Integral University, Lucknow

Effective from Session: 2020 - 2021							
Course Code	AR301	**Title of the Course**	Architectural Design-V	**L**	**T**	**P**	**C**
Year	**III**	**Semester**	V	**3**	-	**6**	**12**
Pre-Requisite	AR210	**Co-requisite**	Nil				
Course Objectives	1. To expose the students to the complexities of proving shelter for people from different socio-economic background in close proximity to each other, in urban areas. 2. To sensitize the students about land scarcity and expose them to different typologies of high-density housing. 3. To expose the students to the challenges of bigger scale site planning involving a group of buildings. 4. To enable the students, apply theoretical knowledge learnt in previous semesters in architectural design exercise. 5. Issues related to housing shortages, basics of housing finance, incremental housing, sites and services schemes, slums and squatter settlements are to be discussed in the class. 6. The students are expected to design in a climate responsive and environment friendly way while planning medium sized housing complexes. 7. The students are expected to carry out detailed site analysis, documenting physical features, vegetation, land forms soil characteristics, slope analysis and natural drainage patters. 8. Site planning exercise should depict understanding of vehicular and pedestrian movement patterns, land grading and conservation of ecologically sensitive features.						

Course Outcomes	
CO1	Learn the art of collecting data and to carry out analysis for the process of evolving design and individuality of approach.
CO2	Understanding site planning: organization, scale, hierarchy, orientation and climate.
CO3	Understand complex services in multi-storied buildings; understanding the architectural content of services in buildings.
CO4	Implicate knowledge of design fundamentals and knowledge gained in other subjects to develop better design solutions.
CO5	Develop appropriate graphic skills and presentation techniques (models, rendering) to explain the contents of a design.

Unit No.	**Title of the Unit**	**Content of Unit**	**Contact Hrs.**	**Mapped CO**
1	Exercise - I	Designing of public leisure and health facilities. Suggested Exercises Neighbourhood shopping centre Healthcare facilities Sports Club	50	1 & 2
2	Exercise - II	Designs to accommodate masses. Application of building bye-laws and codes of practices in design. Suggested Exercises Housing / Apartments / Condominiums Resorts, etc	50	1, 3 & 5
3	TIME PROBLEM	Design of any small scale shall be carried out in design week from introduction to final Submission Design week problem should be introduced on Saturday/ two days before the commencement of the design week for enabling the students to collect literature and relevant data for the exercise. The problem introduced in design week to be judged by external experts.	44	1 & 4

Reference Books:

Time Saver Standards for Building Types by J. D. Chaira. and M. J. Crosbie

A Comparative analysis of 20th C. houses by H. Hareguchi

Design Process: A Primer for Architectural and Interior by S. F. Miller

Geoffrey Bawa: The Complete Works by D. Robson

e-Learning Source:

http://digital.library.unt.edu/ark:/67531.

	Course Articulation Matrix: (Mapping of COs with POs and PSOs)																	
PO-PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	2	2	2		1	1	2					1	3	2	2		
CO2	3	3	2	3	2	2	1	3					1	2	2	3		
CO3	3	3	3	3	1	2	2	3					3	1	1	1		
CO4	2	2	3	3		2	3	3					3	1	2	2		
CO5	2	2	1	3		1	1	3					2	3	3	2		

1- **Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation**

Ar. Shweta Verma **Name & Sign of Program Coordinator**	**Sign & Seal of HoD**

Integral University, Lucknow

Effective from Session: 2020 - 2021							
Course Code	AR302	**Title of the Course**	Building Construction & Material - V	**L**	**T**	**P**	**C**
Year	**III**	**Semester**	V	**1**	**2**	**2**	**5**
Pre-Requisite	AR211	**Co-requisite**	AR305				
Course Objectives	1. To develop understanding about construction principles. 2. Construction technology and appropriate materials for structural systems, roofing, enveloping and interior finishes shall be considered under this subject from simple examples to complex. 3. To introduce and familiarize the students with the basics of seismic design and construction methods. 4. The subjects should also focus on developing design abilities by applying basic principles of construction and choosing appropriate materials and techniques as per market trends.						

Course Outcomes	
CO1	To develop understanding about construction principles
CO2	Construction technology and appropriate materials for structural systems, roofing, enveloping and interior finishes shall be considered under this subject from simple examples to complex.
CO3	To introduce and familiarize the students with the basics of seismic design and construction methods.
CO4	The subjects should also focus on developing design abilities by applying basic principles of construction and choosing appropriate materials and techniques as per market trends.

Unit No.	**Title of the Unit**	**Content of Unit**	**Contact Hrs.**	**Mapped CO**
1	**Curtain walls**	Curtain walls in glass, aluminum, Precast concrete units etc. for buildings like laboratories, offices, Showrooms, Multiplexes, Malls etc. and their joinery details.	16	1&2
2	**Designing for earthquakes**	Building earthquake resistant buildings: Characteristics as regards size of buildings, horizontal and vertical layout of buildings, adjacency of buildings; Ductility for good seismic performance: type of materials, elementary design concept, flexibility, working drawings to cater to details required for earthquake resistant building in Seismic Zone V.	16	1&3
3	**Prefabrication, pre-stressing**	Prefabrication: Open prefab system, large panel prefab system, joints, pre-casting methods, materials, on-site and off-site prefabrication, components, etc.; Pre-stressed Concrete: Introduction, methods of pre-stressing and their application to large-space structures	16	1&4
4	**Structural steel works**	Typical metal joinery- Riveted and bolted, soldering, brazing and welding; Detailing of structural steel work- beam to column joint, beam to beam joint, column splice, column base and roof truss to column joints, Study of roof truss (steel) etc.	16	4&2
5	**Industrial construction**	Structural steel works: Portal frame, North-light truss and Lattice girder roof with various roof coverings.	16	2&3

Reference Books:

Building Construction of Buildings, Vol. I, II and IV by R. Barry

Building Materials by S. K. Duggal

Materials of Construction by D. N. Ghosh

Building Construction – Vol. I and II by W. B. Mackay

Building Construction by S. C. Rangwala

Construction Technology Vol. III by R. Chudley

Earthquake Resistant Design of Structures by M. Shrikhande and P. Agarwal

Earthquake Resistant Building Construction by Hemant Kumar Sharma

e-Learning Source:

Earthquake Resistant Design: https://www.iitk.ac.in/nicee/IITK-GSDMA/EBB_001_30May2013.pdf

Building Materials & Construction: https://archive.nptel.ac.in/courses/105/102/105102088/

	Course Articulation Matrix: (Mapping of COs with POs and PSOs)																	
PO-PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	1	2	2	2		1	1	2					2	3	2	2		
CO2	2	3	2	3	2	2	1	3					3	3	3	1		
CO3	3	3	3	3	1	2	2	3					3	3	3	2		
CO4	2	2	3	3		2	3	3					3	3	2	2		
CO5													3	3	3	1		

1- **Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation**

Ar. Shweta Verma **Name & Sign of Program Coordinator**	**Sign & Seal of HoD**

Integral University, Lucknow

Effective from Session: 2020 - 21							
Course Code	**AR303**	**Title of the Course**	**HOUSING**	**L**	**T**	**P**	**C**
Year	III	**Semester**	V	2	-	-	2
Pre-Requisite	Nill	**Co-requisite**	Nill				
Course Objectives	1. To enable the students to understand the fundamentals of housing needs, housing finance and housing techniques with relation to social and environmental effect. 2. To understand strategies adopted in Mass Housing projects of various nature and issues related to design considerations.						

Course Outcomes	
CO1	Theoretically understand the fundamentals of housing needs.
CO2	Understand housing finance and housing techniques with relation to social and environmental effect.
CO3	Understand strategies adopted in Mass Housing projects of various nature and issues related to design considerations
CO4	Understand planning principles with respect to housing.

