

NIRMA UNIVERSITY

Institute:	Institute of Architecture and Planning
Name of Programme:	Bachelor of Architecture
Course Code:	3AA101CC25
Course Title:	Architectural Design Studio - V
Course Type:	Core
Year of introduction:	2021

L	T	Practical component				C
		LPW	PW	W	S	
-	-	-	-	-	12	12

Course Learning Outcomes (CLO):

At the end of the course, students will be able to -

- Analyze Environmental, Cultural and Place Dimensions of Space [BL4]
- Develop design at building element level, building level, and site level [BL6]
- Demonstrate connection between the natural and built environment through design. [BL5]

Content: 15 weeks (12 hours/week)

Total Teaching hours: 180 Hrs

Unit	Content	Teaching hours
Unit-I	Preparatory exercises/ Programmatic and site analysis – • Factors affecting house form ○ Climate ○ Topography ○ Social and economic aspect ○ Temporary (Nomadic) and permanent (Settler) house structure • Traditional settlement (settler) ○ Community based ○ Security based ○ Income based ○ Climatic and topographic conditions • Temporary settlement (Nomadic) ○ Community based ○ Security based ○ Income based ○ Climatic and topographic conditions • Site Analysis ○ Site location or context (Inside city/outside city) ○ Culture and Socio-economic condition ○ Climate and Topography ○ Built/open relation • Distribution of open space/green space	25 hours
Unit-II	Conceptual stage and Schematic design – Concept of Mass housing • Type of housing ○ Private housing ○ Public housing • Socio-economic condition ○ Income based ▪ Low income ▪ Middle income	35 hours

	▪ High income ○ Community/socioeconomic based ▪ Public participation ○ Construction technology based • Different type of concepts on housing in present ○ Student housing ○ Old people housing ○ Green building • Sustainability	
Unit-III	Preliminary design to Design development – • Typology of Mass housing ○ Income based ○ Community based ○ Climatic and topographic conditions ○ Typology of house form – Low-rise housing, Midrise housing, High-rise housing, Mix use housing • Scale of housing ○ Cluster ○ Neighborhood ○ Sector ○ Block • City	65 hours
Unit-IV	Design Resolution with Synthesis of design parameters – • Typology of Mass housing ○ Income based ○ Community based ○ Climatic and topographic conditions ○ Typology of house form – Low-rise housing, Midrise housing, High-rise housing, Mix use housing • Scale of housing ○ Cluster ○ Neighborhood ○ Sector ○ Block • City	55 hours

Self Study:

Suggested List of

Experiments:

Suggested Case List:

Suggested Readings/

References:

1. Leupen, Bernard, and Harald Mooij. Housing Design: a Manual. NAI Uitgevers, 2018.
2. Habraken, N. J., and Jonathan Teicher. Supports: an Alternative to Mass Housing. Urban International Press, 2011.
3. Bosma, Koos, et al. Housing for the Millions: John Habraken and the SAR (1960-2000). NAI Publishers, 2000.
4. White, Edward T. Site Analysis: Diagramming Information for Architectural Design. ArchiBasX Press, 2013.
5. Correa, Charles. Charles Correa Housing and Urbanisation. Thames & Hudson, 2000.
6. Rybczynski, Witold. How the Other Half Builds. Vol. 1: Space, Centre for

Minimum Cost Housing, 1984.

7. Barquin, Carlos. How the Other Half Builds. Vol. 2: Plots, Centre for Minimum Cost Housing, McGill University, 1986.
8. Bhatt, Vikram. How the Other Half Builds. Vol. 3: Self-Selection Process, Centre for Minimum Cost Housing, McGill University, 1990.
9. Wates, Nick, and Jeremy Brook. The Community Planning Handbook: How People Can Shape Their Cities, Towns, and Villages in Any Part of the World. Earthscan from Routledge, 2017.

