I Semester

ARCHITECTURAL DESIGN - I			
Course Code	**21ARC11**	CIE Marks	100
Teaching Hours/Week (L:T:P: S)	0:0:0:7	SEE Marks (VIVA)	100
Total Hours of Pedagogy		Total Marks	200
Credits	07	Exam Hours	

Course objectives:

1) To develop the ability to generate solutions to spatial constructs, which integrate principles of design with functional requirements
2) To develop an understanding of the holistic role of an Architect and Architecture in society.

Teaching-Learning Process (General Instructions)

These are sample Strategies; which teachers can use to accelerate the attainment of the various course outcomes.

1) The contents of the courses shall be taught in an application-oriented manner on a scientific and design basis. The course contents shall be taught and learned in lectures, seminars, labs or workshops, studio exercises and design projects, etc.
2) In-studio exercises the teachers shall take the lead to provide tasks and offer guidance for solutions finding. The students shall work either individually or in groups.
3) In design studios, the students contribute to the processing, analysis and solving of problems of direct professional practice, attended by faculty(s) entitled to conduct the studio and examine. The results shall be defended through drawings; models and reports and evaluated through periodic assessment and finally by a jury or panel, and finally, evaluated through periodic assessment and an end semester examination or viva voce.

We inhabit and function in space, both the manmade and the natural i.e., “a life spent within an enclosure”. These enclosures have functional and cultural meanings, are symbols of abstract ideas of that period in time.

"Architecture is the art we all encounter most often, most intimately, yet precisely because it is functional and necessary to life, it's hard to be clear about where the "art" in a building begins." - Jonathan Jones

"Architecture is a discipline directly engaged with shaping enclosure, of erecting and toppling barriers or—more explicitly—of extending and limiting ‘freedoms’." - E. Sean Bailey &Erandi de Silva

Module-1

Introduction to Architecture:

- Importance of Architectural Design in architectural education.
- Architect’s role in Society and Architectural Design.
- Understanding of Architecture’s connection with other disciplines of knowledge: Science & Technology, Mathematics, Philosophy, Religion, Sociology, Psychology, Ecology, Climate change etc.

Teaching-Learning Process	• Documentation of local stories on architecture, important local buildings and other favourite buildings or places. • To observe and understand different elements, those comprise architecture like

	doors, windows, staircase, roof, enclosures etc. • Observing and documenting the built environmental condition around and experiencing enclosures (field trips) to learn basics of architectural representation.
Module-2	
<u>Introduction to Design:</u> • Universality of Design in various fields. • Introduction to different fields in Design such as Basic design, Architectural design, Graphic design, Automobile design, Interior design, Fashion design, Product design, sustainable design, and so on.	
Teaching-Learning Process	Objects Analysis – Understanding of objects that are in everyday use around us. Look and feel of them to know the purpose and function, with material, texture, size and shape. • Representation through points and lines, various textures in nature and man-made elements. • To learn basic design principles such as balance, symmetry, rhythm, repetition, hierarchy, unity, proportion, emphasis, contrast
Module-3	
<u>Introduction to the Design Process:</u> To understand the Qualitative and Quantitative aspects of Design Process **Qualitative design process** • What is an Idea or Concept in Design? Understanding the relationship between idea, context, space (form & structure), and functional requirements. • Introduction to the various methods of idea / concept generation - use of form, patterns in nature and in geometry, music, text, and other allied fields. • Understanding the ambience of space using – Form, Colour, Texture, Light, Space and Scale **Quantitative design process** • Anthropometry - Understanding the functional and spatial requirements with respect to the human body and its postures along with furniture. • Study of Standard measurements, minimum and optimum areas for mono functions. • User's data, movement and circulation diagrams. • Case study of famous architect's work or local architecture with respect to spatial analysis, area requirement and program.	
Teaching-Learning Process	• Understanding the difference and similarity while design of a non-enclosed space, a semi-enclosed space, an enclosed space. • Analysis of spaces using – Form, colour, texture, light, ventilation, space and scale along with circulation. • Submission will include Idea generation, Study models, Sketches and drawings to achieve the desired results. • Drawings of the human body in various postures with required measurements with respect to different functions, spaces and furniture. • Design of functional furniture layout with requisite circulation, lighting and ventilation for a specific function. Study models and sketches to explore the design principles. Drawings of study models - plans and sections (suitable scale).
Module-4	

<table>
<tr><td colspan="2">Introduction to Abstraction:
• Elements of form from abstract concepts like point, line, plane, mass and / or volume, 2D forms - circle, square and triangle, 3D forms – cube, sphere and pyramid, therefore, development of more complex forms by the method of addition and / or subtraction.
• Concepts of volume and scale, width to height ratio.
• Additive and subtractive</td></tr>
<tr><td>Teaching-Learning Process</td><td>Method of learning: Observation & Study
• Exercises to introduce 2D concepts to 3D forms without functional constraints and Human scale.
• Declaring the conceptional theme of any composition at the beginning, before the exploring the volume using Horizontal and vertical elements or planes.
• Study of patterns and use the pattern, both physical and material patterns as well as patterns of transformation and Integration. Appreciation of the difference between architecture and the chosen pattern.</td></tr>
<tr><td colspan="2">Module-5</td></tr>
<tr><td colspan="2">Form Development with function
• Design of Spaces such as a pavilion, gazebo, kiosk, bus stop, stage, (outdoor spaces) living/dining, bedrooms, (indoor spaces) Architect’s office, Doctor’s clinic, etc. (Utilitarian Spaces) (anyone in each category)
• Design of functional furniture layout with requisite circulation, lighting, and ventilation for a specific function.
• Understanding the difference and similarities while the design of a non-enclosed space, a semi-enclosed space, an enclosed space.
• Submission will include Idea generation, Study models, Sketches, and drawings to achieve the desired results.</td></tr>
<tr><td>Teaching-Learning Process</td><td>• Discussions, presentations, and case studies will cover three typologies.

The portfolio covering all the assignments shall be presented for term work.</td></tr>
<tr><td colspan="2">Course outcome (Course Skill Set)
the student will be able to:
• Get an introduction into the field of Architectural Design viz. a viz. the duality & the tension that exists between the form and function of a space.
• Make responsible choices for design development
• Get a perspective on design of spaces in formal and informal settlements.</td></tr>
</table>

Assessment Details (both CIE and SEE)

(methods of CIE need to be defined topic wise i.e.- Studio discussions, Reviews, Time problems, test, Seminar or micro project)

The Marks of Continuous Internal Evaluation (CIE) is 100 and for Semester End Exam (SEE)(viva) is 100 marks. The student has to obtain a minimum of 50% of the maximum marks of CIE and 40 % of maximum marks of SEE to pass. The passing percentage shall not be less than the 50% in aggregate for a course (i.e. CIE and SEE put together). Based on the marks scored in CIE+SEE grading will be awarded for this course.

Continuous Internal Evaluation:

Methods suggested:

1. Studio discussions, Reviews, Time problems, CIE tests, Seminar or micro project,Quiz, report writing etc.
2. The class teacher has to decide the topic for the Design and Seminars if any, in the beginning only. The teacher has to announce the methods of CIE for the subject in advance in writing.

Semester End Examination:

1. The student needs to submit his/her works done throughout the semester, including rough sheets for the Viva examination, at least one day prior to the Viva work examination to the course teacher/coordinator.
2. The Viva-voce will be evaluated by an external teacher appointed by the University along with Course teacher or an internal examiner.
3. The SEE marks list generated is to be signed by both internal and external examiners and submitted to VTU in the sealed cover through the Principal of the institution.

Suggested Learning Resources:
REFERENCES: (For all semesters of Architectural Design)

1. Alain de Botton, “How Proust Can Change your life", Picador, 1997.
2. Alain de Botton, “The Architecture of Happiness", Sep. 2006, Vintage Books.
3. Alan Fletcher, " The art of looking sideways", Phaidon Press, 2001 and Partis", Van Nostrand Reinhold, 1985
4. Anthony Di Mari and Nora Yoo, " Operative Design: A Catalogue of Spatial Verbs", 2012, BIS Publishers.
5. 5. Anthony Di Mari, " Conditional Design: An Introduction to Elemental Architecture", 2014, 1st Edition, Thames & Hudson.
6. Bruno Munari,"Design as Art", Penguin UK, 25-Sep-2008
7. Charles George Ramsey and Harold Sleeper, " Architectural Graphic Standards", 1992, Wiley
8. Christopher Alexander, "Notes on the Synthesis of Form", 1964, Harvard University Press.
9. Debkumar Chakrabarti, “Indian Anthropometric Dimensions for Ergonomic Design Practice", 1997.
10. François Blanciak, " Siteless: 1001 Building Forms", 2008, MIT Press
11. Frank Ching, James F. Eckler, "Introduction to Architecture", 2012, John Wiley & Sons, US
12. Frank D.K. Ching, " Architecture: Form, Space, and Order", 4th Edition, Sep. 2014, John Wiley & Sons
13. Herman Hertzberger, "Lessons for Students in Architecture", 2005, 010 Publishers
14. Italo Calvino, " Invisible Cities", Harcourt Brace Jovanovich (May 3, 1978)
15. John Berger, " Way of Seeing", 1972, Penguin, UK
16. John Hancock Callender, " Time-Saver Standards for Architectural Design Data", 1982, McGraw-Hill
17. Michael Pause and Roger H. Clark, " Precedents in Architecture: Analytic Diagrams, Formative Ideas, National Institute of Design.
18. Paul Jacques Grillo, " Form, Function and Design", 1975 , Dover Publications, New York
19. Paul Jacques Grillo, " What is Design?", 1960, P. Theobald
20. Paul Lewis, Marc Tsurumaki, David J. Lewis, "Manual of Section", Princeton Architectural Press, 2016
21. Peter H. Reynolds, " The Dot", 2013, Candlewick Press
22. Philip Jodidio, "Tree houses. Fairy tale castles in the air", 2012, Taschen
23. Robert W. Gill, "Rendering with Pen and Ink", Van Nostrand Reinhold (1 June 1984)
24. Tom Alphin, "The LEGO Architect", 2015, No Starch Press

Web-links and Video Lectures (e-Resources):

- https://ndl.iitkgp.ac.in
- https://www.youtube.com/watch?v=crNeqyiPx8Q
- https://www.youtube.com/watch?v=U2W5Wmp15YA
-

Activity-Based Learning (Suggested Activities in Class)/ Practical Based learning:

- Site visit the historical and contemporary buildings in the nearby area and documenting.
- Spatial analysis of area requirements, movement and circulation diagrams for informal settlement houses.
- Understand and appreciate various elements of Architecture such as Doors, Windows, Balconies, Otlas, Verandas, etc and document them for CIE.
- Examine the use of natural light, ventilation and comfort conditions in built environments.

