1995
6	Concise History of Modern Architecture in India	Jon Lang	Permanent Black	2010
7	Urban Informality	Dr. Solomon Benjamin		
8	Gender and Space	Shilpa Ranade		

(Group-3): 20HDS25 Infrastructure Planning & Management	
Exam Hours: 3 hours	**Exam Marks(Maximum):100**
Module-1	

CONCEPTS IN URBAN INFRASTRUCTURE

Types and characteristics of infrastructure.
Infrastructure provision and guiding principles.
Overview of infrastructure in India; indicators and benchmarks.
Policy Framework- National, State and Local level policies for social and physical infrastructure.

Module-2

PHYSICAL AND SOCIAL INFRASTRUCTURE

URBAN PHYSICAL INFRASTRUCTURE- Qualitative and Quantitative techniques of assessing requirements with emphasis on Water Supply, Sewerage, Solid Waste and Storm Water.

URBAN SOCIAL INFRASTRUCTURE- Qualitative and Quantitative techniques of assessing requirements, Planning Amenities and Institutions.

Module-3

ECONOMIC INFRASTRUCTURE AND ITS ROLE IN INFRASTRUCTURE DEVELOPMENT

Economic infrastructure-Qualitative and Quantitative techniques of assessing requirements, Institutions in Economic Infrastructure.
Role of lead and corporate banks, Self Help Groups, NGOs.
Institutions and instruments of resource mobilization- Public and private sector role in resource mobilization and Urban infrastructure development related issues.
Financing systems, sources of finance, leasing and contracting methods, pricing and financing, Major National and International agencies involved.
Quality control mechanism.

Module-4

URBAN MANAGEMENT BODIES

Introduction to urban management. Evolution and structure of urban management bodies.
Role of Parastatals in Urban Management. Concepts of decentralization of development and management.

Module-5

GOALS AND SUSTAINABLE URBAN INFRASTRUCTURE DEVELOPMENT

Managing Infrastructure development, corporatization and related goals, decentralized and people led infrastructure provisions, social goals and equity. Environmental and economic issues and assessments related to physical infrastructure. Sustainable Development Goals as per United Nations- Study of Infrastructure projects in the present scenario.

Question paper pattern:

- The question paper will have ten questions.
- Each full question is for 20 marks.
- There will be 2 full questions (with a maximum of four sub questions in one full question) from each module.
- Each full question with sub questions will cover the contents under a module.
- Students will have to answer 5 full questions, selecting one full question from each module. ■

Textbook/Reference Books

	Title of the book	Author Name	Publisher's Name	Publication year
1	Urban Transport, Environment and Equity	Eduardo Vasconcellos	Routledge; 1st Edition	2001
2	Principles of Urban Transport Systems Planning	B.G.Hutchinson	McGraw-Hill	1974
3	Principles of Infrastructure: Case Studies and Best Practices	Hideo Nakamura, Kotaro Nagasawa, Kazuaki Hiraishi, Atsushi Hasegawa, KE Seetha Ram, ChulJu Kim, and Kai Xu	Asian Development Bank Institute and Mitsubishi Research Institute, 1st Edition,Inc	2019
4	Infrastructure and Development in India: Inter linkages and Policy Issues	Rajarshi Majumder	Rawat Publications, 1st Edition	2008
5	Infrastructure Planning Handbook: Planning, Engineering, and Economies	Alvin S. Goodman and Makarand Hastak	McGraw-Hill, 1st Edition	2006

(Group-3): 20HDS14 Advanced Theory of Design: Architecture and Human Settlements, Theory of Urbanism

Exam Hours: 3 hours	Exam Marks(Maximum):100

Module-1

COGNITION AND HABITAT

Environmental perception, cognition, cognitive and mental maps. Image of towns and cities. Metaphors and iconic structures and their impacts.

Module-2

BEHAVIOURIAL ASPECTS AND URBAN FORM

Urban scale, urban spaces, urban massing. Quality of urban enclosure. Principles of urban spatial organization. Behavioural issues in urban spaces

Module-3

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DESIGN THEORIES AND URBAN MOVEMENTS

Introduction to Urban Design movements and theories: Modernism, Post Modernism, structuralism and post structuralism, ideas of self-similarity and fractals, neo classism, revivalism etc. and its impact on habitat design theory. Theory of urban form.

Module-4

THEORY OF URBANISM

Modernization & Urban Development: International Perspectives. New Urbanism – Introduction, tools and strategies. Post-Modern Urbanism: Contextualise. Everyday Urbanism. Post-Industrial Landscapes: Rust belts, Free Trade Zones, Sprawl.

Module-5

LAYERING IN A HABITAT

Organic habitats and designed habitats. Historic core and contemporary urbanism. Study of Ideas of historic layering of space and networks, Lattices v/s trees as urban structural metaphors.

Question paper pattern:

- The question paper will have ten questions.
- Each full question is for 20 marks.
- There will be 2 full questions (with a maximum of four sub questions in one full question) from each module.
- Each full question with sub questions will cover the contents under a module.
- Students will have to answer 5 full questions, selecting one full question from each module. ■

Textbook/Reference Books

	Title of the book	Author Name	Publisher's Name	Publication year
1	Creating Architectural Theory-2nd edition	Jon Lang	John Wiley & Sons	1987
2	Urban Design-2nd edition	Jon Lang	Architectural Press	2017
3	Theorizing a New Agenda for Architecture-2nd edition	Kate Nesbit		1996
4	Signs, Symbols and Architecture	Geoffrey Broadbent, Richard Bunt and	John Wiley & Sons,	1980
5	Sustainable Urbanism: Urban design with nature	Douglas Farr	John Wiley & Sons, Inc	2008

(Group-3): 20DAS1.6 Parametric Softwares	
Exam Hours: 3 hours	**Exam Marks(Maximum):100**

The new modelling technique called as Associative modelling will be taught as one of the approach for design development. Demonstrating the significantly associative role of the software as against its assumed role as a representative tool. The subject will become the base to develop digital concepts through parametric skill sets. Students will be introduced to different exercises to familiarize thoroughly with the parametric software fundamentals which help them in precision modelling and to create and edit free-form 3d models.

This studio aims to cover all the essentials needed

• Basic Interface – of 3D modelling and its parametric interface • Capacity determination of the designing agency
• Geometry types - Points, Vectors, Lines,
• Curves, Surfaces and Meshes.
• Organizing data
• Decoding geometrical logic
•Extracting information for fabrication
• Common pitfalls and how to avoid them • An introduction to physical simulation
• Tips, tricks and shortcuts

Question paper pattern:

- The question paper will have ten questions.
- Each full question is for 20 marks.
- There will be 2 full questions (with a maximum of four sub questions in one full question) from each module.
- Each full question with sub questions will cover the contents under a module.
- Students will have to answer 5 full questions, selecting one full question from each module. ■

Textbook/Reference Books

	Title of the book	Author Name	Publisher's Name	Publication year
1	Parametric; Design for Architecture	Robert Woodbury		
2	Algorithmic aided design	Arturo Tedeschi		
3	The Grasshopper Primer_Second Edition	Andy Payne		
4	Generative Algorithms series with	Zubin khabazi		
5	Essential modelling and mathematics	RajaaIssa		
6	Digital By Design : Crafting Technology For Products And	Freyer C		
7	New Mathematics Of Architecture	Burry J		
8	From Control To Design : Parametric Algorithmic Architecture	Sakamoto T		
9	Form Follows Performance	Schulitz H C		

(Group-3): 20ACM21 PROJECT MANAGEMENT - 2	
Exam Hours: 3 hours	**Exam Marks(Maximum):100**

Module-1

Introduction to project management topics: Project Charter, Project Management Plan, Project Management, Programme Management & Portfolio Management, Stakeholder Management, Scope Management, Schedule Management, Change Management.

Module-2

Introduction to project management topics: Communication Management, Procurement Management, Cost Management, Quality Management, Safety Management, Strategy Management.

Module-3

Introduction to project management topics: Resource Management, Conflict Management & Dispute resolution, Contract Management, Design Management, Benefits Management, Project Closure.

Module-4

STAKEHOLDER MANAGEMENT: Definition of stakeholder, Stakeholder category. Stakeholder groups-Team member, Executive and other stakeholder. Stakeholder registry. Stakeholder management. Stakeholder communication, managing stakeholders in virtual world, Managing difficult stakeholder.

Module-5

Construction Management: Introduction, Understand the role and the importance of the construction manager to the project, construction managers tasks, difference between a construction manager and a general or prime contractor for a construction project, Define due diligence and how it applies to construction projects, Understand the construction managers role in contract signing, Carry out the construction managers duties.

Question paper pattern:

- The question paper will have ten questions.
- Each full question is for 20 marks.
- There will be 2 full questions (with a maximum of four sub questions in one full question) from each module.
- Each full question with sub questions will cover the contents under a module.
- Students will have to answer 5 full questions, selecting one full question from each module. ■

Textbook/Reference Books

	Title of the book	Author Name	Publisher's Name	Publication year
1	. *APM body of knowledge*.	Association for Project Management	Buckinghamshire: Association for Project Management.	2012
2	*Project Management Body of Knowledge (PMBOK® GUIDE)*.	Guide, A	Project Management Institute	2017.
3	. *Construction and Project Management*.	Dr.K.G. Krishnamurthy and S.V. Ravindra		2008
4	*Project management for construction: Fundamental concepts for owners, engineers, architects, and builders*	Hendrickson, C., Hendrickson, C.T. and Au, T.	Chris Hendrickson	1989
5	Project Management for Construction: Fundamental Concepts for Owners, Engineers, Architects and Builders	Chris, H	Department of Civil and Environmental Engineering	2003
6	*Project Planning and Control with PERT & CPM*.	Punmia, B.C. and Khandelwal, K.K.	Firewall media	2002

7	*Construction Project Management: Theory and Practice*.	Jha, K.N	Pearson Education India	2015
8	*Construction project management*	Chitkara, K.K	Tata McGraw-Hill Education.	1998

(Group-3): 20ACM22 PROJECT SCOPE, SCHEDULE & COST MANAGEMENT

Exam Hours: 3 hours	**Exam Marks(Maximum):100**

Module-1

Project scope management: Define scope. Project scope management overview. Definition of scope of project. Product & Project scope. Collecting requirements. Prototype of requirements. The requirements management plan (RMP) Requirement tractability matrix documents (RTM). High level scope elicitation. Detailed requirement elicitation. WBS, OBS, Decomposition, Work package, Task. Scope baseline.