NIRMA UNIVERSITY

Institute:	Institute of Architecture and Planning
Name of Programme:	Bachelor of Architecture
Course Code:	3AA102CC25
Course Title:	History and Theory-IV
Course Type:	Core
Year of introduction:	2021

L	T	Practical component				C
		LPW	PW	W	S	
2	-	-	-	-	-	2

Course Learning Outcomes (CLO):

At the end of the course, students will be able to -

- Outline an understating of the architecture and planning in Europe, America and India, during late 17th C to the 20th C, as an outcome of technological, social and political revolutions of the time. [BL2]
- Classify and analyse principles and characteristics of Modern Architecture. [BL4]
- Discuss the forces of colonization and colonial architecture in the Indian subcontinent. [BL6]

Content: 15 weeks (2 hours/week)

Total Teaching hours: 30 Hrs

Unit	Content	Teaching hours
Unit-I	Industrial Revolution – • Enlightenment (the age of reason) and the French revolution • Industrial revolution as a socio-economic paradigm shift • The industrial city and evolution of reform movements • Impact of new materials, building techniques and industrial processes on architecture and aesthetics • Architectural styles: Neo Classical, Gothic Revival , Art Nouveau, etc • Brief upon works of Etienne Boullée, Nicolas Ledoux, Joseph Paxton, Viollet-le-Duc, Louis Sullivan, Antonio Gaudi, Henri Labrouste, etc	6 hours
Unit-II	Modern Movement in Architecture – • Influence of Art & Design movements like Bauhaus, De Stijl, Cubism, constructivism etc. • Characteristics of Modern architecture: Machine aesthetic, universal appeal, form follows function, rejection of ornament, simplicity of forms, etc. • Works of Frank Lloyd Wright, Le Corbusier, Walter Gropius, Mies Van der Rohe, Alvar Aalto, Louis Kahn and other modernists • Antecedents and precedents of the Modern movement.	18 hours
Unit-III	Colonial Architecture -	6 hours

	• The phenomenon of colonisation and expansion of European dominance over large parts of the world. • Brief Socio-political and economic history of India during from 17th C to 20th C under influence of Portuguese, French, British and Dutch colonizers. • Imposition, modification and assimilation of architectural forms and styles: from Neo-classical to Indo-Sarcenic. • Introduction of new building types (bungalow, railway stations, etc) new materials (cast iron, steel, etc) and techniques (pre-fabrication, etc). • New directions in Urban Design and urban planning in colonial India: Calcutta, Bombay, Madras, New Delhi, Pondicherry, Daman & Diu, Goa, Baroda, etc	
--	--	--

Self Study:

Suggested List of Experiments:

Suggested Case List:

Suggested

Readings/

References:

1. Levine, N., & Wright, F. L. (1996). The architecture of Frank Lloyd Wright. Princeton, N.J: Princeton University Press.
2. Norberg-Schulz, C. (2000). Principles of modern architecture. London: Andreas Papadakis Publisher.
3. Ching, F. D. K. (2010). Architecture: Form, Space, and Order. Hoboken: John Wiley & Sons, Inc
4. Frampton, K. (2014). Modern architecture: A critical history. London: Thames & Hudson.
5. Curtis, W. J. R. (2013). Modern architecture since 1900. London: Phaidon.
6. Le, C., Jeanneret, P., In Boesiger, W., In Stonorov, O., & In Bill, M. (1929). Le Corbusier: Oeuvre complète. Basel: Birkhäuser.
7. Pfeiffer, B. B. (2009). Frank Lloyd Wright: The heroic years : 1920-1932. New York: Rizzoli International.
8. Colquhoun, A., & Oxford University Press. (2006). Modern architecture. Oxford: Oxford University Press.
9. Gropius, W., & Shand, P. M. (1998). The new architecture and the Bauhaus. Cambridge, Mass: M.I.T. Press.
10. Lawrence, S. E., Cooper-Hewitt, National Design Museum, Smithsonian Institution, & Teylers Museum. (2007). Piranesi as designer. New York, N.Y: Assouline Publishing
11. Morrison, H. (2001). Louis Sullivan: Prophet of modern architecture. New York: W.W. Norton & Company.
12. Bélier, C., Bergdoll, B., Le, C. M., & Bresson, M. (2013). Henri Labrouste - structure brought to light: [exhibition at The Museum of Modern Art, New York, March 10 - June 24, 2013]. New York: Museum of Modern Art.
13. Dwivedi, S., & Mehrotra, R. (2001). Bombay: The cities within. Bombay: Eminence Designs Pvt. Ltd
14. Frampton, K., Cava, J., & MIT Press. (2007). Studies in tectonic culture: The poetics of construction in nineteenth and twentieth century architecture. Chicago, IL: Graham Foundation for Advanced Studies in the Fine Arts.
15. Giedion, S. (2008). Space, time and architecture: The growth of a new tradition. London: Harvard University Press.
16. Lang, J., Desai, M., & Desai, M. (2000). Architecture and independence: The search for identity - India 1880 to 1980. Delhi: Oxford University Press.
17. Kostof, S. (1985). A history of architecture: Settings and rituals. New York: Oxford University Press.
18. Mokyr, J. (2011). The enlightened economy: Britain and the industrial revolution. London: Penguin.
19. Metcalf, T. R. (2002). An imperial vision: Indian architecture and Britain's raj. New Delhi: Oxford University Press.