MATERIALS AND METHODS IN BUILDING CONSTRUCTION-I			
Course Code	**21ARC12**	CIE Marks	50
Teaching Hours/Week (L:T:P: S)	1:0:0:3	SEE Marks (VIVA)	50
Total Hours of Pedagogy	4	Total Marks	100
Credits	04	Exam Hours	

Course objectives:

- To introduce students to primary building materials and simple construction techniques as applicable to a low-rise building- three to four-storied contemporary building.
- To develop an understanding of brick bonding, foundation details, external wall section with flat roof and parapet.

Teaching-Learning Process (General Instructions)

These are sample Strategies; which teachers can use to accelerate the attainment of the various course outcomes.

1. The students need to do the construction assignments in the studios.
2. The assignments to be submitted to the teacher as continuous internal evaluation on weekly basis.
3. Material assignments to be submitted in the portfolio form.

Module-1

1. Overview of simple masonry building, its various components and materials used for construction.
2. Various conventions used for drawing plan, section and elevation.
3. Brick: Types, properties, uses and manufacturing methods.
4. Brick Walls: Types of brick walls and bonds, mortar types, plasters, buttresses, arches and lintels.

Module-2

5. Stone: Types, properties, quarrying and finishing.
6. Stone Walls: Bonds, arches and lintels.

Module-3

7. Concrete Masonry Unit: Hollow and solid concrete Blocks: Manufacture, uses and properties, CMU Wall construction and detailing.
8. Alternative materials for Wall construction: Clay Hollow Blocks, Fly Ash Blocks, Aerated Concrete Blocks, Autoclaved Cellular Concrete (Aerocon) walls, Stabilized Mud Blocks and Glass Blocks: Manufacture, uses and properties, wall construction and Detailing.

Module-4

9. Masonry Foundation: Simple load bearing foundations in brick and stone.
10. Wood: Natural, hard and soft wood; quality, properties; joints in wood. Timber: Quality of Timber used in buildings External and Internal, defects, seasoning and preservation.

Module-5

11. Wooden doors: Types of wooden Doors - Doors with Frames, Doors on Pivot, Single & Double shutters, Wood with Glass shutters, Design an Innovative Solid Wooden Door for Public scale buildings with Low cost type and High-tech type. Types of Wood details Types of wooden windows & ventilator; Casement, Top Hung & Fixed types, Details of joinery.

Teaching-Learning Process	• Studio works by students, lecture by faculty on materials using teaching aids • Visits to construction yard/site to understand materials and methods of construction. • Seminar by students on their learning.
Note:	• Discussions, presentations, and case studies will cover three typologies. • The portfolio covering all the assignments shall be presented for term work.

Course outcome (Course Skill Set)

- The student will be able to understand the properties and uses of various materials and methods used in buildingconstruction

- The student will be able to design and draw various details used in a typical construction of a low rise building.
- The student will be able to design and detail various basic components used in a typical building construction, such as Doors, Windows, Ventilators etc.

Assessment Details (both CIE and SEE)

(methods of CIE need to be define topic wise i.e.- Submission of construction drawing sheets, Journal of materials, Multiple Choice Question, Quizzes, Open book test, Seminar or micro project)

The Marks of Continuous Internal Evaluation (CIE) is 50 and for Semester End Exam (SEE)(viva) is 50 marks. The student has to obtain a minimum of 50% of the maximum marks of CIE and 40 % of maximum marks of SEE to pass. The passing percentage shall not be less than the 50% in aggregate for a course (i.e. CIE and SEE put together). Based on the marks scored in CIE+SEE grading will be awarded for this course.

Continuous Internal Evaluation:

1. Methods suggested: Submission of Construction sheets, Journal of Materials, Test, Written Quiz, Seminar, report writing etc.
2. The class teacher has to decide the topics for the test, Written Quiz, and Seminar. In the beginning, only the teacher has to announce the methods of CIE for the subject.

Semester End Examination:

1. The student need to submit his/her works done throughout the semester, including rough sheets for Term work examination, at least one day prior to Viva work examination to the course teacher/coordinator.
2. The work will be evaluated by an external teacher appointed by the University along with Course teacher or an internal examiner.
3. The SEE mark list generated is to be signed by both internal and external examiners and submitted to VTU in sealed cover through the Principal of the institution.

Suggested Learning Resources:

REFERENCES:

1. Francis K. Ching‘Buildingconstruction’,Wiley;5edition(February17,2014)
2. R. Barry,“ConstructionofBuildings”Vol1.,1999byWiley-Blackwell
3. RoyChudley,"ConstructionTechnology”,3rdEdition, Longman,1999
4. W.B.Mckay,"BuildingConstruction”,Donhead,2005
5. Building Construction by Rangwala ,33rd Edition 2019
6. Building Construction by Sushil Kumar

Web links and Video Lectures (e-Resources):

- https://ndl.iitkgp.ac.in
- https://www.civilengineeringforum.me/structural-design-procedure/
- https://civiljungle.com/
- http://fairconditioning.org/knowledge-resources/#204-heat-transfer

Activity Based Learning (Suggested Activities in Class)/ Practical Based learning:

- Visit to construction site for observation of materials used and methods adopted in building construction.
- Study of vernacular materials used in different climatic zones and their thermal properties.
- Visit to material testing labs to understand various properties of building materials, and observe the testing methods.
- Discuss with the faculty/experts on life cycle and environmental impact of construction materials

ARCHITECTURAL GRAPHICS-I			
Course Code	**21ARC13**	CIE Marks	50
Teaching Hours/Week (L:T:P: S)	0:0:0:4	SEE Marks (Term Work)	50
Total Hours of Pedagogy		Total Marks	100
Credits	04	Exam Hours	

Course objectives:

- To introduce students to the various concepts and techniques of architectural and graphic presentations.
- To train the students to work on drawing methods both in freehand and with instruments.
- Encourage students to work with computer tools.

Teaching-Learning Process (General Instructions)

These are sample Strategies; which teacher can use to accelerate the attainment of the various course outcomes.

1. The students need to do the assignments in the studios.
2. Use of Video animation for easy understanding of various drawings.

Module-1

Ch.1 Introduction to Graphic Representations: Basic principles and methods of drawing, methods of using instruments, and sign conventions.

- Exercises inline-weightage and its application
- Exercises in free-hand drawing.

Ch-2 Exercises of Practice in Lettering: Lettering used in architectural drawings, including different fonts.

Module-2

Ch-3 Introduction to Euclidian Geometry: Exercises in lines and angles. Basic geometrical constructions, construction of triangles, quadrilaterals and regular polygons. Introduction to the development of simple surfaces of basic geometrical shapes and their applications.

Ch-4 Arches: Typical arch shapes and their construction methods.

Module-3

Ch-5 Introduction to plane curves such as ellipse, parabola, hyperbola and ovals and their construction methods.

Ch-6 Introduction to reduced scales and its application to architectural drawings.

Module-4

Ch-7 Introduction to orthographic projection (First angle projection): Principles of orthographic projection, projections of points, lines and planes in different positions.

Ch-8 Orthographic Projection of Solids, architectural elements and built forms.

Module-5

Ch-9: 3DProjections-I: Isometric and Axonometric views of solids and architectural elements.

Ch 10: 3DProjections-II: Isometric and Axonometric views of built forms

Teaching-Learning Process	1. The students need to do the assignments in the studios. 2. Explore videos in various websites using animation of geometrical drawings
Note:	A consolidated portfolio containing exercises related to each of the above topics are to be submitted for term work examination.

Course outcome (Course Skill Set)

At the end of the semester, the students will be equipped with graphical skills
which shall be useful in translating the graphical ideas into technically appropriate drawing presentations.

Assessment Details (both CIE and SEE)

(methods of CIE need to be defined topic wise i.e.- Studio discussions, drawings, Time problems, test, etc)

The Marks of Continuous Internal Evaluation (CIE) is 50 and for Semester End Exam (SEE) (Term work) is 50 marks. The student has to obtain a minimum of 50% of the maximum marks of CIE and 40 % of maximum marks of SEE to pass. The passing percentage shall not be less than the 50% in aggregate for a course (i.e. CIE and SEE put together). Based on the marks scored in CIE+SEE grading will be awarded for this course.

Continuous Internal Evaluation:

Methods suggested:

1. Studio discussions, drawings, Time problems, CIE tests,
2. The class teacher has to make a list for the drawings sheets to be done in the studio, in the beginning only. The teacher has to announce the methods of CIE for the subject in advance in writing.

Semester End Examination:

1. The student need to submit his/her works done throughout the semester, including rough sheets for Term work examination, atleast one day prior to Term Work Examination to the course teacher/coordinator.
2. The term work will be evaluated by an external teacher appointed by the University along with Course teacher or an internal examiner.
3. The SEE mark list generated is to be signed by both internal and external examiners and submitted to VTU in sealed cover through the Principal of the institution.

Suggested Learning Resources:

REFERENCES:

1. Francis D.K.Ching,"ArchitecturalGraphics",VanNostrandReinholdCo.,1985
2. I.H. Morris, "Geometrical Drawing for Art Students", Longmans(1902)
3. ShankarMalik,"Perspective&Sciography",1994, Allied Publisher

Web links and Video Lectures (e-Resources):

- https://ndl.iitkgp.ac.in
- https://www.youtube.com/watch?v=VrU73IwRyc4
- https://www.youtube.com/watch?v=q8R1618khj4
- https://www.youtube.com/watch?v=-mWqb3DUvgM
- https://www.youtube.com/watch?v=_HUDWZ7pkmc

Activity Based Learning (Suggested Activities in Class)/ Practical Based learning

- Encourage students to work on Computer aided Graphics.