Unit No.	**Title of the Unit**	**Content of Unit**	**Contact Hrs.**	**Mapped CO**
1	Introduction	Housing and its importance in architecture and its relationship with neighborhood and city planning. Significance of housing in National development and social well-being of its citizens; Housing economics, Global housing scenario with emphasis on third world countries.	6	1 & 4
2	Housing Definitions Need and Shortage	Defining and understanding various types of Housing viz. Mass Housing, Group Housing, Apartments, Row Housing, Site and Services, Slums and Squatter housing, Exponential Housing, Social Housing; Assessment of Housing Need, Shortage, and Demand. Economic categorization – EWS, LIG, MIG, and HIG; Quantitative and qualitative aspects of housing.	10	2, 3 & 4
3	Housing Policies and The Role of Housing Agencies	Understanding and evaluation of National and State Housing Policies and programmes in India; Policy framework for urban housing; Affordable Housing, Low Income and Low-Cost Housing.An introductory study of Housing Boards, Development Authorities, and Cooperative Housing Societies in tackling the housing problem of the Country. A brief study of Housing Finance Institutions like HUDCO, HDFC, NHB, etc.	10	1, 2& 4
4	Housing Design and Development Process	Understanding of factors affecting the residential location and site planning, social and physical facilities; revisiting FAR, Density, and Ground coverage norms and standards for the development of housing estates; Determination of Housing mix. Undertaking a conceptual exercise for a small group housing project.	10	4
5	Case Studies	Exclusive case studies relating to Plotted Housing, Slums and High- rise Housing /Apartments including detailed analysis of Unit designs and basic principles of Estate Management.	06	1 & 4

Reference Books:

Mans Struggle For Shelters In An Urbanizing World by Abrams Charles

Urban Housing Strategies by Babur Mumtaz & Patweikly.

Low Income Housing In The Developing World by Geoffrev K.Paul,

Housing By People by John F.C Turner,

Housing, Climate And Comfort by Martin Evans,

Environment And Design In Housing by Lewis Davidson Gotlieb,

Urban Housing Strategies. by Babur Mumtaz and Patweikly,

Urban Housing in Developing Economy by O. P. Miglani .

Urban Housing and Slums by A. K. Jain,

e-Learning Source:

https://www.india.gov.in/topics/housing/urban-housing

https://data.gov.in/keywords/urban-housing

https://www.hudco.org/Site/FormTemplete/frmTemp1PLargeTC1C.aspx?MnId

	Course Articulation Matrix: (Mapping of COs with POs and PSOs)																	
PO-PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4	PSO6	PSO7
CO1	1	1	1	1	3	1	3	2					3	2	3	2		
CO2	3	2	2	1	3	1	1	3					3	3	3	1		
CO3	3	3	3	1	2	2	1	1					3	3	3	2		
CO4	2	2	1	3	3	1	3	1					3	3	2	1		

1- **Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation**

Ar. Shweta Verma **Name & Sign of Program Coordinator**	**Sign & Seal of HoD**

Integral University, Lucknow

Effective from Session: 2020-2021							
Course Code	AR 304	**Title of the Course**	Building Bye Laws	**L**	**T**	**P**	**C**
Year	**III**	**Semester**	V	**2**	**-**	**-**	**2**
Pre-Requisite	Nil	**Co-requisite**	AR301				
Course Objectives	1. Familiarization with Development Control Rules and Building byelaws 2. To acquaint the students with various codes of practices/ acts relating to building construction. 3. To make the student appreciate the implications of issues emerging from an urban context.						

Course Outcomes	
CO1	To make students understand how to maintain the overall massing of the city in an urban context.
CO2	To familiarize student with development of design according to Control Rules and Building Bye laws of Local Authority.
CO3	To understand the plan approval process from the sanctioning authority.
CO4	To make students aware about the various codes of practices and different acts regarding the construction of building
CO5	To make students aware about the Norms and standards for different typology of users.

Unit No.	**Title of the Unit**	**Content of Unit**	**Contact Hrs.**	**Mapped CO**
1	Introduction	Historical background; Relevance; Definitions. ; NBC, Master and Zonal plan; Land-use etc	04	1
2	Building Regulations	General Building Requirements like Setback, Ground Coverage, Height, F.A.R., Density, Room sizes, Light and Ventilation etc.	08	2
3	Procedure For Obtaining Building Permit	Procedure for obtaining Building Permit (including online procedure)- compounding and completion certificate. Development Control rules including open spaces, road widths, junctions, parking norms, community facilities etc	08	3
4	Fire Protection And Fire Safety Requirements	Classification of Buildings based on occupancy, Fire Zones, Types of construction, General requirements of all individual occupancies and General Exit requirements. Fire protection requirements for high rise buildings- 15m in height or above	08	4
5	Special Requirements	Special requirements for group housing, multistoried and special buildings like malls, multiplexes, convention centers, SEZ's etc. Norms for differently abled, senior citizen and children.	04	5

Reference Books:

Bhawan Nirman Avam Vikas Upvidhi, Lucknow Development Authority, Lucknow

2016 National Building Code of India

Master plans of relevant town/city.

Modern building Bye Laws.

e-Learning Source:

http://www.urbanindia.nic.in/publicinfo/byelaws/Chap-2.pdf

https://www.upavp.com/gov_planning.htm

http://uparchitects.org/rev_bye_laws3.htm

http://jmc.nic.in/forms/byelaws.pdf

	Course Articulation Matrix: (Mapping of COs with POs and PSOs)																	
PO-PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4	PSO6	PSO7
CO1	3	3	-	1	3	-	-	1					2	3	3	1		
CO2	-	3	-	-	3	-	-	1					3	3	1	1		
CO3	3	2	1	1	2	-	-	2					3	3	2	1		
CO4	1	3	2	2	2	-	1	2					2	3	2	2		
CO5	3	2	1	1	2	-	-	2					3	3	2	1		

1- **Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation**

Ar. Shweta Verma **Name & Sign of Program Coordinator**	**Sign & Seal of HoD**

Integral University, Lucknow

Effective from Session: 2020 - 2021							
Course Code	AR305	**Title of the Course**	Architectural Structures-IV	**L**	**T**	**P**	**C**
Year	III	**Semester**	V	**1**	**2**	**-**	**2**
Pre-Requisite	AR213	**Co-requisite**	Nil				
Course Objectives	1. To understand the basic principles of structural mechanics, so that it can help in building a strong basis to understand study of structural design. 2. Developing in students, material skills to analyze and understand fundamentals and working of various parts of different structural systems. 3. Analysis and design of indeterminate structures and their use.						

Course Outcomes	
CO1	Forces and their resolution.
CO2	Bending stresses and its nature for different sections.
CO3	Shear stresses and various sections.
CO4	Nature of deflection and angle of slope in cantilever and simply supported beams for different kind of loading.
CO5	Behavior of columns and struts after their loading, understanding through different theories.

Unit No.	**Title of the Unit**	**Content of Unit**	**Contact Hrs.**	**Mapped CO**
1	**STRESSES IN TRUSSES**	Forces in members, analytical method; method of joints, method of sections	10	1
2	**BENDING STRESSES**	Bending equation, bending stresses in symmetrical and asymmetrical sections.	10	2
3	**SHEAR STRESS**	Shear stress distribution in various sections	9	3
4	**DEFLECTION OF BEAMS**	Differential equation of deflected beam, double integration method, Macaulay's method, statically determinate beams and propped cantilever, moment area method.	9	4
5	**COLUMNS AND STRUTS**	End conditions, effective length, slenderness ratio, Euler's and Rankin's formulae.	10	5

Reference Books:

Elements of Structural Analysis by S. A. Bari

Structure and Architecture by A. J. Macdonald

Strength of Materials by R. K. Rajput

Engineering Mechanics by R. K. Bansal

Mechanics of Structures by S. B. Junnarkar

Strength of Materials by R. S. Khurmi

Elements of Engineering Mechanics by S. Mukharji

Engineering Mechanics: A Textbook of Applied Mechanics by S. Ramamurtham

Analysis of Structures. Vol. I by Vazirani and Ratwani

e-Learning Source:

http://emweb.unl.edu/NEGAHBAN/EM223/note12/note12.htm

	Course Articulation Matrix: (Mapping of COs with POs and PSOs)																	
PO-PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	1	1	1	1	1	1	1	1					3	3	2	2		
CO2	2	2	2	2	2	2	2	2					2	3	3	3		
CO3	3	3	3	3	3	3	3	3					3	2	3	2		
CO4	2	2	2	2	2	2	2	2					3	2	3	2		
CO5	2	3	3	2	2	3	2	2					1	3	2	1		

1- Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation

Ar. Shweta Verma **Name & Sign of Program Coordinator**	**Sign & Seal of HoD**

Integral University, Lucknow

Effective from Session: 2020 - 2021							
Course Code	**AR306**	**Title of the Course**	**History of Architecture, Art & Culture-IV**	**L**	**T**	**P**	**C**
Year	III	**Semester**	V	1	2		2
Pre-Requisite	AR215	**Co-requisite**	Nil				
Course Objectives	1. Understanding of period in terms of contexts of location, climate and other parameters. 2. Understanding of period in terms of contexts of location, climate and other parameters. 3. To understand the development in the Western Architecture from Renaissance to the Contemporary with emphasis on the underlying parameters, philosophy, intentions and expressions of associated periods/ movements as a response to the context of time, location and aspirations. 4. Familiarizing with typical examples of building type. 5. Familiarizing with typical examples of building type. 6. To generate an understanding about the development and its architectural implications.						