20. Desai, Madhavi. (2017). BUNGALOW IN TWENTIETH-CENTURY INDIA: The cultural expression of changing ways of life and aspirations in the domestic architecture of coloni. Place of publication not identified: ROUTLEDGE.
21. Scriver, P., & Prakash, V. (2007). Colonial modernities: Building, dwelling and architecture in British India and Ceylon. London: Routledge.
22. Chopra, P. (2011). A joint enterprise: Indian elites and the making of British Bombay. Minneapolis: University of Minnesota Press.

NIRMA UNIVERSITY

Institute:	Institute of Architecture and Planning
Name of Programme:	Bachelor of Architecture
Course Code:	3AA201CC25
Course Title:	Building Construction & Technology - V
Course Type:	Core
Year of introduction:	2021

L	T	Practical component			C
		LPW	PW	W	S
2	-	-	-	2	4

Course Learning Outcomes (CLO):

At the end of the course, students will be able to -

- Illustrate use of long span building construction systems. **[BL2]**
- Appraise Modular and pre-fabricated construction and its application **[BL5]**
- Analyze the use of building finishes with respect to materials and appropriate detailing in buildings. **[BL4]**

Content: 15 weeks (4 hours/week)

Total Teaching hours: 60 Hrs

Unit	Content	Teaching hours
Unit-I	Large Span Construction – • Introduction to a wide range of modern building construction systems incorporating the use of metals like steel, aluminum and composite materials. • Flat slab, beam and ribbed slab, waffle slab, vault, dome, shell structure, steel trusses, girder, portal frame, Space frames folded plate structure. • Pre- Engineered Buildings.	28 hours
Unit-II	Modular and pre-fabricated construction – • Prefabricated construction of building components. • Pre-tensioning and Post-tensioning of RCC members. • Pre-stressing and its advantages	16 hours
Unit-III	Finishes – • Different types of Interior, Exterior, Vertical & Horizontal Finishes i.e. plaster, paint, texture, paving, cladding, flooring, paneling, etc.	16 hours

Self Study:

Suggested List of

Experiments:

Suggested Case

List:

Suggested

Readings/

References:

1. Barry, R. Construction of Buildings Vol - 3: Single Storey Frames, Shells and Lightweight Coverings. New Delhi: Affiliated East-West Press Pvt. Ltd., 1999
2. Barry, R. Construction of Buildings Vol - 4: Multi-Storey Buildings, Foundation and Substructures, Structural Steel Frames, External Walls and Cladding of Framed Buildings. New Delhi: Affiliated East-West Press Pvt. Ltd., 1999