Module-2

Project schedule management: Define schedule management. Schedule management processes. Sequence activities. Activity dependencies. Leads and lags, Floats, Estimating activity resourcing, Estimation activity and project time - Bottom-up, Top down, Analogous Estimating, Parametric Estimate, Three-point Estimating, Resource breakdown structure, Reverse analysis.

Module-3

Preparing schedule, Activity on arrow, Activity on node. Critical path method (CPM). Schedule compression. Resource levelling. Gantt chart, Milestones. Schedule baseline. 100% rule

Module-4

Project cost management: Define cost management. Cost estimating-Alternatives analysis. Reserve analysis. Cost of quality. Project budget and forecasting. Cost estimations. Role of cost consultant. Lifecycle of costing.

Module-5

Project cost management: Earned value method (EVM). Earned value schedule (EVS). Planned Value (PV), Earned value (EV), Actual cost (AC), Budget at Completion (BC). Cost Variance (CV). Schedule Variance (SV), Variance at Completion (VAC), Cost Performance Index (CPI), Schedule Performance Index (SPI), Trend analysis, Estimate At Completion (EAC), Estimate to Complete (ETC). To Complete Performance Index (TCPI)

Question paper pattern:

- The question paper will have ten questions.
- Each full question is for 20 marks.
- There will be 2 full questions (with a maximum of four sub questions in one full question) from each module.
- Each full question with sub questions will cover the contents under a module.
- Students will have to answer 5 full questions, selecting one full question from each module. ■

Textbook/Reference Books

	Title of the book	Author Name	Publisher's Name	Publication year
1	. *Project scheduling: a research handbook* (Vol. 49).	Demeulemeester, E.L. and Herroelen, W.S	Springer Science & Business Media.	2006
2	*Project scope management: A practical guide to requirements for engineering, product, construction, IT and enterprise*	Moustafaev	CRC Press	2014
3	*Construction project scheduling*	Callahan, M.T., Quackenbush, D.G. and Rowings, J.E		1992

4	*Construction project scheduling and control*.	Mubarak, S.A	John Wiley & Sons	2015
5	*Cost management of construction projects*	Towey, D	John Wiley & Sons	2013

(Group-3): 20LA103 Theory of Landscape Design

Exam Hours: 3 hours	Exam Marks(Maximum):100

Module-1

Chronology of development and evolution of landscape from the earliest period to the present day. Early traditions and beliefs about landscape and environment in the eastern and western world. Development of landscape gardening and landscape design till the early 19th century.

Module-2

Detailed study of selected examples from eastern and western traditions. Ancient civilizations – Introduction to Gardens of Egypt, Greek, Roman, Babylon

Module-3

. Formal gardens - Influences, Elements, Principles of garden design in Persian Gardens and Gardens of Spain, Italy and France. Informal gardens - Influences, Elements, Principles of garden design in Chinese and Japanese Landscape

Module-4

Formal and Informal Landscape design in England Colonial landscape development in India

Module-5

Design philosophy and concepts of Landscape works of Humphrey Repton, Lancelot Brown,
William Kent, Thomas Church, F. L. Olmstead. Study of modern Masters of Landscape Architecture, works of Peter Walker, Martha Schwartz.

Question paper pattern:

- The question paper will have ten questions.
- Each full question is for 20 marks.
- There will be 2 full questions (with a maximum of four sub questions in one full question) from each module.
- Each full question with sub questions will cover the contents under a module.
- Students will have to answer 5 full questions, selecting one full question from each module. ■

Textbook/Reference Books

	Title of the book	Author Name	Publisher's Name	Publication year
1	The History of Gardening Design	Derek Culfford	Faber & Faber Ltd	1962
2	The Landscape of Man,	Geffrey & Susan Jellicose	Thames & Hudson Ltd., London	1975
3	Studies in Landscape Design – Vol: 1,2& 3	G.A Jellicose	London oxford University	

4	The History of Landscape Design in 100 Gardens	Linda A. Chisholm		
5	Landscape design history & theory: landscape architecture and garden design origins	Tom Turner		
6	Landscape and Garden Design: Lessons from History Paperback	Gordon Haynes		
7	Garden Design and History	Tom Turner		
8	A History of Landscape Architecture-Relationship of people to Environment	G B Tobey		

(Group-3): 20LA104 Elements of Landscape Design	
Exam Hours: 3 hours	Exam Marks(Maximum):100
Module-1	
Introduction to Landscape design: Definitions, Types of landscape, Introduction to the plant kingdom. Classification of Plant Kingdom, Basic plant structure, General study of plant morphology and anatomy to understand plant functions. Functions of plants depending on their growth habits and climate	
Module-2	
Principles of Taxonomy / nomenclature, Classification, identification and naming, Familiarity with native flora; geographical regions of India. Critical survey of Vegetation types of India. Distribution of plant communities and plant associations in India and its regional distribution. Economic value of plants in Landscape design.	
Module-3	
. Plant processes/ Problems, plant- water- soil relationship, mineral nutrition, photosynthesis, and respiration. Stem, root & leaf relationship, growth & flowering, growth regulators. Plant multiplication & adaptations	
Module-4	
Plant Ecology – Introduction to ecosystem**,** Different types of ecosystem, Food chains - Trophic levels with respect to plant communities and plant storeys. Stages of plant succession, relationship of plant communities & plant storey's.	
Module-5	
Introduction to Horticulture and greenhouse crops. Introduction, importance, scope, advantages and dis-advantages. Types of Greenhouses, plant response to Greenhouse environment. Design criteria of greenhouse for cooling and heating purposes. Hydroponics and aeroponics application techniques, advantages and disadvantages	
Question paper pattern: • The question paper will have ten questions. • Each full question is for 20 marks. • There will be 2 full questions (with a maximum of four sub questions in one full question) from each module. • Each full question with sub questions will cover the contents under a module. • Students will have to answer 5 full questions, selecting one full question from each module. ■	
Textbook/Reference Books	

	Title of the book	Author Name	Publisher's Name	Publication year
1	Botany	W.A. Jenson		
2	Environment of Plant Ecology	Etherington, John R.		
3	Botany	Ashok Kumar		
4	'The study of plant communities	Oosting		
5	The science of Biology	-Paul B. Weisz		

Visvesvaraya Technological University, Belagavi.
Ph.D Coursework Courses – 2020 in ARCITECTURE

(Group-4): 20UDE16A Indian Urbanism	
Exam Hours: 3 hours	**Exam Marks(Maximum):100**

The course covers on issues of Indian urbanism related to polity and colonial legacy, ideology of tenure and exchange, environment and water, daily life and informal sector, gender, art and media in the city. The course would be conducted through readings, discussions and invited lectures covering case studies and published research works**.**

Question paper pattern:

- The question paper will have ten questions.
- Each full question is for 20 marks.
- There will be 2 full questions (with a maximum of four sub questions in one full question) from each module.
- Each full question with sub questions will cover the contents under a module.
- Students will have to answer 5 full questions, selecting one full question from each module. ■

Textbook/Reference Books

	Title of the book	Author Name	Publisher's Name	Publication year
1	Regional Modernities: The Cultural Politics of Development in India,	K.Sivaramakrishnan and Arun Agrawal (Edit)	Stanford University Press	2003
2	Structure and Society in early South India	Kenneth R Hall (Edit),	Oxford University Press	2004
3	The City Cultures Reader	Malcolm Miles and Tim Hall (Eds)	Routledge Taylor & Francis Group	2004
4	The Politics of the Governed	Partha Chatterjee	New York: Columbia University Press	2004
5	Reader compiled	course instructor		

(Group-4): 20UDS35 Urban Governance and Project Finance	
Exam Hours: 3 hours	**Exam Marks(Maximum):100**

Module-1

Basic concepts of urban governance and definitions. Principles of governance of urban areas. Local administration, Structure of local bodies and their role in urban governance, plan making and implementation. Recent amendments to the Constitution and their implications on governance. Concepts of capacity building and related issues of development of man power. Central and State systems of local administration

Module-2

People's participation- theories, concepts and methods. Participatory governance definition, processes and methods. Role of people's participation in plan making. People, NGOs and civil society and urban development.