Course Outcomes	
CO1	Know about the period in terms of contexts of technology and other parameters.
CO2	Know the development in the modern period with emphasis on the underlying parameters, philosophy, intentions and expressions of associated periods/ movements as a response to the context of time, location and aspirations.
CO3	Understand the building type and its architectural style.

Unit No.	Title of the Unit	Content of Unit	Contact Hrs.	Mapped CO
1	**LEADING TO A NEW ARCHITECTURE AND REVIEWING INDUSTRIALIZATIO N**	Beginnings of modernity, Origin and development of Neo Classicism, Structural Neo classicists: Marc Antonie Laugier, acques Germain Soufflot, Karl Friedrich Schinkel, Henri Labrouste; Romantic Neo classicists: Claude Nicolas Ledoux, Etienne-Louis Boulle, Durand,Jefferson Industrialization and its impact, Emergent new building / space types, Growing need for mass housing, Development of Industrial material and construction technologies- concrete, glass and steel, structural engineering, standardization, Industrial exhibitions, Chicago School and skyscraper development. ***Reviewing Industrialization:*** Opposition to industrial arts and production, Arts and Crafts movement in Europe and America: William Morris, Philip Webb Art Nouveau: Victor Horta, Van De Velde, Antonio Gaudi, C. R.Mackintosh Vienna secession: Josef Hoffman, Joseph Maria Olbrich, Frank Lloyd Wright's early works	10	1, 2 & 3
2	**MODERN MOVEMENT AND INTERNATIONAL STYLE**	Second phase of Industrial Revolution (development of automobiles and elevator technologies, rise of mass-production paradigm); Emergence of Modern Architecture, Chicago School, De Stijl movement, Bauhaus movement and CIAM, International style, Post War reconstruction in Europe, and its influences on Modern Architecture, Philosophies of minimalism and Form Follows Function; works of great modern masters (Peter Behrens, Edwin Lutyens, Walter Gropius, Mies Van der Rohe, Le Corbusier, later works Frank Lloyd Wright; Louis Kahn, Alvar Alto etc;). Planning thoughts associated with Modernism: Towers in the sky and automobile dependent urban thoughts of Corbusier and Wright, The International Style: simplification of the Modern architecture into steel and glass cubes- an overview of the works of Philip Johnson; Critiquing Modernism: Brutalism: projects of Smithsons and Aldo Van Eyck, writings of Jane Jacobs, Robert Venturi, Aldo Rossi and Christopher Alexander.	15	1, 2 & 3
3	**POST MODERNISM**	*Post modernism of Reaction:* Architecture entrenched in place and history; sarcastic approval of expression, ornament, symbolism and context - an overview of the works of James Stirling, Michael Graves, Charles Moore. *Post modernism of Resistance:* Disregard for historical imagery; revival of the ideals of the Modern Architecture of the 20's; exaggerated and sophisticated revival of the grid and Corbusier's geometry - an overview of the works of Richard Rogers, Norman Foster, Richard Meier.	6	1, 2 & 3

4	**HI-TECH AND HISTORICISM**	Synthesis of the Hi-Tech and Historicism - an overview of the works of Cesar Pelli, Aldo Rossi, Renzo Piano	4	1 & 2
5	**DECONSTRUCTION**	Deconstruction as a reaction to the Post Modern; non-perfection as important as perfection, narrative and representational; traditional purity of form, geometry and structure in question - an overview of the works of Frank O. Gehry, Peter Eisenman, Bernard Tschumi, Rem Koolhas, Zaha Hadid, and Daniel Libskind *Alternative practices and idea:* Oil crisis of the 1970s and rising environmental consciousness; Theory of New Urbanism and Sustainable Urban Development. *Critical Regionalism*- Ideas and works of Laurie Baker, Hasan Fathy, Ralph Erskine, Lucien Kroll, Ando, Bawa, Barragan, Siza	12	1, 2 & 3

Reference Books:
A History of Architecture by Sir Banister Fletcher,
Modern Architecture - A Critical by K. Frampton
Modern Architecture since 1900 by W. J. R. Curtis.
Architecture in the Twentieth Century by P. Gossel & G. Leuthauser.
The Language of Post-Modern Architecture by C. Jencks
The eyes of the skin: Architecture and the senses. by J. Pallasmaa
Biomimicry in Architecture by M. Pawlyn .
Architecture and disjunction. by B. Tschumi..
Complexity and Contradiction in Architecture by R. Venturi. .
Vitruvius: The ten books on architecture by P. Vitruvius, M. H. Morgan.
e-Learning Source:
http://architecture.arizona.edu/sites/default/files/projects/MAPP%20Tucson%20context%20study.pdf
http://www.studentpulse.com/articles/515/the-rise-and-fall-of-modernist-architecture
http://www.visual-arts-cork.com/architecture/international

	Course Articulation Matrix: (Mapping of COs with POs and PSOs)																	
PO-PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4	PSO6	PSO7
CO1	1	-	3	3	2	-	3	2					2	3	2	1		
CO2	1	-	-	3	3	-	3	2					3	2	3	2		
CO3	1	2	-	3	1	-	3	3					3	3	3	2		

1- **Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation**

Ar. Shweta Verma **Name & Sign of Program Coordinator**	**Sign & Seal of HoD**

Integral University, Lucknow

Effective from Session: 2020 - 2021							
Course Code	AR307	**Title of the Course**	BUILDING SPECIFICATION	**L**	**T**	**P**	**C**
Year	**III**	**Semester**	V	**1**	**2**	**0**	**2**
Pre-Requisite	Nil	**Co-requisite**	Nil				
Course Objectives	To acquaint students with methodology of writing specifications with reference to building trades, materials, Workmanship and performance of different items of work and introducing the students to specifications as an Integral part of contract document for building projects.						

Course Outcomes	
CO1	Introduction, definition, importance and scope of the subject. Correct form of specification writing – avoiding ambiguity and conflicting statements. Form and sequence of clauses, study and use of standard specifications.
CO2	Detailed specification writing of various building materials, e.g. bricks, sand, lime, glass, paints, metals, timber and its products, which includes about selection of materials with their trade names, manufacturers specifications of allied products such as block board, plywood, soft board, aluminum, steel etc.
CO3	DPC and DPM, General idea about water proofing in basement, swimming pool, toilets, kitchen, terraces and water tanks etc.
CO4	Superstructure in cement mortar, plastering and painting, flooring, whitewashing, distempering and painting, cement paint, stone masonry, mud phuska, terracing and others.
CO5	Gen. Specifications for Electrical, plumbing and gas supply arrangement within building. Lighting and Earthling, sewage disposal, rain water harvesting etc.