3. McKay J. K.. Building Construction Vol - 2: Metric. Delhi: Pearson Education Asia Pte. Ltd., 2014
4. McKay, J. K.. Building Construction Vol - 3: Metric. Delhi: Pearson Education Pte. Ltd., 2013
5. McKay, J. K.. Building Construction Vol - 4: Metric. Delhi: Pearson Education Pte. Ltd., 2013
6. McKay, W. B.. Building Construction Vol - 1: Metric. New Delhi: Pearson Education Asia Pvt. Ltd.; India, 2013
7. McLeod, Virginia. Detail In Contemporary Timber Architecture. UK: Laurence King Publishing, 2010
8. Millias, Malcolm . Building structures from concept to design . London: Spon Press, 2005
9. Muttoni, Aurelio. Art of Structures: Introduction to the Functioning of Structures in Architecture. UK: Taylor & Francis, 2011
10. Paulson, Boyd C.. Computer Applications in Construction. New Delhi: McGraw Hill Education India Pvt Ltd, 2014
11. Phillips, David. Detail In Contemporary Concrete Architecture. UK: Laurence King Publishing Ltd, 2012
12. Punaima, B. C.. Comprehensive Design of Steel Structures. New Delhi: Laxmi Publications Pvt. Ltd., 2012
13. Punmia, B. C.. Building Construction. New Delhi: Laxmi Publications Pvt. Ltd., 2008
14. Rangawala, S. C.. Building Construction. Anand: Charotar Publishing House, 2014
15. Ruske, Wolfgang. Timber Construction for Trade, Industry, Administration: Basics and Projects. Switzerland: Birkhauser- Publisher of Architecture, 2004
16. Salvadori, Mario. Why Buildings Stand Up: The Strength of Architecture. New York: W. W. Norton and Co., 1980
17. Schodek, Daniel L.. Structures. New Delhi: PHI Learning Private Limited, 2014
18. Watson, Donald. Time saver Standards for Building Materials and Systems: Design Criteria and Selection Data. New Delhi: Tata McGraw Hill Education Private Limited, 2009

NIRMA UNIVERSITY

Institute:	Institute of Architecture and Planning
Name of Programme:	Bachelor of Architecture
Course Code:	3AA202CC25
Course Title:	Environmental Science & Services – III
Course Type:	Core
Year of introduction:	2021

L	T	Practical component			C
		LPW	PW	W	S
1	-	-	-	2	3

Course Learning Outcomes (CLO):

At the end of the course, students will be able to -

- Illustrate the basic principles of Artificial light & electrification [BL2]
- Appraise methods of Heating & cooling devices for natural and artificially ventilated building design [BL2]
- Determine and apply principles of fire safety in Building Design. [BL5]

Content: 15 weeks (3 hours/week)

Total Teaching hours: 45 Hrs

Unit	Content	Teaching hours
Unit-I	Artificial light, Electrification & Communication Network – Basic electrical supply & distribution to the building, alternate supply & Power connections. Various components & elements of layouts as per use, lifesaving auto-cut circuits & other fixtures. Communication systems like fax, telecom, EPABX, alarm, audio-video monitoring, etc. & their layouts. Criteria of designing of various communicating service layouts	27 hours
Unit-II	H.V.A.C. [Heating, Ventilating, Air-conditioning and cooling] – Mechanical thermal controls, its type, effects of it on heating, ventilating, air-conditioning or cooling an enclosed space. Air-conditioning or cooling systems, various types in practice, chilled water cooling system-air handling package unit & their installation, demand and consumption as per use & volume of space. Supply plants and service layouts, supply and return air's ducting and Channeling systems, calculations for consumption and basic sizes of Components	12 hours
Unit-III	Fire fighting & Protection – - Study of fire fighting regulations, fire alarming & extinguishing system, fire hydrants-their types, location, spacing, distance & specifications. Fire resistance of different building materials, designing of fires resistant door, gangway, and stair & lift block for escape. Case studies of service and escape layouts of building for fire protection system & requirement. - Water consumption for various activities & designing the plumbing system.	6 hours

Self Study:

Suggested List of Experiments:

Suggested Case List:

Suggested Readings/

References:

1. Prakash, N. Sesha .(2011), Manual of Fire Safety .New Delhi: CBS Publishers and Distributors.
2. Parker, S. (2005), Eyewitness Electricity. Dorling Kindersley,
3. Sugarman, S. C. (2015), Testing and balancing HVAC air and water systems. Lulu press, Inc.
4. Grondzik, W. T., & Kwok, A. G. (2014). Mechanical and electrical equipment for buildings. John Wiley & Sons.
5. Roberts, Victor & Krepchin, Ira Eds. (2005), Lighting : technology atlas Book. Colorado :Platts research and consulting.
6. Howell, Ronald H. & others., (2009), Principles of heating ventilating and air conditioning : a textbook with design data based on the 2009 ASHRAE handbook - fundamentals . Atlanta: American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc.
7. VP Lang, (1961), Basics of Air conditioning.
8. HW Stanford III, AF Spach , (2019), Analysis & Design of Heating, Ventilation & Air conditioning systems.
9. M Karlen, C Spangler, J R Benya , (2017), Lighting design basics.
10. H Koster, (2004), Dynamic day lighting architecture: basics, systems and projects.
11. D Philips, (2013), Lighting modern buildings.
12. Roman Showranek , Basics of building services lighting design.
13. Winchip M Susan , (2017), Fundamentals of lighting.
14. Mcnamara Carmel , Bright 2 : Architectural illumination & light installations.
15. Tomczyk John , Silberstein Eugene, Whitman Bill, Johnson Bill, (2012), Refrigeration & Air conditioning technology.
16. Althouse AD, Turnquist CH, Bracciano AF, (1968), Modern refrigeration & Air conditioning Book: theory, practice of refrigeration & air conditioning systems

NIRMA UNIVERSITY

Institute:	Institute of Architecture and Planning
Name of Programme:	Bachelor of Architecture
Course Code:	New course code required
Course Title:	Digital Technology in Architecture-II
Course Type:	Core
Year of introduction:	2026

L	T	Practical component				C
		LPW	PW	W	S	
1	-	-	-	2	-	3

Course Learning Outcomes (CLO):

At the end of the course, students will be able to -

- Develop basic to intermediate scripting workflows using parametric tools to automate design processes, control geometric relationships, and manage design data. [BL6]
- Develop digital simulations, scripting, and emerging technologies to analyze, evaluate, and iteratively refine architectural spaces and systems. [BL4]
- Appraise computational design, simulation, fabrication, and immersive technologies to develop and critically evaluate performance-informed and context-responsive architectural propositions. [BL5]

Content: 15 weeks (3 hours/week)

Total Teaching hours: 45 Hrs

Unit	Content	Teaching hours
Unit-I	Advanced Computational Design Concepts - Review and extension of parametric and algorithmic design principles - Overview of generative design and optimization concepts	9 hours (3 week)
Unit-II	Performance-Based and Simulation-Driven Design - Integration of parametric models with performance analysis tools - Environmental simulations: Solar and daylight analysis, Thermal and ventilation simulations - Data visualization and interpretation for design decision-making	12 hours (4 week)
Unit-III	Integrated Design Project - Design and development of a small-scale architectural or building component project - Integration of: Parametric design, Performance analysis, Digital fabrication strategy - Critical documentation of the digital design-to-production process	24 hours (8 week)

Self Study:

Suggested List of Experiments:

Suggested Case List:

Suggested Readings/ 1. Alexander, C. (1979). The timeless way of building. Oxford University Press.

References: 2. Alexander, C., Ishikawa, S., & Silverstein, M. (1977). A pattern language: Towns,

buildings, construction. Oxford University Press.

3. Kolarevic, B. (2003). *Architecture in the digital age: Design and manufacturing*. Taylor & Francis.
4. Oxman, R., & Oxman, R. (2014). *Theories of the digital in architecture*. Routledge.
5. Schumacher, P. (2011). *The autopoiesis of architecture, Volume I: A new framework for architecture*. Wiley.
6. Oxman, R. (2008). Performance-based design: Current practices and research issues. *International Journal of Architectural Computing*, 6(1), 1–17.
<https://doi.org/10.1260/147807708784640090>
7. Frazer, J. (1995). *An evolutionary architecture*. Architectural Association Publications.
8. Braumann, J., Brell-Cokcan, S., Willette, A., McGee, W., & León, M. P. (2014). *Robotic fabrication in architecture, art and design 2014*. Berlin: Springer.
9. Adriaenssens, S. (2016). *Advances in architectural geometry 2016*. Zürich: Vdf Hochschulverlag AG an der ETH Zürich.
10. Beorkrem, C. (2013). *Material strategies in digital fabrication*. New York: Routledge, Taylor & Francis Group.
11. Gramazio, F., Kohler, M., Picon, A., Roche, F., & Verebes, T. (2014). *Made by robots: challenging architecture at a larger scale*. London: John Wiley & Sons.
12. Gramazio, F., & Kohler, M. (2014). *Fabricate: Negotiating Design and Making*. Zürich: Gta Verlag / Eth Zürich.
13. Naboni, R., & Paoletti, I. (2015). *Advanced customization in architectural design and construction*. Cham: Springer.
14. Pell, B. (2010). *The articulate surface: ornament and technology in contemporary architecture*. Basel: Birkhäuser.
15. Shea, K., Aish, R., & Gourtovaia, M. (2005). Towards integrated performance-driven generative design tools. *Automation in Construction*, 14(2), 253–264.