HISTORY OF ARCHITECTURE-I			
Course Code	**21ARC14**	CIE Marks	50
Teaching Hours/Week (L:T:P: S)	3:0:0:0	SEE Marks (Theory)	50
Total Hours of Pedagogy	40 hours	Total Marks	100
Credits	03	Exam Hours	03

Course objectives:

- Introduce the evolution of architecture, alongside the culture of early civilizations.
- To enable students to understand how different architecture solutions were evolved within the prevalent socio-economic and culture environment, demographic, political, regional influences (availability of materials, climate and topography of a region). (The scope limited from Prehistory, Stone Age to civilizations across continents, early Iron Age).
- To evaluate the architecture of river valley civilization and bygone era through the analysis of appropriate examples

Teaching-Learning Process (General Instructions)

These are sample Strategies; which teacher can use to accelerate the attainment of the various course outcomes.

- Critically evaluate the development of architecture and settlements through ages.
- Learner need to appreciate the efforts of various civilizations in development of art and architecture.
- Understand how belief system shaped the architecture of different periods.

MODULE - 1

Introduction to Pre-Historic Civilization (early cultures):

1. **Introduction to Architectural history.** Primitive man - shelters, settlements, ritual centres (religious and burial systems) e.g.: Oval hut, Nice; settlement at Catal huyuk; Megalithic architecture (Dolmen tomb, gallery grave, passage grave); Henge Monuments, Stonehenge.
2. Generic Cross-cultural understanding of factors influencing early settlement and built form.

MODULE - 2

Introduction to architecture and planning of river valley civilizations of ancient Indus, Egypt, Mesopotamia.

3. **Indus Valley Civilization (Indus and Ghaggar Hakra):** Forces shaping settlements and habitats, E.g.: Mehrgarh, Layout of Mohenjo-Daro, dwellings and monumental architecture (House plan, Community well, Great Bath, Granary).
4. **Mesopotamia (Tigris and Euphrates):** Forces shaping settlements and habitats E.g.: Ziggurats at Warka, Ur and Tchoga Zanbil, Palace of Sargon.
5. **Egyptian Civilization (Nile):** Forces shaping settlements and habitats (funerary and sacred spaces), e.g.: Mastabas, Pyramid complex, Temple of Khons, Karnak.

MODULE - 3

6. **Introduction to Chinese Architecture:** Forces shaping settlements and habitats. Study of civic architecture, Domestic architecture, like palaces, tombs, temples and houses.
7. **Introduction to Mayan and Japanese Architecture**: Forces shaping settlements and habitats.

MODULE - 4

8. **Introduction to Pre-Classical Civilization:** Mycenaean, Etruscan, Persian (Achaemenid) E.g.: Lion Gate and Treasury of Atreus, Mycenae; Palace of Tiryns (Megaron), Etruscan Temples (Juno Sospita, Lanuvium), Tomb of Cyrus, Pasargadae, Palace of Persepolis.
9. **Introduction to Pre-Classical Architecture (Indian sub-continent):** Aryan and early Mauryan E.g.: Vedic village, typologies in Vedic Town and Vedic house. Study of civic architecture, Domestic architecture, like palaces, tombs, temples and houses. e.g.: Palace at Pataliputra.

MODULE - 5

10. **Introduction to Desert and Mountainous Cultures:** Forces shaping settlements and habitats (environmental and cultural influences) e.g.: Include first civilization of America, Andes, Mayans, early societies/cultures in the Sahara, Thar, and North America.
11. **Introduction to Tribal Cultures:** Forces shaping settlements and habitats e.g.: Indigenous Peoples

across the globe (environmental, cultural influences on settlements).	
Teaching-Learning Process	1. Theory classes to evaluate the development through ages 2. Documenting of learning through sketches, notes, assignments.
Note:	Progressive marks to include Submission of a portfolio of sketches, Assignments and study models

Course outcome (Course Skill Set)

- The students will be able to appreciate geographical, geological, social, cultural and political factors that influenced the early society and its architecture.
- They will also understand the use of materials and structural/construction systems explode during that era.
- The students will also understand and focus on local architecture context in addition to understanding the global history of architecture.

Assessment Details (both CIE and SEE)

(methods of CIE need to be define topic wise i.e.- MCQ, Quizzes, Open book test, Seminar or micro project)

The Marks of Continuous Internal Evaluation (CIE) is 50 and for Semester End Exam (SEE) is 50 marks. The student has to obtain a minimum of 50% of the maximum marks of CIE and 40 % of maximum marks of SEE to pass. The passing percentage shall not be less than the 50% in aggregate for a course (i.e. CIE and SEE put together). Based on the marks scored in CIE+SEE grading will be awarded for this course.

Continuous Internal Evaluation:

Three Unit Tests each of **20 Marks (duration 01 hour**)

1. First test at the end of 5th week of the semester
2. Second test at the end of the 10th week of the semester
3. Third test at the end of the 15th week of the semester

Two assignments each of **10 Marks**

4. First assignment at the end of 4th week of the semester
5. Second assignment at the end of 9th week of the semester

Group discussion/Seminar/quiz any one of three suitably planned to attain the COs and POs for **20 Marks**(**duration 01 hours**)

6. At the end of the 13th week of the semester

The sum of three tests, two assignments, and quiz/seminar/group discussion will be out of 100 marks and will be **scaled down to 50 marks**

(to have less stressed CIE, the portion of the syllabus should not be common /repeated for any of the methods of the CIE. Each method of CIE should have a different syllabus portion of the course).

CIE methods /question paper is designed to attain the different levels of Bloom's taxonomy as per the outcome defined for the course.

Semester End Examination:

Theory SEE will be conducted by University as per the scheduled timetable, with common question papers for the subject (**duration 03 hours)**

1. The question paper will have ten questions. Each question is set for 20 marks.
2. There will be 2 questions from each module. Each of the two questions under a module (with a maximum of 3 sub-questions), **should have a mix of topics** under that module.

The students have to answer 5 full questions, selecting one full question from each module. Marks scored by the student will be scale downed to 50 Marks

Suggested Learning Resources:

REFERENCES:

1. Francis D K Ching, Mark M. Jarzombek, Vikramaditya Prakash, "A Global History of Architecture" by Wiley and Sons, 2011.
2. Percy Brown , "Indian Architecture B uddhist and Hindu", Read Books, 2010.
3. Sir Banister Fletcher; edited by Dan Cruickshank , "History of Architecture", CBS Publishers and Distributors, 2003
4. Satish Grover, "Buddhist and Hindu Architecture in India", CBS Publishers and Distributors, 2003
5. History of Architecture by James Fergusson
6. The Story of Architecture by Patrick Nuttgens

Web links and Video Lectures (e-Resources):

- https://ndl.iitkgp.ac.in
- https://www.youtube.com/watch?v=g-bQx0ZtHUw
- https://www.youtube.com/watch?v=aizGoYeski8
- https://www.youtube.com/watch?v=QBqCjY-l9c4
- https://www.youtube.com/watch?v=sohXPx_XZ6Y
- https://www.youtube.com/watch?v=86FyWTKzxpI
- https://www.youtube.com/watch?v=SVA_bdmthrs
- https://www.youtube.com/watch?v=-obKX-mqjXQ
- https://www.youtube.com/watch?v=7MFKy7DJsCY
- https://www.youtube.com/watch?v=Kf8XIxX7NEs
- https://www.youtube.com/watch?v=XIf98WPhR1k
- https://www.youtube.com/watch?v=lYQ9P0k7MoA
- https://www.youtube.com/watch?v=p5bqAKixgYA
- https://www.youtube.com/watch?v=criZ8DDhu6g
- https://www.youtube.com/watch?v=6ij8IEJO0Zk
- https://www.youtube.com/watch?v=tlvgxsq6iU8
- https://www.youtube.com/watch?v=PsIanDAyro4
-

Activity Based Learning (Suggested Activities in Class)/ Practical Based learning

- Making sketches of various buildings in sketch book
- Seminar by students on selected topics in group or individually.
- Group discussion on a topic.

BASIC DESIGN AND VISUAL ARTS			
Course Code	**21ARC15**	CIE Marks	50
Teaching Hours/Week (L:T:P: S)	2:0:0:3	SEE Marks (Term Work)	50
Total Hours of Pedagogy	60	Total Marks	100
Credits	05	Exam Hours	

Course objectives:
To encourage a critical orientation to design thinking and action.

Teaching-Learning Process (General Instructions)
These are sample Strategies; which teacher can use to accelerate the attainment of the various course outcomes.

- Develop observation skill in students towards design in various fields
- Appreciate art in various forms.
- Develop curiosity as how elements of design manifested in nature.

MODULE - 1

Definition of Art and role of Art in Society: Role and meaning of art, various types of arts-fine arts, performing arts, commercial arts, industrial arts, folk arts, abstract art, visual arts, spatial arts, temporal arts, pop art etc. Relationship of architecture with other arts like Painting and Sculpture.

Study Tools- Any three can be explored

- Observation & Study to develop hand & cognitive skill.
- Colours, Pattern & textures, and function
- Additive and Subtractive of Forms Freehand sketching
- Exercises of rendering techniques

MODULE - 2

Principles of Composition: Elements of Design & Principles of Design. Principles of Aesthetics and Architectural Composition -1 – Unity, Balance, Proportion, Scale in Architectural composition. Illustrations and its application to the practice of design with historical as well as contemporary buildings.

Study Tools- Any three can be explored

- Colours, Pattern & textures, and function
- Additive and Subtractive of Forms
- Freehand sketching
- Exercises of rendering techniques
- Material Study

MODULE - 3

<u>Patterns</u>

1. Study of pattern: Natural, Manmade and Geometric patterns
    - Recognizing patterns, analyzing ideas, synthesizing information, solving problems, and creating things involving the process of abstraction.
    - Appreciation of use of patterns in design
2. Space making through patterns

<u>Structure</u>

3. Understanding gravity, and the different ways we resist it. Study of material & structure in nature, and how design brings them together. Sketch analysis of structure and form in an example taken from Patterns.

Study tools - Any three can be explored

- Deconstruction of natural, manmade pattern to grid and abstract patterns
- Point, line, Plane, Form using Grid Pattern.
- Volumetric Exercises- Solid & Void.
- Freehand sketching
- Study of Material & structure in nature, and expressing through design.

MODULE - 4

Study of Art Forms & Crafts of India and Asia. Difference between art and craft.
Art Styles of India- folk, popular and modern art, Art trends, periods and Isms.

Study tools-

- Explore and learn any one Indian art form and regional craft.
- Structural/Material translation from concept mind mapping.

MODULE - 5

Appreciation of oriental and western performing arts.