Unit No.	**Title of the Unit**	**Content of Unit**	**Contact Hrs.**	**Mapped CO**
1	**Specification writing**	Introduction, definition, importance and scope of the subject. Correct form of specification writing – avoiding ambiguity and conflicting statements. Form and sequence of clauses, study and use of standard specifications drafted by C.P.W.D., PWD & MES etc.	8	1
2	**Specification of General Building Materials**	Detailed specification writing of various building materials, e.g. bricks, sand, lime, glass, paints, metals, timber and its products, which includes about selection of materials with their trade names, manufacturer's specifications of allied products such as block board, plywood, soft board, aluminum, steel etc. Identifying a section by their weight, gauge etc. Specifications for alternative building materials and finishes, Wall cladding, facades, ACP, suspended concrete floors, concrete hollow blocks, tampered concrete and Architraves etc.	8	2
3	**Sub-structure work**	DPC and DPM, General idea about water proofing in basement, swimming pool, toilets, kitchen, terraces and water tanks etc.	8	3
4	**Super structure**	Superstructure in cement mortar, plastering and painting, flooring, whitewashing, dis tempering and painting, cement paint, stone masonry, mud phuska, terracing and others. Specifications for concrete work including mixing, transportation, placing and curing of concrete, concrete add mix scaffolding required for R.C.C. Works.	8	4
5	**Services specification & market survey**	Gen. Specifications for Electrical, plumbing and gas supply arrangement within building. Lighting and Earthing, sewage disposal, rain water harvesting etc. A comprehensive market survey required for different building material including their make, quality/grade and size.	8	5

Reference Books:
Estimating, Costing, Specification & Valuation by M. Chakarborty
CPWD Specifications and schedule of rate analysis
I. S. 1200 Parts I to XXV – Method of Measurement of Building and Civil Engineering Works, Bureau of Indian Standards
Cost studies of buildings, Pearson Higher Education by A Ashworth
Standard Handbook for Civil Engineering
Standard Schedule of Rates for Delhi, CPWD & UPPWD
Standard Specifications, CPWD & UPPWD
National Building Code of India (Latest Edition), Bureau of Indian Standards
e-Learning Source:
Building Materials & Construction: https://nptel.ac.in/courses/105102088
Schedule of rates: https://cpwd.gov.in/Publication/DSR_Vol_1_Hindi_2018.pdf
Building Specification Vol – I: https://cpwd.gov.in/Publication/Specs2009V1.pdf
Building Specification Vol – II: https://cpwd.gov.in/Publication/Specs2009V2.pdf

	Course Articulation Matrix: (Mapping of COs with POs and PSOs)																	
PO-PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	1	3	2	1	2	2	2	1					1	3	2	2		
CO2	2	3	3	2	-	3	2	1					3	3	2	3		
CO3	3	3	3	2	-	2	2	1					2	3	3	2		
CO4	2	3	3	1	-	2	2	1					1	3	3	2		
CO5		3	2	1	1	2	1	1					1	2	2	3		

1- **Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation**

Ar. Shweta Verma **Name & Sign of Program Coordinator**	**Sign & Seal of HoD**

Integral University, Lucknow

Effective from Session: 2020 - 2021							
Course Code	AR-308	**Title of the Course**	BUILDING SERVICES - MECHANICAL	**L**	**T**	**P**	**C**
Year	**III**	**Semester**	V	**1**	**2**		**2**
Pre-Requisite	Nil	**Co-requisite**	Nil				
Course Objectives	1. To understand advanced building services pertaining to natural and mechanical ventilation, and their application to built forms. 2. To make students aware about Fire- fighting methods, rules, regulations and equipments. 3. To understand the incorporation of Mechanical and fire fighting Services in building design. 4. To understand and prepare layout and details for design project in architectural design.						

Course Outcomes	
CO1	Demonstrate an understanding of building construction as it relates to firefighter safety, building codes, fire prevention, code inspection, and firefighting strategy.
CO2	Understand the basic fundamentals of mechanical systems.
CO3	Understanding the concept of Fire and methods used as fire-fighting.
CO4	Understanding of working of Lift and escalator as a mechanical device
CO5	Develop an understanding of local codes in reference to the topics of this course

Unit No.	Title of the Unit	Content of Unit	Contact Hrs.	Mapped CO
1	**HVAC (HEATING VENTILATION AND AIR CONDITIONING)**	Heating and Ventilation: Heating of spaces – local and central heating, heating equipments, Comfort conditions, temperature control, humidity control, air filtration, rate of ventilation, Control Room for centralized Heating System. Natural & Mechanical ventilation in buildings, Plenum system, exhaust system, plenum and exhaust system; and air filters. Duct sizes for mechanical ventilation as per NBC standards.	9	2
2	**HVAC (HEATING VENTILATION AND AIR CONDITIONING)**	Air Conditioning: Principles of Air-conditioning, refrigeration cycle and air cycle, working of window air conditioners, split air conditioners and central air-conditioning: parts, standards and location criterion, air distribution systems: fans, filters, ductwork, outlets, and dampers. Classification & working of AHU, norms and load calculation of air-conditioning as per NBC standards	10	2
3	**LIFTS AND ESCALATORS**	Types of lifts, parts, working, terminology: average travel, lift carrying capacity, rated load, rated speed, RTT, lift well, machine room and size. Lift Control Systems. Requirements for installation of lifts, market survey. Grouping of lifts and design standards of a lift lobby. Function and working of Escalators.	10	4
4	**FIRE SAFETY SYSTEMS AND EQUIPMENTS**	Fire- causes and spread of fire. Fire Alarm and Detection System, Fire Protection Systems and Equipments, Fire Fighting Equipments, Hydrant Systems, Fire Extinguishers- Gas taps, Foam, Portable	10	1 & 3
5	**APPLICATION IN DESIGN**	Introduction and calculation of shaft sizes, Fire Control room and location as per NBC Application of above studies in current design problems and preparing design layout and details.	9	2 & 4

Reference Books:

Fire Safety in Buildings by V. K. Jain.

Handbook of Designing and Installation of Services in Building Complex by V. K. Jain.

Heating, Ventilation and Air Conditioning- Systems and Equipments 2000 ASHRAE Handbook,

Handbook of Mechanical & Electrical systems for Buildings by H. E.Bovay

e-Learning Source:

http://www.epa.gov/iaq/schooldesign/hvac.html

http://en.wikipedia.org/wiki/HVAC

http://www.teriin.org/ResUpdate/reep/ch_5.pdf

http://en.wikipedia.org/wiki/Elevator

	Course Articulation Matrix: (Mapping of COs with POs and PSOs)																	
PO-PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3			3	1	3	1	2					2	3	1	2		
CO2	3		2	3		2	1	3					1	2	2	3		
CO3	2	3		3		3	1	1					3	2	1	1		
CO4	3		2	2		3	3	1					3	1	2	2		
CO5	3	2			3	2	3	1					2	3	2	2		

1- **Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation**

Ar. Shweta Verma **Name & Sign of Program Coordinator**	**Sign & Seal of HoD**

Integral University, Lucknow

Effective from Session: 2020 - 2021							
Course Code	AR309	**Title of the Course**	**Non-Teaching Credit Course (Summer Assignment)**	**L**	**T**	**P**	**C**
Year	**III**	**Semester**	V	**-**	**-**	**-**	**1**
Pre-Requisite	Nil	**Co-requisite**	Nil				
Course Objectives	1. Making student learn the art of collecting data and to carry out analysis for the process of evolving design and individuality of approach. 2. To inculcate the habit of reading books related to architecture and allied subjects in a structured manner. 3. To equip the students with the art of paper presentations and preparation of report.						

Course Outcomes	
CO1	Student learned the art of collecting data for the process of evolving design.
CO2	Student learn the art to carry out analysis for the process of evolving design and individuality of approach
CO3	Developed the habit of reading books related to architecture.
CO4	Developed the habit of reading books related to allied subjects of subjects in a structured manner.
CO5	Students equipped with the art of paper presentations and preparation of report.

Unit No.	Title of the Unit	Content of Unit	Contact Hrs.	Mapped CO
1	COURSE OUTLINE	Audit Course is to be undertaken before the commencement of III semester classes. This assignment could be a Measured drawing and documentation of a noted building or library based study and report writing. The choice of the building to be documented or the book to be studied is left to the choice of concerned faculty. The assignment may be given as group work (2 to 4 students per group). In case of book reading they are expected to write critical essays, book reviews or a research report based on their readings. The students have to submit a report on the work done within 15 days from the beginning of the III Semester. The reports are to be assessed by the concerned faculty for progressive marks. SUGGESTIVE EXERCISES Report Writing Power Point Presentations Measure drawing etc.	-	1,2,3,4,5

	Course Articulation Matrix: (Mapping of COs with POs and PSOs)																	
PO-PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	3	2	1	2	3	2	1					3	2	2	3		
CO2	1	3	3	2	1	3	3	2					3	3	3	1		
CO3	3	3	2	1	2	3	2	1					3	2	2	3		
CO4	2	2	2	1	2	2	2	3					3	1	3	1		
CO5	2	2	2	1	2	2	2	3					1	2	3	2		

1- **Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation**

Ar. Shweta Verma **Name & Sign of Program Coordinator**	**Sign & Seal of HoD**

Integral University, Lucknow

Effective from Session: 2020 - 2021							
Course Code	AR310	**Title of the Course**	**ARCHITECTURAL DESIGN - VI**	**L**	**T**	**P**	**C**
Year	**III**	**Semester**	VI	**3**	**-**	**6**	**12**
Pre-Requisite	AR301	**Co-requisite**	Nil				
Course Objectives	The objectives of this studio are twofold. The first objective is to expose the students to the challendesigning functionally complicated buildings, having a complex array of activities and services; The objective is to familiarize the students to the task of coordinating integration of structural design and specbuilding services in the framework of architectural design. The third objective is to let the students und advanced construction technology and newer building materials.						