Module-3

. The economics of geographical concentration -urbanization, history of urbanization, agglomeration economics, and simple theory of interurban location, location decisions of households

Module-4

Finance mechanisms of local administration. Various forms of revenue generation and budgeting. Innovations in methods of revenue generation

Module-5

Types of urban development projects, project cycle, Project identification, selection, preparation, appraisal, monitoring and evaluation

Question paper pattern:

- The question paper will have ten questions.
- Each full question is for 20 marks.
- There will be 2 full questions (with a maximum of four sub questions in one full question) from each module.
- Each full question with sub questions will cover the contents under a module.
- Students will have to answer 5 full questions, selecting one full question from each module. ■

Textbook/Reference Books

	Title of the book	Author Name	Publisher's Name	Publication year
1	Metropolitan City Governance in India	Maria Pinto	Sage Publications,	
2	Sharing the City: Community participation in urban	John Abbott	Routlegde, Abingdon	1996

3	Public Administration in India, 21st Century challenges for Good Governance.	Jain R.B	Deep and Deep Publications	
4	Monitoring and Evaluating Urban development Programmes: A hand book for program	Michael Bambarger and Eleanor Hewitt	The World Bank,	1988
5				

(Group-4): 20HDC32	**Urban Development and Environmental Laws**
Exam Hours: 3 hours	**Exam Marks(Maximum):100**
Module-1	
INTRODUCTION TO LAWS Concepts – Sources of law, meanings of the terms: Law, Legislations, Ordinances, Bills, Acts, Regulations and byelaws. Role of various Organizations in framing and implementing laws, regulations and acts. Evolution of Planning Legislation in India.	
Module-2	
LEGAL TOOLS CONNECTED WITH URBAN PLANNING AND DEVELOPMENT Town and Country Planning, Improvement Trust and Development Authorities: Role and Objectives. Contents and procedures for preparation and implementation of Regional plans, Development plans, Town Planning Schemes and Area Plans.	
Module-3	
LEGISLATION RELATED TO USE AND CONTROL OF LAND Land acquisition, Transfer of Development Rights. Significance of land development control – Objectives and legal tools, critical evaluation of Zoning, Subdivision regulations, Building regulations and Byelaws, Development Code.	
Module-4	
LEGISLATION RELATED TO URBAN AND ENVIRONMENTAL CONSERVATION Legislation on Conservation of natural resources including Mining and Forestry Acts (MOEFCC)Coastal Zone Regulations. Conservation and Management of Ancient Monuments and Archaeological sites and ruins.Legal Framework: Urban Heritage Conservation. Environment v/s Development – Approaches and Analysis.	
Module-5	

ENVIRONMENT MANAGEMENT SYSTEMS

Need for EMS. ISO – 14001 and its planning implications, Need of ISO, case studies of ISO certified industries, Environmental and Financial Benefits of ISO.
Guidelines for Sustainable development by TERI, GRIHA and IGBC.

Question paper pattern:

- The question paper will have ten questions.
- Each full question is for 20 marks.
- There will be 2 full questions (with a maximum of four sub questions in one full question) from each module.
- Each full question with sub questions will cover the contents under a module.
- Students will have to answer 5 full questions, selecting one full question from each module. ■

Textbook/Reference Books

	Title of the book	Author Name	Publisher's Name	Publication year
1	The GAIA Atlas of Cities", new edition	Herbert Girardet	Gaia Books Ltd	1996
2	Urban planning and Policies - Volume 16-A -Part A:	C S Yadav	Concept Publishing	
3	The City Shaped. London	S. Kostoff	Thames and Hudson	1991
4	City sense and city design	Kevin Lynch	The MIT Press	1995
5	Environmental Law in India, (4th Ed.).	P Leelakrishnan		2016
6	Environmental Law and Policy in India: Cases, Materials and Statutes." (2nd ed.)	Shyam Divan	OUP India	2001

(Group-4): 20HDS34	**Ecology and Sustainable Habitat Systems**
Exam Hours: 3 hours	Exam Marks(Maximum):100

Module-1

CONCEPTS AND PRICIPLES OF ECOLOGY

Concepts of settlement ecology- Nature as the primary layer, urban development as the secondary layer.
Introduction to Sustainability- Definition, principles and Evolution.
Sustainability concepts w.r.t Nature, built heritage and community networks.

Module-2

HUMAN HABITAT AND THE ENVIRONMENT

Cities as centers of Consumption of land, water, energy resources and forest cover. Ecological Footprint; Causes and impact of development on ecosystem related to energy and resource depletion. Urban Metabolism- From Linear To Circular.

Module-3

PRACTICES IN ENVIRONMENT MANAGEMENT

Mitigation and adaptation to Climate Crisis in cities. Integrating Disaster Management and building resilience. Planning and management through participatory and inclusive methods. Understanding Green Infrastructure network and its implications through case studies.

Module-4

PUBLIC HEALTH AND ENVIRONMENT

Environment and Informal Settlements; Characteristics, problems faced and their role in the dynamics of a city. Sustainable Urbanization: Bridging the Green and Brown Agendas. Technology and sustainability.

Module-5

ENVIRONMENTAL IMPACT ASSESSMENT

Definition, need, objectives, scope, evolution and its role in the planning process. Methods, advantages, limitations. Legal framework. Assessment of impacts on land and human resources. Public participation.

Question paper pattern:

- The question paper will have ten questions.
- Each full question is for 20 marks.
- There will be 2 full questions (with a maximum of four sub questions in one full question) from each module.
- Each full question with sub questions will cover the contents under a module.
- Students will have to answer 5 full questions, selecting one full question from each module. ■

Textbook/Reference Books

	Title of the book	Author Name	Publisher's Name	Publication year
1	Sustainable Architecture and Urbanism(3rd Edition)	Dominique Gauzin-muller	Pearson	2011
2	Urban Design in Different Climates (Revised Edition)	GivonyB	Princeton University Press,	2015
3	Evaluation of the Built Environment	P.L.Lombardi	Wiley	1989
4	Urban Energy Systems", 1st Edition	Sudhakar Reddy	Blackwell	1998

5	Environment Impact Assessment (1st Edition)	B.R.Barthwal	Concept Publishing	2010
6	Revenge of Gaia	James Lovelock		2006
7	Urbanism in the Age of Climate Change	Peter Calthorpe		2010
8	Sustainable Urbanism: Urban Design With Nature	Douglas Farr		2009

(Group-4): 20 DAC 2.3 DIGITAL ARCHITECTURE PROCESS THEORIES AND HISTORY-II

Exam Hours: 3 hours	**Exam Marks(Maximum):100**

Module-1

1. The subject focuses on the concepts and convergent interdisciplinary effects of evolutionary design processes on design and production technologies in architecture, the focus is on developing these as creative inputs to new architectural design processes.

2. The Subject Course is designed to familiarise students with these instruments, their associated conceptual fields and with their application to architectural design research.

3. Course content includes theories of Generative algorithms within the realm of Emergence (swarm Behaviour, Fractals, L systems, cellular Automata, genetic algorithms).

4. The course is meant to develop vocabulary and critical understanding of a wide array of algorithms, thus developing a critical stance towards algorithmic 'tooling.'

5. Research based theoretical investigations will also include works of architects who recursively use algorithmic tooling in their structural form finding and generative design processes.

Question paper pattern:

- The question paper will have ten questions.
- Each full question is for 20 marks.
- There will be 2 full questions (with a maximum of four sub questions in one full question) from each module.
- Each full question with sub questions will cover the contents under a module.
- Students will have to answer 5 full questions, selecting one full question from each module. ■

Textbook/Reference Books

	Title of the book	Author Name	Publisher's Name	Publication year
1	Form+Code in Design, Art, and Architecture	Casey Reas and Chandler McWilliams		
2	Algorithmic architecture	Kostas Terzidis		
3	On growth and form	D-Arcy Wentworth		

4	Evolutionary architecture	John Frazer		
5	Shapes: Nature's Patterns: A Tapestry.	Philip Ball		
6	From control to Design	Tomoko sakomato		
	New Mathematics of Architecture	Mark Burry and Jane Burry		
	Advanced Biology Principles And Applications	Clegg C J		

(Group-4): 20ACM23 PROJECT RESOURCE MANAGEMENT	
Exam Hours: 3 hours	**Exam Marks(Maximum):100**
Module-1	
Classification and operational characteristics of equipment for earthmoving, hauling,hoisting, conveying, pneumatic, pumping, aggregate production, concrete production, pile driving, tunnelling and road construction applications.	
Module-2	
Planning, selection and purchase of equipment, for earthmoving, hauling, hoisting, conveying, pneumatic, pumping, aggregate production, concrete production, pile driving, tunnelling and road construction applications. New trends and construction equipment of future.	
Module-3	
Systems of material classification and types of construction materials. Procurement of Materials, Materials & their peculiarities, material planning, accounting and material reconciliation. Basic of personnel management, manpower planning, labour laws and industrial relations. The role of personnel management in construction enterprises.	
Module-4	
Concepts, definitions, growth, role and functions, new developments in HRD and HRM, manpower estimation for company and project, methods and procedures of estimation at various stages. Methods of recruitment, selection, training, placement, financial compensation, discipline, separation etc. in employing and retaining engineers and managers.	
Module-5	
Role, functions, status and relationship with other departments, personnel office records and procedures. Labour legislation, related labour acts, grievance handling, enquiry procedure, Labour administration and judiciary in regard to construction industry.	
Question paper pattern: • The question paper will have ten questions. • Each full question is for 20 marks. • There will be 2 full questions (with a maximum of four sub questions in one full question) from each module. • Each full question with sub questions will cover the contents under a module. • Students will have to answer 5 full questions, selecting one full question from each module. ■	
Textbook/Reference Books	

	Title of the book	Author Name	Publisher's Name	Publication year
1	Construction planning, equipment, and methods (No. 4th ed.)	Peurifoy, R.L. and Ledbetter, WB		1985
2	Construction Equipment and its planning and Application	Varma, M	Metropolitan Book Co	1975
3	Construction Equipment and	S. C. Sharma		
4	Human resource management: theory and practice. Palgrave.	Bratton, J. and Gold, J	Palgrave	2017
5	Human Resource Development: Theory & Practice	Deb, T	Ane Books India	2006
6	. *Human resource management in construction projects*	Dainty, A. and Loosemore, M. eds	Routledge	2013

(Group-4): 20ACM24 MANAGEMENT INFORMATION SYSTEM & COMMUNICATION MANAGEMENT

Exam Hours: 3 hours	**Exam Marks(Maximum):100**

Module-1

Key Definitions & Concept of MIS. Role and impact of MIS. Computer application, file design, DBM, data communication Documentation, System design specifications, System analysis and design. System development, data processing and flow chart

Module-2

Development and implementation of MIS. Long range plan, Management of quality, MIS factors of success and failure. Impact of computer application, Information processing technology: Data processing, communication and emerging information technology.

Module-3

Case studies of MIS at corporate and project level – Business Applications. Cash Flow forecasting of Projects using MIS. (Custom/ Local) Introduction to Communication Management.

Module-4

Elements and Function of Communication. Forms of Communications. Communication Strategies & Change. Corporate & Marketing Communication. CRM with MIS.

Module-5

Strategic Communication, Global communication, Brand Communication and Public Relations. Digital Communication Solutions and MIS.