Study tools-

- Exploring Performing arts of India,
- Regional Folk Dance and Crafts like, Leather puppets etc.
- To understand the oriental & western styles. Use them in product design.

Teaching-Learning Process	• Studios to conduct hands on work with models, sheets, drawings in Basic Design • Indoor and outdoor sketching in various medium to explore visual arts • Site/field visit to folklores areas • Screening documentaries, videos, films on various arts and crafts India and Asia.
Note:	Progressive marks to include Submission of a portfolio of sketches, sheets and study models, etc

Course outcome (Course Skill Set)

- The students will be able to appreciate critical orientation to design thinking and action.
- The students will be able to appreciate the concept of abstraction by experimenting with different patterns and materials.
- The student will also develop an ability to appreciate various art forms.

Assessment Details (both CIE and SEE)

(methods of CIE need to be define topic wise i.e.- Studio works, model making, Seminar or micro project)

The Marks of Continuous Internal Evaluation (CIE) is 50 and for Semester End Exam (SEE)(term work) is 50 marks. The student has to obtain a minimum of 50% of the maximum marks of CIE and 40 % of maximum marks of SEE to pass. The passing percentage shall not be less than the 50% in aggregate for a course (i.e. CIE and SEE put together). Based on the marks scored in CIE+SEE grading will be awarded for this course.

.**Continuous Internal Evaluation:**

1. Methods suggested: Test, Written Quiz, Seminar, report writing etc.
2. The class teacher has to decide the topic for the test, Written Quiz, and Seminar. In the beginning, only the teacher has to announce the methods of CIE for the subject.

Semester End Examination:

1. The student need to submit his/her works done throughout the semester, including rough sheets for Term work examination, atleast one day prior to Term Work Examination to the course teacher/coordinator.
2. The term work will be evaluated by an external teacher appointed by the University along with Course teacher or an internal examiner.
3. The SEE mark list generated is to be signed by both internal and external examiners and submitted to VTU in sealed cover through the Principal of the institution

Suggested Learning Resources:

REFERENCES:

1. Donald Norman, ‘Design of Everyday Things”, Basic Books; 2 edition (5 November 2013)
2. John Berger, ‘Ways of Seeing’ 1972, Penguin, UK
3. Maitland Graves, ‘The Art of Color and Design’, McGraw-Hill, 1951
4. Robert Gill, “Rendering with Pen and Ink”, Thames & Hudson; Revised, Enlarged edition (2 April 1984)
5. Abid Husain, “National culture of India", National Book Trust, India, 1994

6. Antony Mason, John T. Spike, "A History of Western Art: from prehistory to the 21st Century", McRae Books, 2007.
7. Arthur Llewellyn Basham, 'The Wonder That Was India", Picador; Indian edition, 2004
8. Christopher Alexander, "The Timeless way of Building" , Oxford University Press (1979)
9. Francis D.K. Ching," Architecture: form, space & order", John Wiley & Sons, 2010
10. Fred S. Kleiner, "Art through the Ages", Cengage Learning; 14 edition, 2012

Web links and Video Lectures (e-Resources):

- https://ndl.iitkgp.ac.in
- https://www.researchgate.net/publication/339016810_Pedagogy_for_Basic_Design_Studio_in_Learning_Architecture_A_Qualitative_Exploration.
- https://www.shs-conferences.org/articles/shsconf/pdf/2016/04/shsconf_erpa2016_01053.pdf

Activity Based Learning (Suggested Activities in Class)/ Practical Based learning

- Hands on workshops by various artists/experts

MODEL MAKING WORKSHOP			
Course Code	**21ARC16**	CIE Marks	100
Teaching Hours/Week (L:T:P: S)	0:0:0:4	SEE Marks	--
Total Hours of Pedagogy	50	Total Marks	100
Credits	04	Exam Hours	

Course objectives:
To train the students to experiment and manipulate materials leading to creative exploration of forms.

Teaching-Learning Process (General Instructions)
These are sample Strategies; which teacher can use to accelerate the attainment of the various course outcomes.

1. Making a student aware of various materials for model making
2. Hands on training for model making in various forms and shapes

COURSE OUTLINE

MODULE - 1

1. Generation of basic forms-cube, cone, dome and arch.
2. Generating of organic and geometrical forms/objects

MODULE - 2

3. Generation of forms &Material exploration: hands on skill by using wood, bamboo, metal wire, thread, balsa wood, clothe, paper board etc

MODULE - 3

4. Composite forms: Experimental form generation by combining various materials and shapes.(rods, pipes, slabs, etc.)
5. Free Forms: Tensile structures, Funicular Shells using wood, fabric, plastic etc.

MODULE - 4

6. Architectural forms: making of windows, wall doors, roofs, trees, shrubs, roads, vehicles etc.

MODULE - 5

7. Introduction to digital modelling like 3D printing and laser cutting. Note: Student may be encouraged to use environment friendly materials. Learning Outcome: At the end of the course the students would be able to use variety of materials to construct architectural models and different geometrical forms

Teaching-Learning Process	• Assign exercises in making different types of models using variety of materials available in the market.
Note:	Progressive marks to include Submission of models as part of CIE

Course outcome (Course Skill Set)

At the end of the course, the students will be able to experiment and manipulate materials leading to creative exploration of forms.

Assessment Details (both CIE and SEE)

(methods of CIE need to be define topic wise i.e.- Studio work, model making, sketching , Seminar or micro project)

The weightage of Continuous Internal Evaluation (CIE) is 100% and there is no Semester End Exam (SEE.) The student has to obtain a minimum of 50% in CIE to pass. Based on the CIE marks grading will be awarded.

Continuous Internal Evaluation:

1. Methods suggested: Submission of the studio work on weekly basis in the form of drawings, models, reports of site/field trips etc.
2. The class teacher has to decide the topic for the studio work and other assignments. In the beginning, only the teacher has to announce the methods of CIE for the subject.
3. The class teacher has to continuously assess the work of students on weekly basis from assignments and tests. CIE marks to be awarded at the end of semester and to be uploaded to VTU portal.

Suggested Learning Resources:

REFERENCES:

1. Arjan Karssen & Bernard Otte, "Model Making: Conceive, Create and Convince", Frame Publishers (November 11, 2014)
2. David Neat , "Model-Making: Materials and Methods", CroWood Press, 2008
3. JocquiAtkin, "250 tips, techniques, and trade secrets for potters", Barron's Educational Series, 2009
4. Matt Driscoll, "Model Making for Architects", The Crowood Press Ltd, 2013
5. Megan Werner," Model making", Princeton Archit.Press,2010
6. Nick Dunn, "Architectural Model Making", Laurence King Publishing, 2014
7. Roark T. Congdon, "Architectural Model Building", Fairchild Books; 1 edition, 2010

Web links and Video Lectures (e-Resources):

- https://ndl.iitkgp.ac.in
- https://www.youtube.com/watch?v=Kfj2-A5rJoQ
- https://www.youtube.com/watch?v=kMil6ETrmj0

Activity Based Learning (Suggested Activities in Class)/ Practical Based learning

- Group work on model making such as geodesic dome.

INNOVATION and DESIGN THINKING			
Course Code	**21IDT19/29**	CIE Marks	50
Teaching Hours/Week (L:T:P: S)	1:0:0	SEE Marks	50
Total Hours of Pedagogy	25	Total Marks	100
Credits	01	Exam Hours	01

Course Category: Foundation

Preamble: Thiscourseprovidesanintroductiontothebasicconceptsandtechniques of engineering and reverses engineering, the process of design, analytical thinking and ideas, basics and development of engineering drawing, application of engineering drawing with computer aide.

Course objectives:

- To explain the concept of design thinking for product and service development
- To explain the fundamental concept of innovation and design thinking
- To discuss the methods of implementing design thinking in the real world.

Teaching-Learning Process (General Instructions)

These are sample Strategies; which teachers can use to accelerate the attainment of the various course outcomes.

1. Lecturer method (L) does not mean only the traditional lecture method, but a different type of teaching method may be adopted to develop the outcomes.
2. Show Video/animation films to explain concepts
3. Encourage collaborative (Group Learning) Learning in the class
4. Ask at least three HOTS (Higher-order Thinking) questions in the class, which promotes critical thinking
5. Adopt Problem Based Learning (PBL), which fosters students' Analytical skills, develops thinking skills such as the ability to evaluate, generalize, and analyze information rather than simply recall it.
6. Topics will be introduced in multiple representations.
7. Show the different ways to solve the same problem and encourage the students to come up with their own creative ways to solve them.
8. Discuss how every concept can be applied to the real world - and when that's possible, it helps improve the students' understanding.

Module-1

PROCESS OFDESIGN

Understanding Design thinking

Shared model in team-based design – Theory and practice in Design thinking – Explore presentation signers across globe – MVP or Prototyping

Teaching-Learning Process	Introduction about the design thinking: Chalk and Talk method Theory and practice through presentation MVP and Prototyping through live examples and videos

Module-2

Tools for Design Thinking

Real-Time design interaction capture and analysis – Enabling efficient collaboration in digital space – Empathy for design – Collaboration in distributed Design

Teaching-Learning Process	Case studies on design thinking for real-time interaction and analysis Simulation exercises for collaborated enabled design thinking

	Live examples on the success of collaborated design thinking

Module-3

Design Thinking in IT

Design Thinking to Business Process modelling – Agile in Virtual collaboration environment – Scenario based Prototyping

Teaching-Learning Process	Case studies on design thinking and business acceptance of the design Simulation on the role of virtual eco-system for collaborated prototyping

Module-4

DT For strategic innovations

Growth – Story telling representation – Strategic Foresight - Change – Sense Making - Maintenance Relevance – Value redefinition - Extreme Competition – experience design - Standardization – Humanization - Creative Culture – Rapid prototyping, Strategy and Organization – Business Model design.