Course Outcomes	
CO1	Learn the art of collecting data and to carry out analysis for the process of evolving design and individuality of approach.
CO2	Understanding site planning: organization, scale, hierarchy, orientation and climate.
CO3	Understand complex services in multi-storied buildings; understanding the architectural content of services in buildings.
CO4	Implicate knowledge of design fundamentals and knowledge gained in other subjects to develop better design solutions.
CO5	Develop appropriate graphic skills and presentation techniques (models, rendering) to explain the contents of a design.

Unit No.	Title of the Unit	Content of Unit	Contact Hrs.	Mapped CO
1	**Muti-storeyed service orientedand recreational building.**	a) Emphasis on the design of services intensive, multi-storeyed, buildings in tighturban spatial context. b) Design focuses on closed environment, with emphases on interior spaces,integration of various services, and conformance with regulatory norms. c) The external environment to take into consideration circulation of emergencyvehicles and parking optimisation. The design studio may be closely synchronised with working drawing studio. *Suggested Exercises*Hotel Design Hospital Design	55	1,2,3
2	**The focus of thestudio is on functionality andintegration of advanced technology and services in multi-storeyed buildings.**	*Suggested Exercises* Mixed use multi-storeyed building.	55	2,3,4
3	**Time Problem**	Design of any small scale shall be carried out in design week from introduction tofinal Submission Design week problem should be introduced on Saturday/ two days before the commencement of the design week for enabling the students to collect literature and relevant data for the exercise. The problem introduced in design week to be judged by external experts.	34	1,2,3,4,5
4				
5				

Reference Books:

Baiche, B. and Walliman, N., Neufert Architects Data, 4th Ed. Oxford : Wiley-Blackwell

Chiara, J. D. and Michael, J. C., Time Savers Standards for Building Types. Singapore :McGraw Hill Professional.

Gauzin-Muller, D., Sustainable Architecture and Urbanism: Concepts, Technologies,Examples. 1st Ed. Basel

Huxtable, A-L. (1984)., Tall Buildings Artistically Reconsidered
Kloft, E. and Johann, E., High-rise Manual: Typology and Design, Construction and Technology, 1st Ed. Basel : Birkhauser Verlag AG
Markus, K., Rollbacher, R., Herrmann, E., Wietzorrek, U. and Ebner, P., Typology+:Innovative Residential Architecture. Basel : BirkhauserVerlag AG.
Parker, D. And Wood, A. (2013), The Tall Buildings Reference Book. New York : Routledge
Wood, A. and Ruba, S. (2012), Guide to Natural Ventilation in High Rise Office Buildings. New York : Routledge
e-Learning Source:
Design Standards for Aged and Handicapped People: https://cpwd.gov.in/Publication/aged&disabled.pdf
Regulations on details of Doors and Windows for a Residential Buildings: https://cpwd.gov.in/Publication/manualdw.pdf

	Course Articulation Matrix: (Mapping of COs with POs and PSOs)																	
PO-PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4	PSO6	PSO7
CO1	3	2	2	2	-	1	1	2					2	2	1	2		
CO2	3	3	2	3	2	2	1	3					3	3	3	3		
CO3	3	3	3	3	1	2	2	3					2	2	2	1		
CO4	2	2	3	3	-	2	3	3					3	3	3	2		
CO5	2	2	1	3	-	1	1	3					3	2	3	2		

Ar. Shweta Verma
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Effective from Session: 2020 - 2021							
Course Code	AR311	**Title of the Course**	Building Construction & Material - VI	**L**	**T**	**P**	**C**
Year	**III**	**Semester**	VI	**1**	**2**	**2**	**5**
Pre-Requisite	AR302	**Co-requisite**	Nil				
Course Objectives	1. To develop understanding about construction principles. 2. Construction technology and appropriate materials for structural systems, roofing, enveloping and interior finishes shall be considered under this subject from simple examples to complex. 3. To understand design limitations due to authority guidelines and making drawings/ details necessary for final execution of a project. 4. To introduce and familiarize the students with the advance construction techniques and methods. 5. The subjects should also focus on developing design abilities by applying basic principles of construction and choosing appropriate materials and techniques and mechanical technology as per market trends.						

Course Outcomes	
CO1	Knows about the construction principles used in the construction industry
CO2	Understand the trending Construction technology and appropriate materials for structural systems, roofing, enveloping and interior finishes
CO3	understand the design limitations with respect to authority guidelines for execution of a project
CO4	Familiarization of the students with the advance construction techniques and methods.
CO5	Understand & knows about the appropriate materials and techniques and mechanical technology as per market trends.

Unit No.	**Title of the Unit**	**Content of Unit**	**Contact Hrs.**	**Mapped CO**
1	**Sound proof construction**	Sound proof partitions and doors for recording studios, Cinemas, broadcasting studios etc. alongwith their construction details, finishes, and specification.	16	1,2
2	**Special construction**	Methods, types of floor construction: Beam & slab, waffle grid slab, drop beam and slab, flush slab and lift slab construction, Cast-in-situ service and stair cores, Cross wall and box frame construction.	14	1,2,3
3	**Vertical movement means**	Lifts, Elevators and Moving Walkways/ Travelators: Lifts of various types such as passenger, goods, hospitals etc. (with special reference to Design of lift cage), Constructional requirements for their installation and their detail- Escalators and Walkways/ Travelators etc.	14	1,3,4
4	**Retrofitting of structures**	Need of retrofitting, Techniques of retrofitting of structural components, Advanced retrofitting techniques of foundations, Beams, and other structural elements etc.	18	1,2,3,4
5	**Defects and remedies in buildings**	The study of various defects in buildings and their remedies: Defects caused by so many factors starting from the construction stage to occupied stage. A detailed portfolio will be prepared which includes the defects, deriving forces and the practiced solution along with any other remedial solution suggested by the student.	18	4,5

Reference Books:

Building Construction of Buildings, Vol. I, II and IV by R. Barry

Building Materials by S. K. Duggal

Materials of Construction by D. N. Ghosh

Building Construction – Vol. I and II by W. B. MAckey

Building Construction by S. C. Rangwala

Construction Technology Vol. III by R chudley

e-Learning Source:

Introduction to Lean Construction: https://archive.nptel.ac.in/courses/105/106/105106213/

Construction Methods & Equipment Management: https://archive.nptel.ac.in/courses/105/103/105103206/

Basic Construction Material: https://archive.nptel.ac.in/courses/105/106/105106206/

Characterization of Construction Material: https://archive.nptel.ac.in/courses/105/106/105106200/

	Course Articulation Matrix: (Mapping of COs with POs and PSOs)																	
PO-PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	2	2	-	-	-	2	3					3	2	2	2		
CO2	1	2	3	2	1	3	3	2					2	3	3	1		
CO3	3	2	3	3	3	2	2	3					3	2	3	1		
CO4	3	2	3	1	-	2	-	3					3	2	3	3		
CO5	2	3	3	2	2	2	1	2					3	3	3	2		

1- **Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation**

Ar. Shweta Verma **Name & Sign of Program Coordinator**	**Sign & Seal of HoD**

Integral University, Lucknow

Effective from Session: 2020 - 21							
Course Code	AR312	**Title of the Course**	Working Drawing and Details	**L**	**T**	**P**	**C**
Year	**III**	**Semester**	VI	**-**	**4**	**-**	**2**
Pre-Requisite	AR203	**Co-requisite**	Nil				
Course Objectives	1. To develop understanding about good for construction drawings. 2. To introduce and familiarize the students with the contemporary construction method with special reference to advance constructional detail. 3. To understand design limitations due to authority guidelines and making drawings/ details necessary for final execution of a project. 4. The subjects should also focus on developing design abilities by applying basic principles of construction and choosing appropriate materials and techniques and mechanical technology as per market trends and site limitations.						