Question paper pattern:

- The question paper will have ten questions.
- Each full question is for 20 marks.
- There will be 2 full questions (with a maximum of four sub questions in one full question) from each module.
- Each full question with sub questions will cover the contents under a module.
- Students will have to answer 5 full questions, selecting one full question from each module. ■

Textbook/Reference Books

	Title of the book	Author Name	Publisher's Name	Publication year
1	*Management Information System*, 2nd ed	Banerjee, Utpal K		
2	Management information systems.	O'Brien, J.A. and Marakas, G.M		2011
3	Communication Theories: perspectives, processes and contexts	Katherine Miller		
4	Introduction to communication studies	John Fiske		

(Group-4): 20LA106 Hydrology	
Exam Hours: 3 hours	**Exam Marks(Maximum):100**

Module-1

. Introduction to Hydrological systems: Hydrological cycle, Precipitation – forms and types, Intensity of rainfall, Measurement of rainfall, computation of average rainfall over a catchment area.

Module-2

Abstraction: evaporation, transpiration, evapo-transpiration, interception, infiltration.
Ground water: Occurrence of ground water, types of aquifers, stream flow effects and bank storage, influent and effluent streams

Module-3

. Runoff: Types, factors affecting runoff. Hydrographs – definition, components of hydrograph, time of concentration, lag time. Floods – definition, impact of floods on environment

Module-4

Soil erosion: Types of soil erosion, controlling soil erosion.
Soil conservation: afforestation, agronomic practice, terracing, bunding, cropping patterns.
Water Conservation: contour bunding, contour terracing, gabiol structures, check dams, percolation tanks, subsurface dams, farm ponding, rain water harvesting

Module-5

Watershed: definition and description of watershed. Watershed management of forest lands, grasslands, agricultural lands, arid and semi-arid regions and urban areas.

Question paper pattern:

- The question paper will have ten questions.
- Each full question is for 20 marks.
- There will be 2 full questions (with a maximum of four sub questions in one full question) from each module.
- Each full question with sub questions will cover the contents under a module.
- Students will have to answer 5 full questions, selecting one full question from each module. ■

Textbook/Reference Books

	Title of the book	Author Name	Publisher's Name	Publication year
1	Ground Water Hydrology	Todd, David Keith		
2	Hydrology	Jayaram Reddy		
3	Applied Hydrology	Chow, Ven Te & others		
4	Soil and Groundwater pollution from agricultural activities	Ramachandra		
5				

(Group-4) 20LA403 Legal Aspects & Environmental Legislation	
Exam Hours: 3 hours	Exam Marks(Maximum):100

Module-1

Significance and Concept of Constitution and Laws in Indian Scenario
Indian Constitution: Concept of Law in Indian Scenario, legislation, Meaning and terms of law, ordinance, bill, act, regulation, and bye-laws, importance and significance of laws in relationship to landscape architect, Process of law making,

Module-2

Environmental Legislation in India
Significance, Powers and function, application, penalties and current scenario of: Environmental Protection Act, Air Act, Water Act, Mining Act, Forest Act, Wetland Act, Biodiversity Act, National Green Tribunal Act, Tribal Act, Wildlife Protection Act, Ancient Monument Act, International Environmental regulation and treaties

Module-3

. Land Acquisition
Significance, Process of acquisition, ownership details, issues, penalties of land Acquisition 1894, The Right to Fair Compensation and Transparency in Land Acquisition, Rehabilitation and Resettlement Act, 2013

Module-4

Panchayat and Municipalities
Need of 73rd and 74th amendments, Balwant Rai Metha Committee and Ashok Metha Committee, Evolution of 73rd and 74th amendment, Distribution of Power – 3 tier governance system, importance of the amendment, implementation of the amendment in different region, issues of the amendment

Module-5

Town Planning Legislation in India and Abroad
Town and Country Planning Act, Importance and Need of Development Plans in India, Hierarchy and significance of green area in development plans, Concept of Planning in other countries

Question paper pattern:

- The question paper will have ten questions.
- Each full question is for 20 marks.
- There will be 2 full questions (with a maximum of four sub questions in one full question) from each module.
- Each full question with sub questions will cover the contents under a module.
- Students will have to answer 5 full questions, selecting one full question from each module. ■

Textbook/Reference Books

	Title of the book	Author Name	Publisher's Name	Publication year
1	Our National park policy,	Ise John	The John Hopkins Press	1961
2	Parks and Recreational Needs in Urban area	Commissioner Envor C. Cymoodhhames	Twayne Publishers Inc	1969
3	Professional Practice of Landscape Architecture	Walter Rogers		
4	Project Management for the Design Professional	Frank Burstein		

5	Making Environmental Law: The Politics of Protecting the Earth	Nancy E. Marion		
6	The Making of Environmental Law	Richard J. Lazarus		
7	The Global Environment and International Law	Michael J. Lynch; Ronald G. Burns		
8	Environmental Law, Crime, and Justice	Paul B. Stretesky		
9	Protecting Life on Earth: An Introduction to the Science of	Michael P. Marchetti; Peter B.		
10	Environment and Law	David Wilkinson		

PhD Coursework Courses under Group-5			
Sr No	**Course Code**	**Course Name**	**Page**
1	20UDE16B	Geographic Information Systems-I	2
2	18UDE42B	Urban Economics	4
3	20 UDS25	Ecology and Site Planning	4
4	20HDS35	Project Planning, Analysis & Appraisal/Evaluation	6
5	20HDE37A	Real Estate development and Finance	7
6	20DAS3.3	Parametric Urbanism	9
7	20ACM31	Conflict Management & Dispute Resolution	10
8	20ACM32	Project Risk Management	11
9	20LA105	Geology & Geomorphology	12
10	20LA402	Landscape Conservation	13

(Group-5): 16UDE16B Geographic Information Systems-I	
Exam Hours: 3 hours	**Exam Marks(Maximum):100**

Module-1

1 : Geographical Information Systems:

- Representing Geography: Information technologies in geography
- Geographic information systems: a generic definition, Importance of GIS in Urban analysis, Its other contributing discipline, Major areas of application
- The appeal and potential of GIS, Components of GIS, Benefits of computerising information and collating information in a single platform.

2 : History and Development of GIS:

- Maps and their historical development, Advantages of GIS over manual methods, First automatic processing of geographical information Important milestones in the development of GIS, Recent developments

Module-2

3 : GIS Roots in Cartography:

- Spatial learning and development, Using and learning maps, GIS and spatial cognition, Defining a map, Types, Other representation of the world, GIS and computer cartography, Mapping concepts, features and properties.
- Types of information in a digital map, The shape of the earth, Datum types, General coordinate systems, Earth coordinate geometry, Map projections, World geographic reference system (GEOREF), Concept of grid on earth surface and its required correction.

Module-3

. 4: Spatial Data Structure and Models:

- Information organisation and data structure, Geographic data and geographic information, The relationship perspective of information organization, The operating system perspective-the software, Data– Fundamental concepts, Spatial – non spatial data, database management system, data models, data modeling - theoretical concept with hands-on training.

5: The Nature and Source of Geographic Data :

- Spatial data formats – raster and vector data capture, Data collection workflow, Primary & secondary geographic data capture, Obtaining data from external sources, Geographic data formats, Capturing attribute data, Managing a data capture project, Data editing, Data conversion, Geographic data – linkages and matching.

Module-4

6: GIS and the Real World Model:

- Geographical representation of objects, Object attributes, Object relations, From database to GIS to map.
- Role of maps in data modeling, Extension of the reality concept.
- Introduction to Google earth and its connection with GIS.

7: Selection of a GIS:

- The evolution of GIS software, The early GIS software programs, Operating systems and GIS, GIS functional capabilities - Data capture, Data storage, Data management, Data retrieval, Data analysis, Data display. Data structures and GIS software, The leading GIS softwares.

Module-5

8: Basic Data Models in GIS:

- Vector data model, Storing points and lines, Storing area boundaries, The Topological approach, Storing vector data.
- Raster data models-realising the raster model, Storing raster data structures,
- Automatic conversion between vector and raster models, Vector versus raster models.
- Attribute data and computer registers, Coding and entering attribute data Storing attribute data, Linking digital map and register information.

Question paper pattern:

- The question paper will have ten questions.
- Each full question is for 20 marks.
- There will be 2 full questions (with a maximum of four sub questions in one full question) from each module.
- Each full question with sub questions will cover the contents under a module.
- Students will have to answer 5 full questions, selecting one full question from each module. ■

Textbook/Reference Books

	Title of the book	Author Name	Publisher's Name	Publication year
1	Learning QGIS	Anita Graser	PAKT open source	2016
2	A refreshing look at QGIS: Mastering QGIS	GISP Dr. John Van Hoesen, Dr. Luigi Pirelli, GISP Dr. Richard Smith Jr., GISP Kurt	PACKT Pub	2016
3	Displaying and analysing 3D data			
4	https://sites.duke.edu/envgis/tutorials/introduction-to-google-earth/			

(Group-5): 18UDE42B Urban Economics	
Exam Hours: 3 hours	**Exam Marks(Maximum):100**
Module-1	
.■ Introduction to the economics of geographical concentration, urbanization, history of urbanization, agglomeration economics, and simple theory of inter- urban location, location decisions of households	
Module-2	
Land Use and Location Theory	
Module-3	
. The Contemporary City and Suburbanization/Sprawl The Economics of Zoning	
Module-4	
Housing, Segregation, Crime, and Poverty	
Module-5	
Local Government and governance	

Question paper pattern:

- The question paper will have ten questions.
- Each full question is for 20 marks.
- There will be 2 full questions (with a maximum of four sub questions in one full question) from each module.
- Each full question with sub questions will cover the contents under a module.
- Students will have to answer 5 full questions, selecting one full question from each module. ■

Textbook/Reference Books

	Title of the book	Author Name	Publisher's Name	Publication year
1	*Urban Economics* (Fifth Edition).	O'Sullivan, Arthur	Boston: Irwin/McGr	1990, 2003.