Teaching-Learning Process	Business model examples of successful designs Presentation by the students on the success of design Live project on design thinking in a group of 4 students

Module-5

Design thinking workshop

Design Thinking Work shop Empathize, Design, Ideate, Prototype and Test

Teaching-Learning Process	8 hours design thinking workshop from the expect and then presentation by the students on the learning from the workshop

Course Outcomes:

Upon the successful completion of the course, students will be able to:

CO Nos.	Course Outcomes	Knowledge Level (Based on revised Bloom's Taxonomy)
CO1	Appreciate various design process procedure	K2
CO2	Generate and develop design idea through different technique	K2
CO3	Identify the significance of reverse Engineering to Understand products	K2
CO4	Draw technical drawing for design ideas	K3

Assessment Details (both CIE and SEE)

(methods of CIE need to be defined topic wise i.e.- Tests, MCQ, Quizzes, Seminar or micro project/Course Project, Term Paper)

The weightage for Continuous Internal Evaluation (CIE) is 50% and that for Semester End Exam (SEE) is 50%. The student has to obtain a minimum of 50% of the maximum marks of CIE and 40 % of maximum marks of SEE to pass a course. The average marks of CIE and SEE put together shall not be less than 50% of the marks of course. Based on the marks scored in CIE+SEE, grades for the course will be included in the grade card.

Continuous Internal Evaluation:

Three Unit Tests each of **20 Marks (duration 01 hour**)

1. First test at the end of 5th week of the semester
2. Second test at the end of the 10th week of the semester
3. Third test at the end of the 15th week of the semester

(Preferred pattern of the all test are similar to the SEE pattern, however; teacher may follow the CIE test pattern of other engineering courses)

Two assignments each of **10 Marks**

4. First assignment at the end of 4th week of the semester
5. Second assignment at the end of 9th week of the semester

Report writing /Group discussion/Seminar any one of three suitably planned to attain the COs and POs for **20 Marks**(**duration 01 hours**)

6. At the end of the 13th week of the semester

The sum of three tests, two assignments, and quiz/seminar/group discussion will be out of 100 marks and will be **scaled down to 50 marks**

CIE methods /question paper is designed to attain the different levels of Bloom's taxonomy as per the outcome defined for the course.

Semester End Examination:

Theory SEE will be conducted by University as per the scheduled timetable, with common question papers for subject

SEE paper will be set for 50 questions of each of 01 mark. The pattern of the question paper is MCQ. The time allotted for SEE is **01 hours**

Suggested Learning Resources:

Text Books:

1. **John.R.Karsnitz,StephenO'BrienandJohnP.Hutchinson,"EngineeringDesign",Cengagelearning(Internationaledition)SecondEdition,2013.**
2. **Roger Martin, "The Design of Business: Why Design Thinking is the Next Competitive Advantage", Harvard Business Press , 2009.**
3. **Hasso Plattner, Christoph Meinel and Larry Leifer (eds), "Design Thinking: Understand – Improve – Apply", Springer, 2011**
4. **Idris Mootee, "Design Thinking for Strategic Innovation: What They Can't Teach You at Business or Design School", John Wiley & Sons 2013.**

References:

5. **YousefHaikandTamerM.Shahin,"EngineeringDesignProcess",CengageLearning,SecondEditi**

on, 2011.

6. **Book - Solving Problems with Design Thinking - Ten Stories of What Works (Columbia Business School Publishing) Hardcover – 20 Sep 2013 by Jeanne Liedtka (Author), Andrew King (Author), Kevin Bennett (Author).**

Web links and Video Lectures (e-Resources):

1. **www.tutor2u.net/business/presentations/./productlifecycle/default.html**
2. **https://docs.oracle.com/cd/E11108_02/otn/pdf/./E11087_01.pdf**
3. **www.bizfilings.com›Home›Marketing›ProductDevelopmen**
4. **https://www.mindtools.com/brainstm.html**
5. **https://www.quicksprout.com/./how-to-reverse-engineer-your-competit**
6. **www.vertabelo.com/blog/documentation/reverse-engineeringhttps://support.microsoft.com/en-us/kb/273814**
7. **https://support.google.com/docs/answer/179740?hl=en**
8. **https://www.youtube.com/watch?v=2mjSDIBaUlMthevirtualinstructor.com/foreshortening.html**

https://dschool.stanford.edu/.../designresources/.../ModeGuideBOOTCAMP2010L.pdf https://dschool.stanford.edu/use-our-methods/ 6. https://www.interaction-design.org/literature/article/5-stages-in-the-design-thinking-process 7. http://www.creativityatwork.com/design-thinking-strategy-for-innovation/ 49 8. https://www.nngroup.com/articles/design-thinking/ 9. https://designthinkingforeducators.com/design-thinking/ 10. www.designthinkingformobility.org/wp-content/.../10/NapkinPitch_Worksheet.pdf

Activity Based Learning (Suggested Activities in Class)/ Practical Based learning

- http://dschool.stanford.edu/dgift/

Communicative English

Course Code	**21EGH18**	CIE Marks	50
Teaching Hours/Week (L:T:P: S)	2:0:0 Hours	SEE Marks	50
Total Hours of Pedagogy	02 Hours/Week	Total Marks	100
Credits	02	Exam Hours	02 hours

Course objectives:

The course (21EGH18) will enable the students,

- To know about Fundamentals of Communicative English and Communication Skills in general.
- To train to identify the nuances of phonetics, intonation and enhance pronunciation skills for better communication skills.
- To impart Basic English grammar and essentials of important language skills.
- To enhance English vocabulary and language proficiency for better communication skills.
- To learn about Techniques of Information Transfer through presentation.

Language Lab : To augment LSRW, grammar, and Vocabulary skills (Listening, Speaking, Reading, Writing and Grammar, Vocabulary) through tests, activities, exercises etc., comprehensive web-based learning and assessment systems can be referred as per the AICTE /VTU guidelines.

Teaching-Learning Process (General Instructions)

These are sample Strategies, which teacher can use to accelerate the attainment of the various course outcomes.

1. Teachers shall adopt suitable pedagogy for effective teaching - learning process. The pedagogy shall involve the combination of different methodologies which suit modern technological tools and software's to meet the present requirements of the Global employment market.
   (i) Direct instructional method (Low /Old Technology),
   (ii) Flipped classrooms (High/advanced Technological tools),
   (iii) Blended learning (combination of both),
   (iv) Enquiry and evaluation based learning,
   (v) Personalized learning,
   (vi) Problems based learning through discussion,
   (vii) Following the method of expeditionary learning Tools and techniques,
   (viii) Use of audio visual methods through language Labs in teaching of of LSRW skills.
2. Apart from conventional lecture methods, various types of innovative teaching techniques through videos, animation films may be adapted so that the delivered lesson can progress the students In theoretical applied and practical skills in teaching of communicative skills in general.

Module-1

Introduction to Communicative English:

Introduction, Language as a Tool, Fundamentals of Communicative English, Process of Communication, Barriers to Effective Communicative English, Different styles and levels in Communicative English (Communication Channels). Interpersonal and Intrapersonal Communication Skills, How to improve and Develop Interpersonal and Intrapersonal Communication Skills.

Teaching-Learning Process	Chalk and talk method, Videos, PowerPoint presentation to teach Communication skills (LSRW Skills), Creating real time stations in classroom discussions, Giving activities and assignments (Connecting Campus & community with companies real time situations).

Module-2

Introduction to Phonetics :
Introduction, Phonetic Transcription, English Pronunciation, Pronunciation Guidelines Related to consonants and vowels, Sounds Mispronounced, Silent and Non-silent Letters, Syllables and Structure, Word Accent and Stress Shift, – Rules for Word Accent, Intonation – purposes of intonation, Spelling Rules and Words often Misspelt – Exercises on it. Common Errors in Pronunciation.

Teaching-Learning Process	Chalk and talk method, Videos, PowerPoint presentation and Animation videos to teach phonetics in Practical method, creating real time stations in classroom discussions, Giving activities and assignments (Connecting Campus & community with companies real time situations).

Module-3

Basic English Communicative Grammar and Vocabulary PART - I :
Grammar: Basic English Grammar and Parts of Speech - Nouns, Pronouns, Adjectives, Verbs, Adverbs, Conjunctions, Articles and Preposition. Preposition, kinds of Preposition and Prepositions often Confused. Articles: Use of Articles – Indefinite and Definite Articles, Pronunciation of '*The*', words ending '*age*', some plural forms. Introduction to Vocabulary, All Types of Vocabulary –Exercises on it.

Teaching-Learning Process	Chalk and talk method, Videos, PowerPoint presentation to teach Grammar, Animation videos on communication and language skills, creating real-time stations in classroom discussions, Giving activities and assignments (Connecting Campus & community with companies real time situations).

Module-4

Basic English Communicative Grammar and Vocabulary PART - II:
Question Tags, Question Tags for Assertive Sentences (Statements) – Some Exceptions in Question Tags and Exercises, One Word Substitutes and Exercises. Strong and Weak forms of words, Words formation - Prefixes and Suffixes (Vocabulary), Contractions and Abbreviations. Word Pairs (Minimal Pairs) – Exercises, Tense and Types of tenses, The Sequence of Tenses (Rules in use of Tenses) and Exercises on it.

Teaching-Learning Process	Chalk and talk method, PowerPoint presentation to teach Grammar and phonetics, Animation videos on communication and language skills, creating real time stations in classroom discussions, Giving activities and assignments (Connecting Campus & community with companies real time situations).

Module-5

Communication Skills for Employment:
Information Transfer: Oral Presentation - Examples and Practice. Extempore / Public Speaking, Difference between Extempore / Public Speaking, Communication Guidelines for Practice. Mother Tongue Influence (MTI) – South Indian Speakers, Various Techniques for Neutralization of Mother Tongue Influence – Exercises. Reading and Listening Comprehensions – Exercises.

Teaching-Learning Process	Chalk and talk method, Videos, PowerPoint presentation to teach Grammar and phonetics, Animation videos on communication and language skills, creating real time stations in classroom discussions, Giving activities and assignments (Connecting Campus & community with companies real time situations).

Course outcome (Course Skill Set)

At the end of the course(21EGH18) the student will be able to :

1. Understand and apply the Fundamentals of Communication Skills in their communication skills.
2. Identify the nuances of phonetics, intonation and enhance pronunciation skills.
3. To impart basic English grammar and essentials of language skills as per present requirement.
4. Understand and use all types of English vocabulary and language proficiency.

5. Adopt the Techniques of Information Transfer through presentation.

Assessment Details (both CIE and SEE)

(methods of CIE need to be defined topic wise i.e.- MCQ, Quizzes, written test, Reports writing, Seminar and activities).

The weightage for Continuous Internal Evaluation (CIE) is 50% and that for Semester End Exam (SEE) is 50%. The student has to obtain a minimum of 50% of the maximum marks of CIE and 40 % of maximum marks of SEE to pass a course. The average marks of CIE and SEE put together shall not be less than 50% of the marks of course. Based on the marks scored in CIE+SEE, grades for the course will be included in the grade card.