Course Outcomes	
CO1	To learn and study the types of drawings.
CO2	To introduce and familiarize the students with the contemporary construction method with special reference to advance constructional detail.
CO3	To understand design limitations due to authority guidelines and making drawings/ details necessary for final execution of a project.
CO4	To develop design abilities by applying basic principles of construction. and choosing appropriate materials and techniques and mechanical technology as per market trends and site limitations.
CO5	To develop abilities for selecting appropriate materials and techniques and mechanical technology as per market trends and site limitations.

Unit No.	**Title of the Unit**	**Content of Unit**	**Contact Hrs.**	**Mapped CO**
1	Building Blocks	Structural Plan: Coordinated foundation layout with details, Plinth beam layout & detail, Column layout & detail, Lintel, Chajja, Projection plan & detail etc. Floor Plan(s): Coordinated ground floor plan; Coordinated first floor plan (typical); Coordinated terrace plan, Flooring pattern layout etc.	16	1-4
2	Building Blocks	Elevation & Sections: Coordinated elevation drawing, Coordinated sections, skin sections etc. Door/window/ventilators design/ drawing; door and window schedule, design, details etc.	08	1-4
3	Building Blocks	Services: Electrical layout plan and schedule; plumbing layout and schedule; toilet plan & details- complete with all fittings& fixtures; kitchen details complete with all fittings& fixtures etc.	16	1-4
4	Site Plan	Site/building set-out plan, Landscape plan & detail of various design elements used in previous design exercises, Drainage layout, Electrical layout, Fire fighting layout.	16	1-4
5	Details	Staircase details including railings; Design detail of entrance gate, grills, parapet and/or railings; Septic tank detail, Water harvesting pit details. Toilet/ Kitchen's counter finishes, dado details etc.	08	5

Reference Books:

Building Construction of Buildings, Vol. I, II and IV by R. Barry

Architectural Drafting and Design by Jefferis, A. and Madsen, D.A.

Details in Architecture: Vol. I-V by Joe, B. (Ed).

Plans Sections Elevations – Key buildings of the twentieth century. by R. Weston.

e-Learning Source:

https://www.designingbuildings.co.uk/wiki/Working_drawing

https://www.slideshare.net/sanjibsengupta18/architectural-working-drawing-248307290

https://www.pearsonhighered.com/assets/samplechapter/0/1/3/2/0132740648.pdf

	Course Articulation Matrix: (Mapping of COs with POs and PSOs)																	
PO-PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO4	PSO5	PSO6	PSO7
CO1	2	3	2	1	2	1	2	1					2	3	2	1		
CO2	2	2	1	2	2	3	2	2					3	2	3	2		
CO3	1	3	3	3	1	2	1	3					3	3	3	1		
CO4	3	2	2	3	2	1	2	2					2	3	3	2		
CO5	2	3	3	1	1	2	2	2					2	2	3	1		

1- **Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation**

Ar. Shweta Verma **Name & Sign of Program Coordinator**	**Sign & Seal of HoD**

Integral University, Lucknow

Effective from Session: 2020 - 2021							
Course Code	**AR313**	**Title of the Course**	**Architectural Structures-V**	**L**	**T**	**P**	**C**
Year	III	**Semester**	VI	**1**	**2**	**-**	**2**
Pre-Requisite	AR305	**Co-requisite**	Nil				
Course Objectives	1. To understand the basic principles of structural mechanics, so that it can help in building a strong basis to understand study of structural design. 2. Developing in students, material skills to analyze and understand fundamentals and working of various parts of different structural systems. 3. Analysis and design of indeterminate structures and their use. 4. Design of structural elements in reinforced cement concrete and steel structures.						

Course Outcomes	
CO1	Familiarizing about pre stressing technology and its application in modern construction.
CO2	Understanding about how to obtain effective and economical RCC section using pre-stressing technology.
CO3	Understanding role of riveted and welded joint in tresses and steel frames.
CO4	Understanding role of framed structure during considering earthquake resist design.
CO5	Have developing basic skill to use structural design software's and their importance.

Unit No.	**Title of the Unit**	**Content of Unit**	**Contact Hrs.**	**Mapped CO**
1	**PRE-STRESSED CONCRETE**	Introduction: principles and systems, loss of pre-stress, analysis and design of pre-stress beams.	8	1
2	**REINFORCED CONCRETE BUILDINGS IN SEISMIC ZONES**	Effect of earthquake on concrete buildings, Role and design of beams, columns and joints in RC buildings. Planning for reducing earthquake effects on buildings.	6	2
3	**STEEL STRUCTURES**	Design of riveted and welded connections (simple cases only), tension and compression members, beam and plate girder, introduction to grillage foundation and trusses.	6	3
4	**EARTHQUAKE RESISTANT DESIGN**	Elements of Earthquake Engineering, zoning, base shear, lateral forces, ductile detailing and introduction to new codes.	6	4
5	**INTRODUCTION TO COMPUTER-AIDED STRUCTURAL DESIGN**	Demo of practical problems using STAAD taking G+3 framed RCC structure case.	6	5

Reference Books:

Elements of Structural Analysis by S. A. Bari

Structure and Architecture by A. J. Macdonald

Strength of Materials by R. K. Rajput

Engineering Mechanics by R. K. Bansal

Mechanics of Structures by S. B. Junnarkar

Strength of Materials by R. S. Khurmi

Elements of Engineering Mechanics by S. Mukharji

Engineering Mechanics: A Textbook of Applied Mechanics by S. Ramamurtham

Analysis of Structures. Vol. I by Vazirani and Ratwani

e-Learning Source:

http://www.cement.org/cement-concrete-basics/products/prestressed-concrete

	Course Articulation Matrix: (Mapping of COs with POs and PSOs)

PO-PSO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	2	3	3	2	-	2	2	1					1	3	2	3		
CO2	1	2	3	2	-	1	1	-					2	2	3	2		
CO3	3	3	3	3	-	3	2	1					2	3	2	1		
CO4	1	2	3	2	-	2	1	1					3	2	2	1		
CO5	1	3	3	2	2	3	1	3					2	3	3	2		

1- Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation

Ar. Shweta Verma **Name & Sign of Program Coordinator**	**Sign & Seal of HoD**

Integral University, Lucknow

Effective from Session: 2020 - 2021							
Course Code	AR314	**Title of the Course**	Urban Legislation	**L**	**T**	**P**	**C**
Year	III	**Semester**	VI	2	-	-	2
Pre-Requisite	AR304	**Co-requisite**	Nil				
Course Objectives	1. Familiarization with Development Control Rules and Building Byelaws. 2. To acquaint the students with various codes of practices/ acts relating to building construction. 3. To make the student appreciate the implications of issues emerging from an urban context						

Course Outcomes	
CO1	Students knows and familiarized with Development Control Rules
CO2	Students knows and familiarized with building bye laws of respective areas
CO3	Understand the use of various codes of practices with respect to standards of construction industry
CO4	Understanding of the working of acts of building construction. .
CO5	Develop an understanding of implications of issues emerging from an urban context in construction.