(Group-5): 20UDS25 Ecology and Site Planning	
Exam Hours: 3 hours	**Exam Marks(Maximum):100**
Module-1	
.■ Introduction to site analysis with emphasis on study of natural and manmade features of the site. Site Planning: Site, User, Programme and Design. Sensed landscape and its	

materials, access, earth work and utilities. Field surveys, reading aerial survey, climatic variables. Site Planning strategies and case studies.

Module-2

Landscape design concepts and design of open and public spaces, recreation areas, road side landscapes.

Module-3

.

Ecology: Basic concepts of ecology, components of environmental planning, use and management of resources; environmental concerns related to development; environmental degradation; pollution control and evaluation of energy resources

Module-4

Introduction to environmental planning concepts, spatial environmental planning. Eco-system and components of ecosystem structure; principles of ecology; physical science; earth science; man-environment interface towards sustainable development

Module-5

Sustainable urbanity and urban climate change: ECO URBANITY- Towards well-directed urbanity.

Urban landscapes and Sustainable cities: Urban Biodiversity and ecology.

Ecology and settlements,, changing Role, of Terrain, water and vegetation.

Question paper pattern:

- The question paper will have ten questions.
- Each full question is for 20 marks.
- There will be 2 full questions (with a maximum of four sub questions in one full question) from each module.
- Each full question with sub questions will cover the contents under a module.
- Students will have to answer 5 full questions, selecting one full question from each module. ■

Textbook/Reference Books

	Title of the book	Author Name	Publisher's Name	Publication year
1	Good City Form	Kevin Lynch	MIT Press, Cambridge	
2	Site Planning	Kevin Lynch and Gary Hack	MIT Press, Cambridge	
3	Visual Analysis of Landscape Development	Peter Jacobs and Douglas Way	Harvard Press	
4	Landscape Planning and Energy Conservation.	Gary.O.Robinette (Ed),	Van-Nostrand Reinhold.	
5	Design with Nature	Ian L. McHarg		

6	The Landscape of Man	Geoffrey Jellicoe and Susan Jellicoe		
7	***Geography of Settlements***	***R.Y. Singh***	ISBN	

(Group-5): 20HDS35 Project Planning, Analysis & Appraisal/Evaluation	
Exam Hours: 3 hours	**Exam Marks(Maximum):100**
Module-1	
.■ **INTRODUCTION TO PROJECT PLANNING** Introduction to terminologies and concepts of Project planning. Urban Projects: Scales, Institutions involved and their organization structure. Public relation and citizen participation: Personnel management, Manpower Planning, performance, appraisal, motivation and morale. Corporate Management: Systems approach to Urban Management, organizational design, management information systems.	
Module-2	
CONCEPTS OF PROJECT ANALYSIS Requirement Analysis, Feasibility Check and Techniques involved. Operational Analysis: Performance, Business, Environment, Scenario Setting. Identification and estimation of project impacts, Desirable and undesirable project impacts. COST BENEFIT ANALYSIS Identifying costs and benefits, Pricing, Opportunity costs, Shadow Prices, Cash flow, Payback periods and Internal Rate of Return.	
Module-3	
METHODS OF PROJECT EVALUATION SINGLE AND MULTIPLE CRITERIA PROJECT EVALUATIONS Details of single Criteria cost -benefit analysis and its application with case studies. Concept of multi-criteria project evaluation and their applications: Concept of time scheduling, Project network and monitoring, PERT and CPM with their application in planning projects, Project monitoring under resource constraints.	
Module-4	
LOCAL PLANNING AND BUDGETING Methods of Urban Finance: Financial perspective of Urban Development. Municipal Corporate Planning, Program Planning and Budgeting, Local Financial Management, Financial Control & Delegation, Performance evaluation techniques, Cash flow management, Local debt management, Financial Information System, Municipal fiscal programming, Project scheduling and budgeting.	
Module-5	

PROJECT IMPLEMENTATION PLAN:

Project Implementation Techniques and Phasing

Technical Aspects of cost, schedule and quality of deliverables.

Human Aspects of Authority, orientation, Motivation and Group orientation.

Risk Management and Execution Plans.

New methods, practices and technological advancements in project Implementation- Best Practices.

Question paper pattern:

- The question paper will have ten questions.
- Each full question is for 20 marks.
- There will be 2 full questions (with a maximum of four sub questions in one full question) from each module.
- Each full question with sub questions will cover the contents under a module.
- Students will have to answer 5 full questions, selecting one full question from each module. ■

Textbook/Reference Books

	Title of the book	Author Name	Publisher's Name	Publication year
1	Construction Management 2nd Edition	Daniel Halpin and Ronald Woodhead	Wiley	1997
2	Construction Management 2nd Edition	Krishnamurthy and S.V.Ravindra	CBS Publishers & Distributors Pvt. Ltd	2017
3	Projects Planning, Analysis, Selection, Financing, Implementation and Review -8th Edition	Prasanna Chandra	McGraw-Hill	2017
4	PERT and CPR-Principles and Application	L S Srinath	Affiliated East-West Press	2001
5	Project Management	Harold Kerzner	Wiley, New York	2003
6	Construction Project Management	Chitkara	Tata McGraw-Hill, New Delhi	
7	Essentials of Project Management	Kamaraju Ramakrishna	PHI Learning, New Delhi	2010

(Group-5): 20HDE37A Real Estate development and Finance	
Exam Hours: 3 hours	**Exam Marks(Maximum):100**
Module-1	

.■ **INTRODUCTION TO REAL ESTATE**

Introduction and history of Real-estate Development.

Real-estate market and assessment techniques, economic cycles, demand and supply, values and rental structure and advertising.

Module-2

REAL ESTATE FINANCING AGENCIES

International investments and packaging, implications on Real estate market, public-private participation and Real-estate development agencies.

FDI in real estate sector.

Module-3

REAL ESTATE REGULATION AND TECHNIQUES

Real estate laws, rent control laws and other legal framework.

Investment and risk assessment techniques, market surveys and research, rating system in Real-estate market.

Module-4

POST DEVELOPMENT MAINTENANCE

Infrastructure development and quality control, Post development management and maintenance in Real-estate development.

Module-5

REAL ESTATE AS A HABITAT DETERMINANT

Impacts on urban form.

Good practices in development of Real estate through case studies.

Documentation of Real-estate practices in India and foreign markets.

Question paper pattern:

- The question paper will have ten questions.
- Each full question is for 20 marks.
- There will be 2 full questions (with a maximum of four sub questions in one full question) from each module.
- Each full question with sub questions will cover the contents under a module.
- Students will have to answer 5 full questions, selecting one full question from each module. ■

Textbook/Reference Books

	Title of the book	Author Name	Publisher's Name	Publication year
1	The Economics of Commercial Property Markets- 1st Edition	Michael Ball, Colin Lizieri,	Routledge	1998
2	Real Estate Market Analysis: A Case Study Approach- 2nd Edition	Adrienne Schmitz,Deborah L Brett	Urban Land institute	2001

3	Real Estate Development: Principles and Process-5th Edition	Mike E. Miles,Laurence M. Netherton, Adrienne Schmitz	Urban Land institute	2015
4	Real Estate Finance in India	Prashant Das and Divyanshu Sharma	Sage Publications	2013
5	A Practical Guide to GST on Real Estate Industry	CA MadhukarHiregang ,CA VirenderChauhan, CA Sudhir V S and CA RoopaNayak	Bloomsbury	2019

(Group-5): 20DAC3.3 PARAMETRIC URBANISM	
Exam Hours: 3 hours	**Exam Marks(Maximum):100**
Module-1	
• The subject will examine architectural vision of the city from emergence of the metropolis to the contemporary city. • Emphasizing the concepts of form, movement, infrastructure, network, pattern and landscape, the seminar will investigate different agendas, strategies, manipulations that were employed in relation to the city, forcing a new understanding of the urban realm to emerge. • This course focuses on relationship between urban design ideals, urban design action, and the built environment through readings, discussions, presentations, and papers. It specifically will delve in the theoretical development of use of parametric tools in urban design where their utilization augments the multi-layered and collaborative urban design process. It will analyse the diverse design ideals that influence cities and settlements, and investigates how urban designers use parametric technologies to shape urban form.	
Question paper pattern: • The question paper will have ten questions. • Each full question is for 20 marks. • There will be 2 full questions (with a maximum of four sub questions in one full question) from each module. • Each full question with sub questions will cover the contents under a module. • Students will have to answer 5 full questions, selecting one full question from each module. ■	
Textbook/Reference Books	

	Title of the book	Author Name	Publisher's Name	Publication year
1	Parametric Urbanism	Patrick Schumacher		
2	The Digital Design in Sustainable Urbanism – Explorations in	Toni Oosterland		
3	Masterplanning the Adaptive City: Parametric Urbanism in the Twenty-first Century	Tom Verebes		
4	Architecture & Urbanism	Michael Hensel Tom Verebes		
5	Digital and parametric architecture	EVOLO		
6	Hybrid architecture for future urbanism	Tomas Michael		
7	Architecture of Emergence	Michael Weinstock		
8	Architecture of the city	Aldo Rossi		

(Group-5): 20ACM31 CONFLICT MANAGEMENT & DISPUTE RESOLUTION	
Exam Hours: 3 hours	**Exam Marks(Maximum):100**
Module-1	
Definition of Conflict, Dispute, Conflict Management and Dispute resolution; Difference between conflict and dispute; Types of Conflict, Sources of Conflict.	
Module-2	
Conflict management Methodologies, Avoiding Conflict Resolution Style, Competing Conflict Resolution Style, Accommodating Conflict Resolution Style, Compromising Conflict Resolution Style, Collaborating Conflict Resolution Style.	
Module-3	
Conflict Avoidance, Common conflicts and disputes observed in a construction project;Dispute Resolution techniques; Types of Dispute resolution processes; Adjudicative and Consensual Processes; Binding and Non-Binding Dispute resolution; Alternate Dispute Resolution Techniques.	
Module-4	
Binding Dispute resolution techniques; Adjudicative Processes; Litigation, Characteristics of Litigation; Arbitration, Characteristics of Arbitration; Adjudication, Characteristics of Adjudication; Expert determination, Characteristics of Expert determination.	
Module-5	

Module-5:
Non-Binding Dispute resolution techniques; Consensual Processes; Negotiation, Characteristics of Negotiation; Mediation, Characteristics of Mediation; Conciliation, Characteristics of Conciliation; Executive Tribunal, Characteristics of Executive Tribunal.