Continuous Internal Evaluation (CIE) :

Three Unit Tests each of **20 Marks (duration 01 hour**)

7. First test at the end of 5th week of the semester
8. Second test at the end of the 10th week of the semester
9. Third test at the end of the 15th week of the semester

All the tests are preferred similar to SEE pattern; however, teacher may follow test pattern similar to other theory courses of Engineering

Two assignments each of **10 Marks**

10. First assignment at the end of 4th week of the semester
11. Second assignment at the end of 9th week of the semester

Report writing /Group discussion/Seminar any one of three suitably planned to attain the COs and POs for **20 Marks** (**duration 01 hours**)

12. At the end of the 13th week of the semester

The sum of three tests, two assignments, and quiz/seminar/group discussion will be out of 100 marks and will be **scaled down to 50 marks**

CIE methods /question paper is designed to attain the different levels of Bloom's taxonomy as per the outcome defined for the course.

Semester End Examination (SEE) :

SEE paper will be set for 100 questions of each of 01 marks. The pattern of the question paper is MCQ. The time allotted for SEE is 120 minutes**.** Marks scored are scaled down to 50 Marks. *(Time duration may be made 90 minutes to train the students for engineering / non-engineering competitive examination)*

1. Communicative English has become a very important component in all engineering and non-engineering competitive examinations. In exams like GRE, TOEFL, IELTS and GATE exam, all state and Central Government recruitment examinations, placement tests and other Examinations, so the pattern of question paper, in general, will be in a multiple-choice question (MCQ) Pattern. So, to meet the relevance of the recruitment requirement of our Engineering students "Communicative English" Semester end examination (SEE) will be conducted in a multiple choice question (MCQ) pattern.
2. MCQ Pattern (Multiple Choice Questions) Semester End Exam (SEE) is conducted for 50 marks (120 minutes duration).

Suggested Learning Resources:

1) **Communication Skills** by Sanjay Kumar and Pushp Lata, Oxford University Press - 2019.
2) **English for Engineers** by N.P.Sudharshana and C.Savitha, Cambridge University Press – 2018.
3) **A Textbook of English Language Communication Skills,** Infinite Learning Solutions–(Revised Edition) 2021.
4) **A Course in Technical English–D Praveen Sam, KN Shoba,** Cambridge University Press – 2020.
5) **Technical Communication** by Gajendra Singh Chauhan and Et al, Cengage learning India Pvt Limited [Latest Revised Edition] - 2019.
6) **English Language Communication Skills – Lab Manual cum Workbook,** Cengage learning India Pvt Limited [Latest Revised Edition] – 2019.
7) **Practical English Usage** by Michael Swan, Oxford University Press – 2016.
8) **Technical Communication** – Principles and Practice, Third Edition by Meenakshi Raman and Sangeetha Sharma, Oxford University Press 2017.

Activity Based Learning (Suggested Activities in Class)/ Practical Based learning

- ✓ Contents related activities (Activity-based discussions)
- ✓ For active participation of students instruct the students to prepare Flowcharts and Handouts
- ✓ Organising Group wise discussions Connecting to placement activities
- ✓ Quizzes and Discussions
- ✓ Seminars and assignments

II Semester

ARCHITECTURAL DESIGN - II			
Course Code	**21ARC21**	CIE Marks	100
Teaching Hours/Week (L:T:P: S)	0:0:0:7	SEE Marks(VIVA)	100
Total Hours of Pedagogy	84	Total Marks	200
Credits	07	Exam Hours	-

Course objectives:

To develop the ability to generate solutions to spatial constructs, i.e., space and form which integrate principles of design with functional requirements by emphasizing the study of variables like light, movement, transformation, scale, structure & skin., physical constraints and cultural context, either urban or rural, Formal and informal housing.

To develop the ability to translate abstract principles of design into architectural solutions for simple problems.

Teaching-Learning Process (General Instructions)

These are sample Strategies, which teacher can use to accelerate the attainment of the various course outcomes.

4) The contents of the courses shall be taught in an application-oriented manner on a scientific and design basis. The course contents shall be taught and learned in lectures, seminars, labs or workshops, studio exercises and design projects, etc.
5) In-studio exercises the teachers shall take the lead to provide tasks and offer guidance for solutions finding. The students shall work either individually or in groups.
6) In design studios, the students contribute to the processing, analysis and solving of problems of direct professional practice, attended by faculty(s) entitled to conduct the studio and examine. The results shall be defended through drawings; models and reports and evaluated through periodic assessment and finally by a jury or panel, and finally, evaluated through periodic assessment and an end semester examination or viva voce.

We inhabit and function in space, both the manmade and the natural i.e., "a life spent within an enclosure". These enclosures have functional and cultural meanings, are symbols of abstract ideas of that period in time.

"Architecture is about giving form to the places where people live. It is not more complicated than that but also not simpler than that." - Alejandro Aravena

"Architecture is both an art and a practical pursuit, and the profession has always been divided between those who emphasize the art, that is pure design, and those who give priority to the practical." - Paul Goldberger

"Architecture is used by political leaders to seduce, to impress, and to intimidate." - Deyan Sudjic

Module-1

To relearn the "principles of Design" and anthromopometric requirements of space planning,

Teaching-Learning Process	• Observe daily activities with respect to functional spaces in plan and section • Study of the relationship between human body and the built environment understanding usage, spatial and thermal comfort.

Module-2

Introduction to "Nature of Space": • *Understanding the notions of PLACE: A "boundary", a "center" and a "spirit", PATH: A "way" and a "goal", DOMAIN: A conglomeration of paths and goals that forms a "whole" with its own "identity",* • *Understanding the notions of "Enclosure, Ambiguity, and Transparency", "Spatial Context in formal and informal built environment. - open, closed, transition spaces", "cultural context – inclusion, exclusion, spatial segregation",* • Culture & Design: Understanding social attitudes to Built-form: extroverted/introverted, formal/informal, typical/individual, simple/labyrinthine, contiguous/isolated etc.	
Teaching-Learning Process	• . Mapping of one's journey from home to studio/of the campus/of a Neighbourhood. Explore issues of movement, navigation, circulation, direction and discovery. Explore issues of representation, scale, starting point, orientation, landmarks, and imagery.
Module-3	
Introduction to "Poetics of Space" : • *light, movement, transformation, scale, structure and skin,* • *key tools for learning : text / language as a tool; emotion, cultural, climatic, eg.- contemplative / severe / dramatic / minimalist / natural / organic / contemporary / traditional / etc.,*	
Teaching-Learning Process	• Observation & study • Presentation *of case studies based on literature survey & field visit.* • Study models, Sketches and Drawings of study models - plans and sections (suitable scale) using a mono functional space.
Module-4	
Understanding the role of Physical Context - terrain, materials, structure, etc.,	
Teaching-Learning Process	• Hands-on Design exercise – creation of a simple design in which form is distinct from structure and creation of a simple design in which form is integral with structure. • Presentation *of case studies based on literature survey & field visit.* • Study models, Sketches and Drawings of study models - plans and sections (suitable scale) using a mono functional space.
Module-5	
Design process to test the learning of the semester using a multifunctional program to incorporate "nature of space", "poetics of space" and "physical constraints", • *Generation of a design brief for a multifunctional program, generation of areas based on human activity and anthropometric data,* • *Selection a of suitable site,* • *Idea generation, design development, & design drawings,* • *Eg. - A House for self, Guest House, Farm house, Villa, Container house, Courtyard house, Tree house,* house in an informal settlement *etc.*	
Teaching-Learning Process	• Presentation *of case studies based on literature survey & field visit*. • *A comparative analysis of a formal design house and an informal (self-help) house on analogy of space, function, modern and vernacular materials used, etc.*

	• Submission will include Idea generation, Study models, Sketches to achieve the desired result, development drawings and a set of plans, sections and elevations & model to suitable scale.

Course outcome (Course Skill Set)

At the end of the course the student will be equipped to understand the requirements of a multifunctional programs with respect to aspects of locating the design program on site viz a vie light, movement, etc.. The student will also be equipped to understand how to start a settlement study.

Assessment Details (both CIE and SEE)

(methods of CIE need to be defined topic wise i.e.- Studio discussions, Reviews, Time problems, test, Seminar or micro project)

The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%. The student has to obtain a minimum of 50% marks individually both in CIE and 40 % marks in SEE to pass. Semester End Exam (SEE) is conducted for 100 marks (Viva-voce). Based on this grading will be awarded. The student shall secure the 50% maximum marks for the course (CIE+SEE) for passing in the course.

Continuous Internal Evaluation:

Methods suggested:

3. Studio discussions, Reviews, Time problems, CIE tests, Seminar or micro project, Quiz, report writing etc.
4. The class teacher has to decide the topic for the Design and Seminars if any, in the beginning only. The teacher has to announce the methods of CIE for the subject in advance in writing.

Semester End Examination:

4. The student needs to submit his/her works done throughout the semester, including rough sheets for the Viva examination, at least one day prior to the Viva work examination to the course teacher/coordinator.
5. The Viva-voce will be evaluated by an external teacher appointed by the University along with Course teacher or an internal examiner.

The SEE marks list generated is to be signed by both internal and external examiners and submitted to VTU in the sealed cover through the Principal of the institution.