Unit No.	Title of the Unit	Content of Unit	Contact Hrs.	Mapped CO
1	**Introduction and Brief Description**	Objective and Methodology of Urban legislations	8	1 & 5
2	**Uttar Pradesh State Acts and Rules**	• Uttar Pradesh (Regulation of Building Operations) Act. 1958 • Uttar Pradesh Avas Evam Vikas Parishad Adhiniyam, 1965 • Uttar Pradesh Urban Planning and Development Act, 1973 • Uttar Pradesh Parks, Playgrounds and Open Spaces (Preservation and Regulation) Act, 1975 • The Uttar Pradesh *Apartment* (Promotion of Construction, Ownership and Maintenance) *Act*, *2010*	6	2 & 3
3	**Central Acts and Rules**	• The Ancient Monuments and Archaeological Sites and Remains Act -1958 along with 2010 Amendment • The Constitution (Seventy-Fourth Amendment) Act, 1992 • The Special Economic Zones Act, 2005 • Land Acquisition, Rehabilitation and Resettlement Act, 2013 • The *Real Estate (Regulation and* Development) *Act*, 2016	6	3
4	**Environmental Protection Acts and Rules**	• The Slum Areas (Improvement and Clearance) Act, 1956 • Water (Prevention and Control of Pollution) Act, 1974; • Air (Prevention and Control of Pollution) Act, 1981 • The Environment (Protection) Act, 1986 • Coastal Regulation Zone Notification-2011 • E-Waste Management Rules, 2016	8	4
5	**Special Acts and Rules**	• The Delhi Urban Arts Commission Act 1973 • The National Capital Region Act 1985 • Delhi Metro Railway (Operation and Maintenance) Act, 2002	4	1, 2 & 4

Reference Books:
Bhawan Nirman Avam Vikas Upvidhi, Lucknow Development Authority, Lucknow
Master plans of relevant town/city.
National Building Code of India- 2005
Unified Building Byelaws of U. P. Government -2008
IS Code- 8888
The U.P. Urban Planning and Development Act 1973 Environmental Protection Act 1986
Energy Conservation Building Codes of India- 200
National Building Code of India 2016
The Uttar Pradesh (Regulations and Building operations) Act. 1958.
e-Learning Source:

http://www.urbanindia.nic.in/publicinfo/byelaws/Chap-2.pdf
https://www.upavp.com/gov_planning.htm
http://uparchitects.org/rev_bye_laws3.htm
http://jmc.nic.in/forms/byelaws.pdf

	Course Articulation Matrix: (Mapping of COs with POs and PSOs)																	
PO-PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4	PSO6	PSO7
CO1	-	1	3	2	1	2	2	1					3	3	2	3		
CO2	2	-	3	1	-		3	1					3	3	3	2		
CO3	-	2	-	-	-	3	-	1					3	2	3	1		
CO4	3		1	2	3	2	2	3					3	2	3	1		
CO5	-	3	-	3	1		1	3					3	3	3	2		

1- **Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation**

Ar. Shweta Verma **Name & Sign of Program Coordinator**	**Sign & Seal of HoD**

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Effective from Session: 2020 - 2021							
Course Code	AR315	**Title of the Course**	Principles of Human Settlement	**L**	**T**	**P**	**C**
Year	III	**Semester**	VI	**1**	**2**	**-**	**2**
Pre-Requisite	AR205	**Co-requisite**	Nil				
Course Objectives	1. Familiarization with parameters responsible for evolution of human civilization and human settlements with a view to have a better understanding of the history of architecture at later stages. 2. Introduction to the architecture of the ancient world and understanding architecture of periods in terms of space, form and structure. 3. To generate an understanding about the development of civilization and its architectural implications.						

Course Outcomes	
CO1	To introduce the subject of Town planning to students of architecture so that the students can relate to the architectural projects in context of planning.
CO2	To develop basic skills in planning surveys, analysis, generating alternative planning strategies
CO3	Evaluation of options and preparation of plans.
CO4	Understand planning principles and their evolution.

Unit No.	Title of the Unit	Content of Unit	Contact Hrs.	Mapped CO
1	Man and Environment	Basic concepts of settlements, civilization, environment (natural and built), habitat, community. Man-Environment interaction: A brief description of major types of environment, major components of human environment interaction, Biological and behavioral responses to human settlements.	14	2, 3.4
2	Evolution of Planning Thought in India And Abroad	Evolution of Planning process in India with reference to Indus Valley Civilization and Vedic period. Ancient: Early cave and hut settlements, Mesopotamia, Jericho, Ancient Roman and Greece settlements. Medieval: Delhi and Fatehpur Sikri. Gothic and Renaissance with reference to extensive settlement system, city characteristics, infrastructure and transportation. Modern: Jaipur, Chandigarh.	10	1, 3, 4
3	The Human Settlement System	Vancouver Declaration on Human Settlements (1976), Physical components of Human Settlements such as shelter, infrastructure and services, Principles of Human Settlements.	12	3, 4
4	Urban and Rural Settlements	Classification of Settlements. Basic differences between rural and urban settlements, semi agricultural and semi urban settlements. Urban Settlements: The commercial city, the industrial city, the transportation city, the recreational city, educational cities. Rural settlements: Types and hierarchies of rural settlements: farmstead, nomadic, semi-nomadic, composite and permanent rural settlements.	12	2, 3, 4

Reference Books:
Urban Pattern by B. Gallion.
Fundamentals of Town Planning by G. K. Hiraskar,
City in History by Lewis Mumford.
History Builds the Town by Auther Korn.
Town Planning by S. C. Rangwala.
Town Planning in Ancient India. planning by B.B. Dutt.
Urban and Regional by Gowda Rame.
e-Learning Source:
http://www.nios.ac.in/media/documents/316courseE/ch29.pdf
http://prezi.com/ifubcui3ikau/development-of-indian-civilization/
http://education.nationalgeographic.com/education/standards/national-geography-standards/12/?ar_a=1

	Course Articulation Matrix: (Mapping of COs with POs and PSOs)																	
PO-PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	1	1	1	3	3	1	3	2					3	2	2	3		
CO2	2	2	2	3	3	1	3	3					2	2	1	2		
CO3	3	2	3	3	2	2	1	2					3	3	3	1		
CO4	2	2	1	3	2	1	3	1					2	3	3	2		

1- **Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation**

Ar. Shweta Verma **Name & Sign of Program Coordinator**	**Sign & Seal of HoD**

Integral University, Lucknow

Effective from Session: 2020 - 2021							
Course Code	AR316	**Title of the Course**	ESTIMATION & VALUATION	**L**	**T**	**P**	**C**
Year	**III**	**Semester**	VI	**1**	**2**	**0**	**2**
Pre-Requisite	AR307	**Co-requisite**	AR505				
Course Objectives	1. To initiate the students into theory and practice of estimating and quantity surveying. 2. To inculcate awareness regarding factors affecting cost of buildings. 3. To familiarize the student with the commonly used methods of preparing estimates of Architectural Projects.						

Course Outcomes	
CO1	Definition, Aim and object, Scope and importance of subject, types of estimates - approximate and detailed.
CO2	Procedure of estimating, Calculation of quantities, schedule of rates. Exercises of estimating (with different methods) of small buildings including interior schemes, plumbing work and electrical installations etc.
CO3	Principles of analysis of rates, rates of labour and materials, exercises in rate analysis of different building works, e.g. earthwork for foundations, PCC, masonry, RCC, flooring, timber work etc.
CO4	Costing of a small residential unit project. Introduction to computer-based software for cost estimation.
CO5	Importance and scope of subject for an architect, Essential characteristics of valuation, elements of valuation, value classification and types of valuation, difference between cost, price and value, factors affecting valuation, techniques of valuation of landed and building property.

Unit No.	**Title of the Unit**	**Content of Unit**	**Contact Hrs.**	**Mapped CO**	
1	**Estimating and its various methods**	Definition, Aim and object, Scope and importance of subject, types of estimates - approximate and detailed. Methods for estimation viz-a-viz Plinth area method, carpet/floor area method, cubic content method, approximate quantity method and number system	8	CO1	
2	**Detailed estimates**	Procedure of estimating, Calculation of quantities, schedule of rates. Exercises of estimating (with different methods) of small buildings including interior schemes, plumbing work and electrical installations etc. Measurements of typical elements, viz. Arches, steps and polygonal rooms	8	CO2	
3	**Analysis of Rates**	Principles of analysis of rates, rates of labour and materials, exercises in rate analysis of different building works, e.g. earthwork for foundations, PCC, masonry, RCC, flooring, timber work etc. preparing Bill of Quantities by using advance software's	8	CO3	
4	**Costing practices**	Costing of a small residential unit project. Introduction to computer-based software for cost estimation.	8	CO4	
5	**Valuation**	Importance and scope of subject for an architect, Essential characteristics of valuation, elements of valuation, value classification and types of valuation, difference between cost, price and value, factors affecting valuation, techniques of valuation of landed and building property. Standard rent calculation, depreciation, preparation of valuation reports	8	CO5	