Question paper pattern:

- The question paper will have ten questions.
- Each full question is for 20 marks.
- There will be 2 full questions (with a maximum of four sub questions in one full question) from each module.
- Each full question with sub questions will cover the contents under a module.
- Students will have to answer 5 full questions, selecting one full question from each module. ■

Textbook/Reference Books

	Title of the book	Author Name	Publisher's Name	Publication year
1	*Commercial Conflict Management and Dispute Resolution*.	Fenn, P	Routledge	2012
2	Introduction to construction dispute resolution	Pena-Mora, F.A., Sosa, C.E. and McCone, D.S		2003
3	*Alternative dispute resolution: a developing world perspective*.	Fiadjoe, A	Routledge	2013
4	Construction contract claims, changes, and dispute resolution	Levin, P. ed	American Society of Civil Engineers.	2016
5	*Construction conflict management and resolution*	Fenn, P.F. and Gameson, R	Taylor & Francis	1992
6	Conflict and dispute in construction. *Construction Management & Economics*, *15*(6), pp.513-518.	Fenn, P., Lowe, D. and Speck, C		1997

(Group-5): 20ACM32 PROJECT RISK MANAGEMENT

Exam Hours: 3 hours	Exam Marks(Maximum):100

Module-1

Introduction, Risk management process, Risk management Plan, Risk Awareness, Nature of construction Risks

Module-2

Importance of Risk, types of risks, quantifiable and unquantified risks, Classification of risks, Risk Identification methods (checklists, prompt lists, brainstorming), Risk owner identification.

Module-3

Risk Management: Risk avoidance, Risk reduction, Risk sharing, Risk transfer, Risk deference, Risk mitigation, Risk contingency, Risk insurance, Risk acceptance.

Module-4

Risk assessment, Risk probability and Risk impact, Qualitative Risk Analysis, Quantitative Risk analysis, Quantification of probability, Quantification of impact (severity), Exposure rating, Risk Evaluation.

Module-5

Risk Mitigation: Risk mitigation by elimination, reducing, transferring, avoiding, absorbing or pooling. Residual risk, mitigation of unquantified risk, Risk Monitoring, Risk register, Software usage (if any), Monitoring and reporting.

Question paper pattern:

- The question paper will have ten questions.
- Each full question is for 20 marks.
- There will be 2 full questions (with a maximum of four sub questions in one full question) from each module.
- Each full question with sub questions will cover the contents under a module.
- Students will have to answer 5 full questions, selecting one full question from each module. ■

Textbook/Reference Books

	Title of the book	Author Name	Publisher's Name	Publication year
1	Risk and Financial Management in Construction.	Burtonshaw-Gunn, S.A		2017
2	. *Practical risk management in the construction industry*.	Edwards, L. and Edwards, L.J	Thomas Telford	1995
3	*Risk management for design and construction* (Vol. 75)	Cretu, O., Stewart, R.B. and Berends, T	John Wiley & Sons	2011
4	*Fundamentals of risk management: understanding, evaluating and implementing effective risk management*	Hopkin, P	Kogan Page Publishers	2018
5	*Managing risk in construction projects*.	Smith, N.J., Merna, T. and Jobling, P	John Wiley & Sons	2014
6	*Risk management in projects*	Loosemore, M., Raftery, J. and Reilly, C	Taylor & Francis	2006

(Group-5): 20LA105 Geology & Geomorphology

Exam Hours: 3 hours	Exam Marks(Maximum):100

Module-1

The Earth – origin, composition, structure distribution of land and sea. Outer zones of earth. Major geological cycles- external and internal processes, Plate Tectonics and its effects etc.,
Rocks- formation, classification, physical and chemical properties.

Module-2

Petrology-Igneous, Sedimentary, Metamorphic.
Structural geology- dip, strike, folds, faults, joints, unconformities. Stratigraphy: principles, stratigraphy and geology of India.

Module-3

.
Earthquakes: causes and effects, seismic micro zonation, seismic zones of India. Volcanoes and their types. Evolution of landscapes - Basics concept of geomorphology/ Geological factors in developments of landscapes. Based on geological resources and man's interventions their impact on environment and landscape design. Economic impact of geological formations

Module-4

Application of geological information in the interpretation of landscapes on maps and in the field.
The relationships between geology, soils and vegetation: Practical examples.

Module-5

Landscape Assessment- Based on geological resources and man's interventions and their impact on the environment. Economic impact of geological formations, Applications of landscapes on maps and in the field: Practical examples of relationships between geology, structures, slope stabilization, water development and management etc

Question paper pattern:

- The question paper will have ten questions.
- Each full question is for 20 marks.
- There will be 2 full questions (with a maximum of four sub questions in one full question) from each module.
- Each full question with sub questions will cover the contents under a module.
- Students will have to answer 5 full questions, selecting one full question from each module. ■

Textbook/Reference Books

	Title of the book	Author Name	Publisher's Name	Publication year
1	Introduction to the Geology of India	Krishnan M.S		
2	Elements of Geology	Zumberge, James H.		
3	Environmental Geology	K.S. Vadiya		

(Group-5): 20LA402 Landscape Conservation

Exam Hours: 3 hours	Exam Marks(Maximum):100

Module-1

.■ Introduction to the concept of Landscape Conservation, Principles of Landscape Conservation. Types of Landscape for Conservation. Layers in Landscapes, Values in Landscapes

Module-2

Introduction to Historical perspective of Landscape Conservation – Eurocentric and Indian. Impact of Human activities on Historic Landscapes.
Introduction to Cultural Landscapes -Role of communities in Conservation of Landscapes. UNESCO Cultural Landscapes – examples

Module-3

.
Impact of Large scale projects on Landscapes – Dams, Reservoirs, mining and industries etc.
Methodology of Landscape Conservation, Documentation process, Documentation techniques, examples. Burra Charter and the NARA document

Module-4

Landscape conservation Policies – International, National, State, Regional and Local level

Module-5

Relevance of Landscape Conservation in Modern Era

Question paper pattern:

- The question paper will have ten questions.
- Each full question is for 20 marks.
- There will be 2 full questions (with a maximum of four sub questions in one full question) from each module.
- Each full question with sub questions will cover the contents under a module.
- Students will have to answer 5 full questions, selecting one full question from each module. ■

Textbook/Reference Books

	Title of the book	Author Name	Publisher's Name	Publication year
1	Strategies for Sustainable Rural Development	Singh Surat		
2	Sustainable Design: Towards New Ethic in Architecture and Town Planning	Contal, Marie-Helene		
	Green Architecture: Guide to Sustainable	Contal, Marie-Helene		
4	Wetlands, A Threatened Landscape	Michael Williams		
5	Architecture in Conservation: Managing Development at Historic Sites	James Strike		
6	Models for Planning Wildlife Conservation in Large Landscapes	Joshua J. Millspaugh and Frank R. Thompson		
7	Climate and Conservation: Landscape and Seascape Science, Planning, and Action	Charles C. Chester		
8	Applying Landscape Ecology in Biological Conservation	Gutzwiller, Kevin		
9	Applying Ecological Principles to Land Management	Dale, Virginia H., Haeuber, Richard A.		
10	Gardens & Landscapes in Historic Building Conservation	Marion Harney		
11	Urban Nature Conservation: Landscape Management in the Urban Countryside	Taylor & Francis	Taylor & Francis	

Visvesvaraya Technological University, Belagavi.
Ph.D Coursework Courses – 2020 in ARCITECTURE

PhD Coursework Courses under Group-6			
Sr No	**Course Code**	**Course Name**	**Page**
1	20 UDC 22	Urban Conservation	2
2	20 UDE42A	Politics of Development	3
3	20 UDS23	Urban Design Policy & Implementation	4
4	20HDC22	Land Use Structure and Urban Morphology	6
5	20HDC33	Housing and Community: Policy, Finance and Public Private Participation	7
6	20DAC3.2	Parametric urban mapping	8
7	20ACM33	Advanced Construction Techniques	9
8	20ACM35	Construction Quality & Safety Management	11
9	20LA107	Soil Science	12
10	20LA303	Remote sensing	13

(Group-6): 20UDC22 Urban Conservation	
Exam Hours: 3 hours	**Exam Marks(Maximum):100**

Module-1

.■ Introduction to conservation of historic and inner city areas. Concepts of conservation in India and Understanding INTEGRATED HERITAGE MANAGEMENT for historic cities

Module-2

Socio-Economic development, Tourism Infrastructure Development, and role of Urban Design in Understanding of CULTURAL LANDSCAPES, SACRED CITIES

Module-3

.

Institutional aspects of Conservation- Charters, World heritage legislation and sites, Conservation Acts and legislation and available institutional frame work of conservation in India- New schemes of Government like HRIDAY for heritage cities, SMART CITIES.

Module-4

Conservation area practice, Adaptive Reuse, up gradation programs in old areas, infill design and regeneration of inner city areas.

Conservation management, Community Participation, Economic Regeneration, Financing and Implementation of frame work for Redevelopment and Revitalization projects.

Module-5

Case studies in India and abroad to illustrate the above mentioned concepts and approaches-Introduction to World Heritage Sites and Site Management Plans

Question paper pattern:

- The question paper will have ten questions.
- Each full question is for 20 marks.
- There will be 2 full questions (with a maximum of four sub questions in one full question) from each module.
- Each full question with sub questions will cover the contents under a module.
- Students will have to answer 5 full questions, selecting one full question from each module. ■

Textbook/Reference Books

	Title of the book	Author Name	Publisher's Name	Publication year
1	Conservation of Historic Buildings	Feildan Bernard	Butterworth-Heinemann	
2	Historic Preservation- A Curatorial Approach	Fitch James	University Press of Virginia.	