NIRMA UNIVERSITY

Institute:	Institute of Architecture and Planning
Name of Programme:	Bachelor of Architecture
Course Code:	3AA901CC25
Course Title:	Related Study Programme - IV
Course Type:	Core
Year of introduction:	2021

L	T	Practical component				C
		LPW	PW	W	S	
-	-	-	-	-	-	3

Course Learning Outcomes (CLO):

At the end of the course, students will be able to -

- Appraise various built environment at different places of architectural relevance across the state, region, country and the world. **[BL5]**
- Apprise the relevance of built environment by observing & photo documentation of selected places. **[BL5]**

Content: 3 weeks (30 hours / week)

Total Teaching hours: 90 Hrs

Unit	Content	Teaching hours
Unit-I	Multidisciplinary study of parts of urban structures, planning, regulations, building, landscape, conservation issues, study analysis, development proposals – • Student and faculty members stay at the selected city/ metro city for 8 to ten days. • Students will get comprehensive awareness of the city/ metro city. • Students will explore the built environment in terms of Social, educational, political institutes, settlement pattern etc. • Students will understand the typology, design style, material-construction system, etc. • Students will also documents the social, cultural, environmental aspects of that city/ metro city	60 hours
Unit-II	Compilation and documentation – • Students came back at institute and make the final Documentation report within remaining days.	30 hours

NIRMA UNIVERSITY

Institute:	Institute of Architecture and Planning
Name of Programme:	Bachelor of Architecture
Course Code:	0AA025VA25
Course Title:	Social Work/ NSS-IV
Course Type:	Value Added Course
Year of introduction:	2023

-

L	T	Practical component				C
		LPW	PW	W	S	
-	-	-	-	2	-	-

Course Learning Outcomes (CLO):

At the end of the course, students will be able to -

- Appraise the role and need of social work in the society [BL2]
- Appraise the methods and techniques of social work and its practice [BL5]
- Develop awareness and participate in social welfare work towards society development [BL6]

Content: 15 weeks (2 hours/week)

Total Teaching hours: 30 Hrs

Unit	Content	Teaching hours
Unit-I	Understanding social in social work – • Sensitive to the needs of different people within the society and to social problems in changing social, cultural and techno-economic context;	10 Hours
Unit-II	Social work as a practice – • To inculcate in the need for inquiring and research to understand the social issues/ problems within a context • Develop problem solving and decision making abilities for relevant concerns through the medium of social work as a practice	20 Hours

***This course can be taken as a Block or as a 7-day residential camp of minimum 30 hours**

Self Study:

Suggested List of Experiments:

Suggested Case List:

Suggested Readings/

References:

1. Banks, S. (1995). Ethics and Values in Social Work: Practical Social Work Series, London: Macmillan Press Ltd.
2. Friedlander, Walter A. (1977) Concepts and Methods of Social Work, New Delhi: Prentice Hall of India Pvt. Ltd
3. Heun, Linda R., Heun, Richard E. (2001) Developing Skills for Human Interaction, London: Charles E. Merrill Co.
4. Skidmore, Rex A.(1982), Introduction to Social Work, New Jersey, Thackeray, Milton G. Prentice-Hall, Englewood Cliffs.