Reference Books:
Estimating, Costing, Specification & Valuation by M. Chakarborty
CPWD Specifications and schedule of rate analysis
I. S. 1200 Parts I to XXV – Method of Measurement of Building and Civil Engineering Works, Bureau of Indian Standards
Cost studies of buildings, Pearson Higher Education by A Ashworth
Standard Handbook for Civil Engineering
Standard Schedule of Rates for Delhi, CPWD & UPPWD
Standard Specifications, CPWD & UPPWD
National Building Code of India (Latest Edition), Bureau of Indian Standards
e-Learning Source:
Building Specification Vol – I: https://cpwd.gov.in/Publication/Specs2009V1.pdf
Building Specification Vol – II; https://cpwd.gov.in/Publication/Specs2009V2.pdf
Schedule of Rates Vol – I: https://cpwd.gov.in/Publication/DSR_Vol_1_Hindi_2018.pdf
Schedule of Rates Vol – II: https://cpwd.gov.in/Publication/DSR_Vol_2_Hindi_2018.pdf

	Course Articulation Matrix: (Mapping of COs with POs and PSOs)																	
PO-PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	2	3	3	2	1	2	2	1					2	2	2	1		
CO2	3	3	3	2	-	2	2	2					2	3	1	2		
CO3	2	1	2	2	-	2	2	1					3	3	1	3		
CO4	1	3	3	2	-	2	2	1					3	2	2	2		
CO5	2	3	3	1	1	2	2	1					3	3	1	2		

1- **Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation**

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Integral University, Lucknow

Effective from Session: 20200 - 2021							
Course Code	AR317	**Title of the Course**	Building Services-Acoustics	**L**	**T**	**P**	**C**
Year	**III**	**Semester**	VI	**2**	**-**	**-**	**2**
Pre-Requisite	Nil	**Co-requisite**	AR311				
Course Objectives	1. To initiate students into theory and practice of acoustics. 2. Applying in architectural design and preparing layout and details						

Course Outcomes	
CO1	Understand standard measurement methods that are used in building acoustics and Analyze acoustic properties of typically used materials for design consideration. .
CO2	Apply prediction methods to assess the transmission of noise in buildings, its mitigation and reverberation of sound.
CO3	Select appropriate building constructions for the solution of practical noise problems and evaluate their performance
CO4	Make basic room acoustic measurements and determine the various indicators used for auditorium acoustics
CO5	Learn various ideologies and context of designs thereby developing their own theories and applying the same knowledge in their own design skills.

Unit No.	Title of the Unit	Content of Unit	Contact Hrs.	Mapped CO
1	**INTRODUCTION**	Fundamentals of acoustics: nature of sound Basic terminology: frequency, pitch, tone, sound pressure, sound intensity, decibel scale, loudness, threshold of audibility and pain, masking, sound and distance – inverse square law, background noise, reverberation, echo, reverberation time (T20, T30, EDT T60), optimum reverberation time, clarity, definition, loudness, ray diagram, testing rooms, anechoic chambers, reverberation chambers.	5	2
2	**BEHAVIOUR OF AUDIBLE SOUND AND COMMON ACOUSTICAL DEFECTS**	Behaviour of sound in an enclosed spaces – reflection of sound, nature of reflection from plane, convex and concave surfaces, sound diffraction, Absorption of sound, sound absorption coefficient, reverberation, reverberation time calculation, use of Sabine's and Eyring's formulae,	6	2
3	**CONSTRUCTIONAL MEASURES FOR SOUND INSULATION OF BUILDINGS**	Sound absorbents, porous materials, panel or membrane absorbers and cavity or Holmboltz resonators, role of functional absorbers Bass trap, acoustical detailing of interior spaces, hollow & composite wall construction, flooring & ceiling. Absorption coefficients of indigenous acoustical materials, use of IS code 2526-1963 Simulation software: EASE, Odeon etc.	8	4
4	**NOISE CONTROL**	External noise source and its control (Traffic, Rain, industry etc.), Source within buildings and its control (Fans, chillers, boilers, HVAC noise sources), air born and structure borne sound transmission, vibration isolation, damping. Site planning, Background noise criteria (NR, PNC, STI), Noise barrier, Types and design of Noise barrier, Urban Soundscape, Keynote, foreground and soundmark, Hi-fi, lo-fi, micro and macroscale modelling.	8	1 & 3
5	**ACOUSTICAL DESIGN**	Site selection, acoustics of ancient Greek and Roman theatres Design of open air theatre, acoustical design of Lecture halls, meeting rooms, recording studios, auditoriums, concert halls, churches, home theatres, cinema theatres etc.	5	2 & 4

Reference Books:

Engineering Materials by R. K. Rajpoot,

Building Construction by S. C. Rangwala .

Auditorium acoustics and architectural design by M. Barron.

Concepts in Architectural Acoustics by D. M. Eagan

e-Learning Source:

http://www.airah.org.au/iMIS15_Prod/Content_Files/Divisionmeetingpresentations/QLD/

http://www.soundvent.co.uk/building-services-acoustics-dos-and-donts/

http://calteches.library.caltech.edu/98/1/Watson.pdf

https://law.resource.org/pub/bd/bnbc.2012/gov.bd.bnbc.2012.08.03.pdf

	Course Articulation Matrix: (Mapping of COs with POs and PSOs)																	
PO-PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3			3	1	3	1	2					2	2	1	2		
CO2	3		2	3		2	1	3					3	1	3	2		
CO3	2	3		3		3	1	1					2	2	1	1		
CO4	3		2	2		3	3	1					3	1	2	1		
CO5	3	2			3	2	3	1					2	3	1	2		

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Integral University, Lucknow

Effective from Session: 2020 - 2021							
Course Code	AR318	**Title of the Course**	**Educational Tour and Documentation**	**L**	**T**	**P**	**C**
Year	**III**	**Semester**	VI	**-**	**-**	**-**	**1**
Pre-Requisite	Nil	**Co-requisite**	Nil				
Course Objectives	1. Making student learn the art of collecting data and to carry out analysis for the process of evolving design and individuality of approach. 2. Making students familiarize with various kind of architecture for a given single resource (recreational architecture) 3. Understanding site planning: organization, scale, hierarchy, orientation and climate. 4. Understanding complex services in multi-storied buildings; understanding the architectural content of services in buildings. 5. Development of various styles with reference to the influencing factors such as geographical, geological, climatic, religious social and political conditions.						

Course Outcomes	
CO1	Student learn the art of collecting data and to carry out analysis for the process of evolving design and individuality of approach
CO2	Students familiarize with various kind of architecture for a given single resource (recreational architecture).
CO3	Understand site planning: organization, scale, hierarchy, orientation and climate.
CO4	Understand complex services in multi-storied buildings; understanding the architectural content of services in buildings.
CO5	Developed various styles with reference to the influencing factors such as geographical, geological, climatic, religious social and political conditions.

Unit No.	Title of the Unit	Content of Unit	Contact Hrs.	Mapped CO
1	***Suggestive places to visit***	Place to visit in this tour will be decided by a committee chair by HoD; and members as, tour coordinator, course coordinator, design teachers etc. The destination will be in complete compliance with the prescribed syllabus of design, history, vernacular, settlement pattern etc· ***Suggestive exercises*** Case study - presentation on complex services of any building taken Case study - presentation on the intelligent building parameter/sustainable parameter applicable over the building taken. Case study - presentation on challenges and solution in a site plan of any campus visited. Measure drawing (as built drawing). . **An abroad tour could be arranged depending on the student willingness with proper consent from their parents/ guardians.**	-	1,2,3,4,5

	Course Articulation Matrix: (Mapping of COs with POs and PSOs)																	
PO-PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4	PSO6	PSO7
CO1	3	3	2	1	3	3	2	2					3	2	1	2		
CO2	3	3	2	1	3	3	2	2					2	3	1	2		
CO3	2	2	2	1	2	2	2	3					3	2	2	3		
CO4	3	3	2	1	2	3	2	1					3	2	3	2		
CO5	2	2	2	1	2	2	2	3					1	2	3	2		

1- **Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation**

Ar. Shweta Verma **Name & Sign of Program Coordinator**	**Sign & Seal of HoD**