(Group-6): 20 UDE42A	**Politics of Development**
Exam Hours: 3 hours	**Exam Marks(Maximum):100**

The course explores the impact of the intentions, conflicting interests, pressures and policies on the social and morphological dimensions of the city. Various issues pertaining to the role of different actors in shaping urban developmental projects are discussed, using papers and literature on those topics. Topics discussed in this weekly four hour class include public and private developmental project, design commissions, social planning and spatial planning and planning processes in Indian cities.

Question paper pattern:

- The question paper will have ten questions.
- Each full question is for 20 marks.
- There will be 2 full questions (with a maximum of four sub questions in one full question) from each module.
- Each full question with sub questions will cover the contents under a module.
- Students will have to answer 5 full questions, selecting one full question from each module. ■

Textbook/Reference Books

	Title of the book	Author Name	Publisher's Name	Publication year
1	The Urban Politics Reader	Elizabeth Strom and John Mollenkopf (Eds)	Routledge Taylor & Francis Group	2004
2	The Politics of the Governed,	Partha Chatterjee	New York: Columbia	2004
3	Imagining India	Nandan Nilekeni	Penguin Press	2009
4	Trade Ideology and Urbanisation in India	Champakalakshmi R	Oxford University	1999
5				

(Group-6): 20UDS23 Urban Design Policy & Implementation	
Exam Hours: 3 hours	**Exam Marks(Maximum):100**

Module-1

Role of urban design in city planning; historic overview and case examples of policy;

Module-2

visioning process; urban design plans, policies and developmental strategies

Module-3

.
Case studies of impact of development controls and zoning; analysis of urban design issues; current innovations in development regulations; alternative types of zoning

Module-4

Implementation of urban design plans, policies and concepts - tools and methods; local-level plans; design guidelines; design review and concept of design review boards

Module-5

Role of Government, private parties and other stakeholders; participatory design

Question paper pattern:

- The question paper will have ten questions.
- Each full question is for 20 marks.
- There will be 2 full questions (with a maximum of four sub questions in one full question) from each module.
- Each full question with sub questions will cover the contents under a module.
- Students will have to answer 5 full questions, selecting one full question from each module. ■

Textbook/Reference Books

	Title of the book	Author Name	Publisher's Name	Publication year
1	*Making City Planning Work*	Jacob, Alan	American lanning Association, 1980. ISBN:978-918286123	
2	*. Introduction to Urban Design*	Barnett, Jonathan	Harpe); 1st edition ISBN: 978-0064303767	1982
3	**Urban Design as Public Policy**	Barnett, Jonathan	McGraw-Hill Inc.,US	1974
4	*Design Review, Principles and Practice,. www.cabe.org.uk/files/design-review-principles-and-practice.pdf.*	Commission for Architecture and the Built Environment		2009

5	*Turning a Town Around: A Proactive Approach to Urban Design* ISBN: 978-1405170239	*Hall, Tony*	Oxford, United Kingdom: Blackwell Publishing.	2008.
6	*Urban Design in the Real Estate Development Process* ISBN: 978-1405192194	Steve Tiesdell, David Adams	Wiley-Blackwell	2011
7	*Urban Design: A Typology of Procedures and Products* ISBN: 978-0750666282	Lang, Jon	Architectural Press, Oxford, United Kingdom	2005
8	*City Making: Building Communities without Building Walls.* ISBN: 978-0691007410	Gerald E. Frug	Princeton University Press	1999
9	*National Building Code*	Bureau of Indian Standards	Bureau of Indian Standards	2010.
10	Master Plans of Bangalore, New Delhi, Mumbai and other metropolitan Indian cities.		Respective Authorities	

(Group-6): 20HDC22 Land Use Structure and Urban Morphology	
Exam Hours: 3 hours	**Exam Marks(Maximum):100**

Module-1

INTERPRETING THE URBAN GEOGRAPHY

Introduction to urban geography – Triggers and Outcomes of urbanization.
Study of patterns of distribution and interaction within cities, from quantitative, qualitative, structural, and behavioral perspectives.
Understanding Urban Geography through: Cognition, perception and spatial representation.
Cognitive mapping- Contemporary and traditional methods.

Module-2

MORPHOLOGY OF HABITAT STRUCTURES

Renaissance and the Re-configurement of space.
Industrial revolution, Technologies and the 19th century transformation of world views.
Compression of time-space and the birth of Suburbia, Idealized Space, Romanticism and the Garden City Movement.
Ideal-Space diagram and city form.

Module-3

MAPPING SACRED GEOGRAPHY

Astronomy and city structure. Vastu Shastra and the integrated world view.
Sacred Geographies, Sacred Cities, Precincts and Spaces.
Sacred Rivers, Ghats, Mounds, Trees and other Totems in Urban Space.
Mapping the Sacred.

Module-4

RHYTHMS OF THE CITY

Modern work rituals and the definition of fragmented zones, time space and lives.
Nightlife and electronic definition of time.
Significance, Signs and meaning of structure.
Imagined places, collage of time space representations in Literature, Cinema and the Performing Arts.

Module-5

URBAN GROWTH AND SYSTEM OF CITIES

Growth of metropolitan and mega cities: scale, complexity.
Metropolitan growth– Trends, characteristics, challenges, socio-economic and political issues in India and other Asian Geographies.

Question paper pattern:

- The question paper will have ten questions.
- Each full question is for 20 marks.
- There will be 2 full questions (with a maximum of four sub questions in one full question) from each module.
- Each full question with sub questions will cover the contents under a module.
- Students will have to answer 5 full questions, selecting one full question from each module. ■

Textbook/Reference Books

	Title of the book	Author Name	Publisher's Name	Publication year

1	City shaped	Spiro Kostoff	Bulfinch	1993
2	Introduction to settlement geography	SumitaGhosh	Orient BlackSwan	1998
3	Urban Geography: A Global perspective	Michael Pacione	Routledge	2009
4	Urbanization	Paul L Knox	Pearson	2012
5	India: A Sacred Geography	Diana L. Eck	Three Rivers Press	2013

(Group-6): 20HDC33 Housing and Community: Policy, Finance and Public Private Participation

Exam Hours: 3 hours	Exam Marks(Maximum):100

Module-1

INTRODUCTION TO HOUSING

Definitions and components of housing. Housing in relation to non-residential components of settlement. Housing concepts, characteristics; Housing as a process. Importance of Housing Need Assessment: Housing demand, supply and gap. Role of housing in socio-economic development of the nation.

Module-2

HOUSING PROVISION AND STRESSED COMMUNITIES

Housing tenure- Home ownership, Rental Housing (Public and Private) and its impact (Social and Economic) on the households. Housing Affordability. Housing Stress.
Housing Challenges- Slums and Squatter settlements. Methods of enabling housing through Public Housing, Sites and Services, Self Help Groups, NGO engagement.

Module-3

HOUSING-INDIA

The role of government in Indian housing sector - as a developer, financier and policy maker to be critically assessed in the era of privatization. National Housing Policy and Housing schemes in India. Role of HUDCO. State Housing Boards in provision of housing.

Module-4

HOUSING FINANCE

Finance mechanisms for Housing provision- Role of public and private agencies.
Role of NHB and other housing finance companies (HFC's), Co-operatives.
Mechanisms for housing loans for various income groups and industry.
Role of Microfinance.

Module-5

ROLE OF PRIVATE SECTOR

Privatization in housing provision and Role of private sector in housing infrastructure development.

Globalization and effect of global capital participation in housing and urban infrastructure sector.

FDI in housing and SEBI's regulations on REIT.

Legislations related to provision of housing- RERA.

Question paper pattern:

- The question paper will have ten questions.
- Each full question is for 20 marks.
- There will be 2 full questions (with a maximum of four sub questions in one full question) from each module.
- Each full question with sub questions will cover the contents under a module.
- Students will have to answer 5 full questions, selecting one full question from each module. ■

Textbook/Reference Books

	Title of the book	Author Name	Publisher's Name	Publication year
1	Housing laws in India – Problems and Remedies	. P K Sarkar	Eastern Law House	2000
2	Housing Finance In Developing Countries	KavitaDatta and Gareth Jones	Routledge	2012
3	Housing and Urbanization	Cedric Pugh	SAGE Publications	1990
4	Housing- An Indian Perspective	P K Guha	New Central Book Agency	1999
5	Cities and Slums - A study of squatters' settlement in the city of Vijayawada	K RangaRao& M S A Rao	Concept Publishing Company	
6	Urban Housing in the 3rd world	Geoffrey Kayne	New Central Book Agency	1999
7	Town and Country Planning and Housing	N V Modak	Sangam Books Ltd	1979

(Group-6): 20DAC3.2 PARAMETRIC URBAN MAPPING

Exam Hours: 3 hours	**Exam Marks(Maximum):100**

Module-1

The studio explores spatial diagramming, through digital modelling and documentation, showcases how the urban phenomenon and its geospatial pattern can be interpolated into parametrically controlled forms which can later be translated into design solutions. The students will investigate programmatic and formal precedents through readings, discussions, field trips which will be in support of the subject research. The goal will be to understand current urban conditions and practices, and reveal underlying patterns of the fields of research within the

domain of parametric designing. The research conducted by students will cover mapping of different aspects of urban phenomena and their relation with physical city scape. The course syllabus assumes preparing students to best practice the urban planner profession in the conditions of information society. Another objective is to provide them with the tools for influencing the dominant discourses.