Suggested Learning Resources:

Books

1. Alain de Botton, " How Proust Can Change your life", Picador, 1997.
2. Alain de Botton, " The Architecture of Happiness", Sep. 2006, Vintage Books.
3. Alan Fletcher, " The art of looking sideways", Phaidon Press, 2001
4. Anthony Di Mari and Nora Yoo, " Operative Design: A Catalogue of Spatial Verbs", 2012, BIS Publishers.
5. Anthony Di Mari, " Conditional Design: An Introduction to Elemental Architecture", 2014, 1st Edition, Thames & Hudson.
6. Bruno Munari, "Design as Art", Penguin UK, 25-Sep-2008
7. Charles George Ramsey and Harold Sleeper, " Architectural Graphic Standards", 1992, Wiley
8. Christopher Alexander, "Notes on the Synthesis of Form", 1964, Harvard University Press.
9. Debkumar Chakrabarti, " Indian Anthropometric Dimensions For Ergonomic Design Practice", 1997, National Institute of Design.
10. François Blanciak, " Site less: 1001 Building Forms", 2008, MIT Press
11. Frank Ching, James F. Eckler, "Introduction to Architecture", 2012, John Wiley & Sons, US

12. Frank D.K. Ching, " Architecture: Form, Space, and Order", 4th Edition, Sep. 2014, John Wiley & Sons
13. Herman Hertzberger, "Lessons for Students in Architecture", 2005, 010 Publishers
14. Italo Calvino, " Invisible Cities", Harcourt Brace Jovanovich (May 3, 1978)
15. John Berger, " Way of Seeing", 1972, Penguin, UK
16. John Hancock Callender, " Time-Saver Standards for Architectural Design Data", 1982, McGraw-Hill
17. Michael Pause and Roger H. Clark, " Precedents in Architecture: Analytic Diagrams, Formative Ideas, and Partis", Van Nostrand Reinhold, 1985
18. Paul Jacques Grillo, " Form, Function and Design", 1975 , Dover Publications, New York
19. Paul Jacques Grillo, " What is Design ?", 1960, P. Theobald
20. Paul Lewis,Marc Tsurumaki, David J. Lewis, "Manual of Section", Princeton Architectural Press, 2016
21. Peter H. Reynolds, " The Dot", 2013, Candlewick Press
22. Philip Jodidio, "Tree houses. Fairy tale castles in the air", 2012, Taschen
23. Robert W. Gill, "Rendering with Pen and Ink", Van Nostrand Reinhold (1 June 1984)
24. Tom Alphin, "The LEGO Architect", 2015, No Starch Press

Web links and Video Lectures (e-Resources):

- https://ndl.iitkgp.ac.in
- https://www.youtube.com/watch?v=ly8orBNiNQM
- https://www.youtube.com/watch?v=gKddX70lNMg
- https://www.youtube.com/watch?v=lj0TnkAqsts
- https://www.youtube.com/watch?v=k4dVgbuxBAw
- https://www.youtube.com/watch?v=2d1VrCvdzbY
- https://www.youtube.com/watch?v=k4dVgbuxBAw

Activity Based Learning (Suggested Activities in Class)/ Practical Based learning

- Seminar by students on their field trips to dwellings in formal and vernacular settlements.

II Semester

Materials and Methods in Building Construction-II			
Course Code	**21ARC22**	CIE Marks	50
Teaching Hours/Week (L:T:P: S)	1:0:0:3	SEE Marks(VIVA)	50
Total Hours of Pedagogy	50	Total Marks	100
Credits	4	Exam Hours	-

Course objectives:

- *To understand Roofing systems using Timber, Steel Truss and Concrete. Cement, Steel and Reinforced Concrete.*

Teaching-Learning Process (General Instructions)

These are sample Strategies, which teacher can use to accelerate the attainment of the various course outcomes.

1. Studio works by students, lecture by faculty on materials using teaching aids
2. Visits to construction yard/site to understand materials and methods of construction.
3. Seminar by students on their learning.

Module-1

1) Timber Roof – Lean to roof, Collared Roof, King post roof, Queen Post Roof; details of joinery.
2) Steel Roof – Types of Steel Truss Roofs and method of construction.

Teaching-Learning Process	1. Studio work on different types and shapes of trusses used in timber and Steel. 2. Details of sections and sizes of principle rafters, struts, perlins, etc., used in steel and timber trusses for different spans. 3. Site visit, documentation, studio presentation by students on their learning.

Module-2

3) Cement: Types, applications, Tests - laboratory and field.
4) Steel: Properties and uses of reinforced steel.
5) Concrete: Ingredients, grades, admixtures, properties, production, mix, proportioning and placing of concrete.

Teaching-Learning Process	1. Understanding how cement, steel and concrete are tested in field and in laboratory. 2. Exploring the properties, uses and application of cement, steel and concrete in a typical building and in special applications. 3. Field visit to understand different materials used in concrete and quality parameters of concrete before and after concrete casting.

Module-3

6) Reinforced Cement Concrete: Form work, placing, and compaction, curing of concrete, sampling and testing of concrete. Construction joints, expansion joints, finish in concrete, chemical admixtures. Advantages and disadvantages with respect to thermal properties and impact on life cycle of a building.
7) RCC Foundations (Isolated footing) and Columns (Square and Round). Raft foundations, Grillage foundations and combined footing.

Teaching-Learning Process	1. Basics of form work with conventional and modern materials used in all R C C works. 2. Understanding different grades of Concrete in R C C (M-15, M-20, M- 25) 3. PPT/videos /field visits on different types of foundation.

Module-4

8) Staircase: Anthropometry of stairs, types of Staircases.
9) Timber Stairs: Single and Double Stringer stairs: construction methods and joinery.
10) RCC Stairs: Waist slab, folded plate, stringer beam stairs, precast stairs: construction methods and

joinery.	
Teaching-Learning Process	1. Studio work on different types and shapes of staircases built in Timber, Steel and Concrete. 2. Analysing details in joinery and techniques of construction of staircase

Module-5

11) Steel Stairs: Stringer stairs, Folded Type, Spiral stairs, Fire escape stairs: construction methods and joinery.

12) Composite Stairs: Brick/stone, Steel/Timber, Concrete/wood, steel/ glass: construction methods and joinery.

Teaching-Learning Process	1. Understanding the purpose and uses of steel and composite staircases. 2. Analysing construction methods and joinery details. 3. PPT/videos presentation on different types of steel and composite stairs.

Course outcome (Course Skill Set)

At the end of the course, the students would be able to:

1. Appreciate the procedure involved and various materials that can be used in construction of roofs, foundations and staircases with greater understanding of details involved in joinery.
2. Compare various materials and their inherent properties

Assessment Details (both CIE and SEE)

(methods of CIE need to be define topic wise i.e.- Submission of construction drawing sheets, Journal of materials, Multiple Choice Question, Quizzes, Open book test, Seminar or micro project)

The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%. The student has to obtain a minimum of 50% marks individually both in CIE and 40% marks in SEE to pass. The average score of CIE + SEE shall be not less than 50% maximum marks of the course. Semester End Exam (SEE) is conducted for 50 marks (Viva-voce). Based on this grading will be awarded.

Continuous Internal Evaluation:

3. Methods suggested: Submission of Construction sheets, Journal of Materials, Test, Written Quiz, Seminar, report writing etc.
4. The class teacher has to decide the topics for the test, Written Quiz, and Seminar. In the beginning, only the teacher has to announce the methods of CIE for the subject.

Semester End Examination:

4. The student need to submit his/her works done throughout the semester, including rough sheets for Term work examination, atleast one day prior to Viva work examination to the course teacher/coordinator.
5. The work will be evaluated by an external teacher appointed by the University along with Course teacher or an internal examiner.
6. The SEE mark list generated is to be signed by both internal and external examiners and submitted to VTU in sealed cover through the Principal of the institution.

Suggested Learning Resources:

Books

1) Francis K Ching 'Building construction', Wiley; 5 edition (February 17, 2014)
2) R. Barry, "Construction of Buildings" Vol 1., 1999 by Wiley-Blackwell
3) Roy Chudley, "Construction Technology", 3rd Edition, Longman, 1999
4) W.B. Mckay, "Building Construction", Donhead, 2005

Web links and Video Lectures (e-Resources):

- . https://ndl.iitkgp.ac.in
- https://www.civilengineeringforum.me/structural-design-procedure/
- https://civiljungle.com/
- http://fairconditioning.org/knowledge-resources/#204-heat-transfer
- https://www.youtube.com/watch?v=e7DXW4DNJJo
- https://www.youtube.com/watch?v=dWSmgwPuyE4
- https://www.youtube.com/watch?v=rY2kHbUxZbs

Activity Based Learning (Suggested Activities in Class)/ Practical Based learning

- Visit to construction site for observation of materials used and methods adopted in building construction.
- Study of vernacular materials used in different climatic zones and their thermal properties.
- Visit to material testing labs to understand various properties of building materials, and observe the testing methods.
- Discuss with the faculty/experts on life cycle and environmental impact of construction materials

II Semester

Architectural Graphics-II			
Course Code	**21ARC23**	CIE Marks	50
Teaching Hours/Week (L:T:P: S)	0:0:0:4	SEE Marks(Term Work)	50
Total Hours of Pedagogy	48	Total Marks`	100
Credits	4	Exam Hours	-

Course objectives:
To develop visual communication and representation skills and methods of presentation of spatial design through 3D drawing techniques.

Teaching-Learning Process (General Instructions)
These are sample Strategies, which teacher can use to accelerate the attainment of the various course outcomes.

3. The students need to do the assignments in the studios.
1. Use of Video animation for easy understanding of various drawings

Module-1

1. 3D-Projections: exercises in 3D representation of exploded isometric and axonometric views of objects, furniture and built forms.

2. Development of surfaces for architectural roof forms, built enclosures and envelopes such as tents, upholstery and exercises of application to develop the paper and cardboard models.

Teaching-Learning Process	3. The students need to do the discussions on assignments in the studios. 4. Explore videos in various websites using animation of geometrical drawings. 5. A consolidated portfolio containing exercises related to each of the above topics are to be submitted for term work examination.

Module-2

3. Section of geometrical solids and construction of true shapes.

4. Interpenetration of geometric solids, combination of different forms in architectural compositions.
Ex: Projecting towers of vertical circulation on building facades, chimney over sloping roofs and projecting canopies and balconies on facades and dormer windows.

Teaching-Learning Process	1. The students need to do the discussions on assignments in the studios. 2. Explore videos in various websites using animation of geometrical drawings. 3. A consolidated portfolio containing exercises related to each of the above topics are to be submitted for term work examination.

Module-3

5. Introduction to perspective drawing: Its importance in architectural drawings, principles of perspective drawing, visual perceptions and its limitations. Exercises of observation, recording and representing the visual effects of depth, diminution and vanishing of built forms and understanding the methods of perspective projection.

6. Studies in perspective drawing: Understanding the importance and purpose of picture plane, station point, vanishing point, ground level, eye level, cone of vision and central line of vision - their variations and resultant effects.

Teaching-Learning	1. The students need to do the discussions on assignments in the studios. 2. Explore videos in various websites using animation of geometrical drawings.