Question paper pattern:

- The question paper will have ten questions.
- Each full question is for 20 marks.
- There will be 2 full questions (with a maximum of four sub questions in one full question) from each module.
- Each full question with sub questions will cover the contents under a module.
- Students will have to answer 5 full questions, selecting one full question from each module. ■

Textbook/Reference Books

	Title of the book	Author Name	Publisher's Name	Publication year
1	Agendas on Urbanism	MVRDV		
2	A lateral method for 3D urban design	JernejVidmar	University of Ljubljana,	
3	City Information Modelling: parametric urban models including design Support data Campus and the City	José Beirão, NunoMontenegro, PedroArrobas		
4	Urban Design for the Knowledge Society	Kerstin Hoeger and KeesChristianse		

(Group-6): 20ACM33 ADVANCED CONSTRUCTION TECHNIQUES

Exam Hours: 3 hours	Exam Marks(Maximum):100

Module-1

Conceptual Understanding of various large span structures, like Geodesic domes, hyperbolic paraboloids, and free form shapes etc. used for Airports, Stadia, Industrial buildings, public spaces etc. Construction details understanding, Service systems, Structural Systems, Sequence of erection and facilitating maintenance of such structures. Identify specialized equipment required for erection of such structures. Case studies of such structures and reporting.

Module-2

Study of advance building materials like Special alloys of steel & other metals, glass, polymer, fabric, Various types of finishes & treatments, Construction chemicals, specially manufactured items from manufacturers catalogues, etc. and specialized equipment required for erection used in erection of structures mentioned in Module 1above. Market survey and collection of information about the materials.

Module-3

Conceptual Understanding of High-rise buildings in normal and adverse conditions considering topography of the site, water-logging, marine structures, et. Construction details understanding, Service systems, Structural Systems, Sequence of erection and facilitating maintenance of such structures. Identify specialized equipment required for erection of such structures. Case studies of such structures and reporting.

Module-4

Conceptual Understanding of Pre-fabrication in building construction. Concept of Modular co-ordination. Construction details understanding, Service systems, Structural Systems, Sequence of erection and facilitating maintenance of such structures. Essential process of manufacturing, handling of pre-fabricated components. Identify specialized equipment required for erection of such structures. Case studies of such structures and reporting.

Module-5

Conceptual Understanding of Demolition Techniques, Demolition by Machines, Demolition by Explosives, Advanced techniques using Robotic Machines, Demolition Sequence, Dismantling Techniques, Safety precaution in Demolition and Dismantling. Case studies of such Demolition Techniques and reporting.

Question paper pattern:

- The question paper will have ten questions.
- Each full question is for 20 marks.
- There will be 2 full questions (with a maximum of four sub questions in one full question) from each module.
- Each full question with sub questions will cover the contents under a module.
- Students will have to answer 5 full questions, selecting one full question from each module. ■

Textbook/Reference Books

	Title of the book	Author Name	Publisher's Name	Publication year
1	Construction Technology	S.S. Ataev	Mir Publishers	
2	Prefabrication of Reinforced Concrete	P. Dyanchenko& S. Mirotvorsky	Mir Publishers	
3	Industrial Building and Modular Design	Henrick Nissen	Cement Concrete Association, London	
4	Construction Technology", (Vol. I to IV)	R. Chudley	Longman	
5	Practical foundation engineering hand book	Robertwade Brown	McGraw Hill Publications	
6	Construction Dewatering: New Methods and Applications	Patrick Powers. J	John Wiley & Sons	
7	Advanced Construction Techniques	Roy Chudley& Roger Greeno	Pearson Prentice Hall	
8	Construction Planning, Equipment & Method	Peurifoy	Tata McGraw Hall Pub.	
9	Construction Technology	Sanksar S, Saraswati S	Oxford University Press	
10	Concrete Technology: Theory and Practice	M.S. Shetty	S. Chand Pub.	
11	Fundamentals of Building Construction", subscription E Book, Material and Method	Allen E, Iano, J	John Wiley and Sons	2011

12	Principles and Practices of Commercial Construction", 8th Ed.,	Cameron K. Andres, Ronald C. Smith	Prentice Hall	2009
13	*Off-site fabrication: prefabrication, pre-assembly and modularisation*	Gibb, A.G	John Wiley & Sons	1999

(Group-6): 20ACM35 CONSTRUCTION QUALITY & SAFETY MANAGEMENT	
Exam Hours: 3 hours	**Exam Marks(Maximum):100**

Module-1

QUALITY MANAGEMENT: Quality policy in construction industry-Consumer satisfaction Ergonomics, Time of Completion-Statistical Tolerance- concept of quality- Contract and construction programming-Inspection procedures, total quality control concept, sustainable construction methods

Module-2

QUALITY ASSURANCE AND CONTROL: Total Quality Assurance and Quality Control Program and cost implication. Different aspects of quality Appraisals, failure mode analysis, Stability methods and tools, Influence of drawings, detailing, specification,

Module-3

Quality assurance protocols, work procedure preparation, advanced quality programs, Quality audit and monitoring, Quality circles.

Module-4

STANDARDIZATION AND SAFETY: Standardization-Bid Preparation-Construction activity, the SOP method, Construction Safety - Theory, meaning and scope.

Module-5

SAFETY PROGRAMMES AND ORGANIZATION: Environmental safety, Social and environmental factors, Hazards in construction projects, mitigation and preventive measures, OSHAAS guidelines for construction safety, repercussions of construction accidents, construction accident reporting, Contractual obligations for construction safety, EHS budgeting.

Question paper pattern:

- The question paper will have ten questions.
- Each full question is for 20 marks.
- There will be 2 full questions (with a maximum of four sub questions in one full question) from each module.
- Each full question with sub questions will cover the contents under a module.
- Students will have to answer 5 full questions, selecting one full question from each module. ■

Textbook/Reference Books

	Title of the book	Author Name	Publisher's Name	Publication year
1	Construction Safety (Safety Management)	D S Ganguly& C S Changeriya		
2	Quality on Site	Ferguson Ian and Mitcheel Eric		
3	Quality management-The project Managers perspective	Patterson John		
4	*Construction safety management*.	Levitt, R.E. and Samelson, N.M	John Wiley & Sons	1993
5	*Strategic safety management in construction and engineering*.	Zou, P.X. and Sunindijo, R.Y	John Wiley & Sons	2015
6	*Occupational health and safety in construction project management*.	Lingard, H. and Rowlinson	Taylor & Francis	2005

7	*Quality management in construction projects*.	Rumane, A.R	Crc Press	2016
8	*Construction quality management: Principles and practice*.	Howarth, T. and Watson, P	Routledge.	2012

(Group-6): 16LA107 Soil Science

Exam Hours: 3 hours	**Exam Marks(Maximum):100**

Module-1

Introduction to soil science. Role of soil in landscape design. Formation of the soil, physical, chemical and biological properties of the soil. Importance of Soil pH value, Soil horizons, soil moisture permeability, Ion exchange capacity. Soil texture and classification. Various classification of soil in India, Karnataka and Bangalore

Module-2

Mineralogical properties of Soil. Soil erosion, Factors responsible for soil erosion, measures for stabilization, methods adopted for soil conservation

Module-3

. Soil degradation control, remedial actions and reclamation techniques. Managing difficult soils.
Reclamation of problem soils, saline, alkaline and acidic soils, measures to reclaim the soil, deficiency symptoms.

Module-4

Role of soil organisms, humus and top soil content, green manure, compost, organic/ inorganic fertilizers, Composting, Vermi- Composting, Bio fertilizers

Module-5

Soil required for plant growth and preparation of the soil, soil for potted plants and terrace gardens. Soil analysis: Soil survey and field mapping, land capability classification, soil capability study.

Question paper pattern:

- The question paper will have ten questions.
- Each full question is for 20 marks.
- There will be 2 full questions (with a maximum of four sub questions in one full question) from each module.
- Each full question with sub questions will cover the contents under a module.
- Students will have to answer 5 full questions, selecting one full question from each module. ■

Textbook/Reference Books

	Title of the book	Author Name	Publisher's Name	Publication year
1	Nature & Properties of Soil	Brady Nylec		
2	Handbook of Agriculture	CSIR Publication		
3	Soil Management for Conservation &	R.L. Cook		

(Group-6): 20LA303 Remote Sensing and GIS	
Exam Hours: 3 hours	**Exam Marks(Maximum):100**

Module-1

Concept and Foundation of Remote Sensing - Elements of Photographic System Types of Aerial Photographs: Vertical Photographs, Oblique Photographs, Satellite Imagery - Classification of Spatial and non-spatial data - spatial relationships among elements / activities – fundamentals of topological relationship - spatial data and their representation in maps - raster and vector based system to representing spatial objects

Module-2

Objective and functions Geographical Information System – GIS software in general - over view of GIS map components.
Google Earth – site marking – KML files- exposure to other data sources – Bhuvan. nrc - USGS earth explorer, etc

Module-3

. Basics of GIS maps preparation – digitization of spatial data - concept of point, line and polygon features - fundamental of coordinate system – map layers and georeferencing – displaying spatial features – adding attribute values to the features – preparing and displaying thematic layers and maps - selecting and editing spatial features and attribute data - preparing Grid surfaces form point, line and polygon features

Module-4

SPATIAL ANALYSIS USING GIS
Spatial joining - concept of geo processing – union, intersect, clip and merge – features to raster - preparing surfaces - creating TIN surfaces and contours - surface analysis – spatial joining of geographic features

Module-5

Overlaying features and analyzing using overlay function – feature selection – buffering – table joining and analysis - manipulating attribute data – classification and reclassifications - GIS modelling – 3-D GIS Digital Elevation Model & Digital Terrain Model - Case problem on landscape analysis – application of GIS in assessing Landscape Ecological risks

Question paper pattern:

- The question paper will have ten questions.
- Each full question is for 20 marks.
- There will be 2 full questions (with a maximum of four sub questions in one full question) from each module.
- Each full question with sub questions will cover the contents under a module.
- Students will have to answer 5 full questions, selecting one full question from each module. ■

Textbook/Reference Books

	Title of the book	Author Name	Publisher's Name	Publication year
1	Introduction to G.I.S	Kang Tsung Chang		
2	Remote Sensing and Image Interpretation	Thomos M Lillisand, Ralph		
3	Fundamentals of Remote Sensing	George Joseph		
4	Principles of G.I.S	Peter A Burrough, Rachael A		
5	Spatial Analysis and G.I.S	Michael F Goodchild		