Process	A consolidated portfolio containing exercises related to each of the above topics are to be submitted for term work examination.
Module-4	
7. One - point perspective drawings: Exercises of perspective drawings of simple built forms, interior views of a room with furniture. Exercise of perspective by changing the variables, their positions of PP, CV, SP and eye level etc. 8. Two-point perspective drawings: exercises of perspective drawings of simple built forms, architectural elements. Interior views of a room with furniture. Exercises of perspective by changing the variables, their positions of PP, CV, SP and eye-level etc.	
Teaching-Learning Process	1. The students need to do the discussions on assignments in the studios. 2. Explore videos in various websites using animation of geometrical drawings. A consolidated portfolio containing exercises related to each of the above topics are to be submitted for term work examination.
Module-5	
9. Free-hand perspective drawings of architectural elements, built forms. Exercises of rendering techniques showing light, shade and shadow on built forms. Rendering of plants, trees, water, landscape, human figures, vehicles, furniture and buildings with suitable elements of foreground and background. 10. Introduction to Sciography: Principles of shade and shadow constructions for geometrical solids, architectural elements and built forms. Construction of shadows on floor plans, elevations, sectional elevations and roof-top views.	
Teaching-Learning Process	1. The students need to do the discussions on assignments in the studios. 2. Explore videos in various websites using animation of geometrical drawings. A consolidated portfolio containing exercises related to each of the above topics are to be submitted for term work examination.
Course outcome (Course Skill Set) At the end of the course, the students will be equipped with a skills to use 3D techniques in architectural presentations. They would also attain skills to make architectural presentation using rendering and sciographic techniques.	

Assessment Details (both CIE and SEE)

(methods of CIE need to be define topic wise i.e.- Submission of construction drawing sheets, Journal of materials, Multiple Choice Question, Quizzes, Open book test, Seminar or micro project)

The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%. The student has to obtain a minimum of 50% marks individually both in CIE and 40% marks in SEE to pass. The average score of CIE + SEE shall be not less than 50% maximum marks of the course. Semester End Exam (SEE) is conducted for 50 marks (Term work). Based on this grading will be awarded.

Continuous Internal Evaluation:

5. Methods suggested: Submission of drawings done in studio, assignment sheets, etc., to be evaluated on weekly basis.
6. The class teacher has to decide the topics for the test. In the beginning only the teacher has to announce the methods of CIE for the subject.

Semester End Examination:

7. The student need to submit his/her works done throughout the semester, including rough sheets for Term work examination, atleast one day prior to Term work examination to the course teacher/coordinator.
8. The work will be evaluated by an external teacher appointed by the University along with Course teacher or an internal examiner.
9. The SEE mark list generated is to be signed by both internal and external examiners and submitted to VTU in sealed cover through the Principal of the institution.

Suggested Learning Resources:

Books

1) Francis D.K.Ching, "Architectural Graphics", Van Nostrand Reinhold Co., 1985
2) I.H.Morris, " Geometrical Drawing for Art Students", Longmans (1902)
3) Robert.W.Gill, "Rendering with pen and ink".
4) Shankar Malik, " Perspective & Sciography", 1994, Allied Publisher

Web links and Video Lectures (e-Resources):

- ` https://ndl.iitkgp.ac.in
- https://www.youtube.com/watch?v=VlVfHNDu1ds
- https://www.youtube.com/watch?v=IpOlOlUbk14
- https://www.youtube.com/watch?v=uAH9gsUZBEY
- https://www.youtube.com/watch?v=1gpNcVgOzjg
- https://www.youtube.com/watch?v=bjhkxFDvD78
- https://www.youtube.com/watch?v=JBGzoOlwFt4
- https://www.youtube.com/watch?v=7K2yaBfaVhk
- https://www.youtube.com/watch?v=vY20JGl4v44
- https://www.youtube.com/watch?v=lmrHPGFYIVg
- https://www.youtube.com/watch?v=WiofaB6lZLU

Activity Based Learning (Suggested Activities in Class)/ Practical Based learning

- Encourage students to work on Computer aided Graphics.
-

II Semester

History of Architecture-II			
Course Code	**21ARC24**	CIE Marks	50
Teaching Hours/Week (L:T:P: S)	3:0:0:0	SEE Marks	50
Total Hours of Pedagogy	40	Total Marks	100
Credits	3	Exam Hours	3

Course objectives:

To provide an understanding of the evolution of Hindu Architecture in India in its various stylistic modes, characterized by technology, ornamentation and planning practices.

Teaching-Learning Process (General Instructions)

These are sample Strategies, which teacher can use to accelerate the attainment of the various course outcomes.

1) Use of theory, activities, sketches, drawings, assignment and tutorial for teaching.
2) Evaluation by quiz, tests, classroom activities.

Module-1

1. **Introduction to Classical (Buddhist)**: Mahayana phase, stupa and rock cut cave Architecture.
2. **Buddhist Examples:** Study of principles of design of buildings through study of three kinds of Architecture: a) Monumental; Great Stupa at Sanchi, Chaitya at Karli, Viharas at Ajanta, and Toranas at Sanchi b) Domestic (Built to inhabit) and c) Civic space.
3. **Introduction to Jain Architecture:** Study of principles of design of buildings through study of three kinds of Architecture: a) Monumental; b) Domestic (Built to inhabit) and c) Civic space.

Teaching-Learning Process	1) The teacher can use PPTs, Videos to discuss the buildings, style of architecture. 2) The students need to sketch the buildings for its unique qualities. 3) Quizzes, models, seminars from students can be encouraged

Module-2

4. **Evolution of Hindu temple**: Indo Aryan and Dravidian – Early temples at Udaigiri, Tigawa and Sanchi.
5. **Evolution of Hindu temple**: Dravidian Experiments at Aihole (Durga temple and LadKhan temple), Deogarh, Bhitargaon and Badami.
6. **Beginnings of Dravidian architecture:** Pallavas, rathas at Mamallapuram, Shore temple, Kailsanatha and Vaikuntaperumal temples at Kancheepuram.

Teaching-Learning Process	1) The teacher can use PPTs, Videos to discuss the buildings, style of architecture. 2) The students need to sketch the buildings for its unique qualities. 3) Quizzes, models, seminars from students can be encouraged

Module-3

7. **The Cholas contribution:** Study of principles of design of buildings through study of three kinds of Architecture: a) Monumental; Brihadeshwara temple at Thanjavur and Gangaikonda Cholapuram b) Domestic (Built to inhabit) and c) Civic space;
8. **The Pandyan & Madurai Dynasties contribution:** Study of principles of design of buildings through study of three kinds of Architecture: a) Monumental; Gopurams Madurai (Meenakshi

temple) and Srirangam. b) Domestic (Built to inhabit) and c) Civic space;	
Teaching-Learning Process	1) The teacher can use PPTs, Videos to discuss the buildings, style of architecture. 2) The students need to sketch the buildings for its unique qualities. 3) Quizzes, models, seminars from students can be encouraged
Module-4	
9. **The Hoysala contribution:** Study of principles of design of buildings through study of three kinds of Architecture: a) Monumental; Eg: Channakesava temple, Belur, Hoysalesvara temple, Halebid, Kesava temple, Somnathpur b) Domestic (Built to inhabit) and c) Civic space; 10. **Indo Aryan Mode**: the beginnings in Orissa – the Lingaraja at Bhubaneshwar. .	
Teaching-Learning Process	1) The teacher can use PPTs, Videos to discuss the buildings, style of architecture. 2) The students need to sketch the buildings for its unique qualities. 3) Quizzes, models, seminars from students can be encouraged
Module-5	
11. **Hindu architecture at Rajputana & Khajuraho group:** (Temple of Surya, Orisa, Marwar) and Gujarat (Temple of Surya, Modhera). The Khajuraho group: Khandariya Mahadev, Jain temples – Chaumukh temple at Ranpur 12. **Later Dravidian period:** The Vijayanagar and– Noted temples at Hampi (Vitthala temple and Hazara Rama temple), NOTE: Site visit and documentation of a Temple may be made for part assessment of the progressive marks.	
Teaching-Learning Process	1) The teacher can use PPTs, Videos to discuss the buildings, style of architecture. 2) The students need to sketch the buildings for its unique qualities. 3) Quizzes, models, seminars from students can be encouraged
Course outcome (Course Skill Set) 1) At the end of the course the student will be able to develop appropriate skills of reading, writing and understanding the physical and aesthetic experience of buildings. 2) The students will be able to appreciate	

Assessment Details (both CIE and SEE)

The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%. The minimum passing mark for the CIE is 50% of the maximum marks (50 marks). A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to each subject/ course if the student secures not less than 40% (20 Marks out of 50)in the semester-end examination(SEE), and a minimum of 50% (50 marks out of 100) in the sum total of the CIE (Continuous Internal Evaluation) and SEE (Semester End Examination) taken together

Continuous Internal Evaluation:

Three Unit Tests each of **20 Marks (duration 01 hour**)

7. First test at the end of 5th week of the semester
8. Second test at the end of the 10th week of the semester
9. Third test at the end of the 15th week of the semester

Two assignments each of **10 Marks**

10. First assignment at the end of 4th week of the semester
11. Second assignment at the end of 9th week of the semester

Group discussion/Seminar/quiz any one of three suitably planned to attain the COs and POs for **20 Marks** (**duration 01 hours**)

12. At the end of the 13th week of the semester

The sum of three tests, two assignments, and quiz/seminar/group discussion will be out of 100 marks and will be **scaled down to 50 marks**

(to have less stressed CIE, the portion of the syllabus should not be common /repeated for any of the methods of the CIE. Each method of CIE should have a different syllabus portion of the course).

CIE methods /question paper is designed to attain the different levels of Bloom's taxonomy as per the outcome defined for the course.

Semester End Examination:

Theory SEE will be conducted by University as per the scheduled timetable, with common question papers for the subject (**duration 03 hours)**

3. The question paper will have ten questions. Each question is set for 20 marks.
4. There will be 2 questions from each module. Each of the two questions under a module (with a maximum of 3 sub-questions), **should have a mix of topics** under that module.

The students have to answer 5 full questions, selecting one full question from each module..

Theory paper will be out of 100 marks and will be **scaled down to 50 marks.**

Suggested Learning Resources:

Books

1. Bannister Fletcher , "History of Architecture", CBS Publishers, 1992
2. "Indian Architecture, Buddhist and Hindu Period" by Brown, Percy
3. "Architecture of India – Buddhist and Hindu" by Grover Satish

Web links and Video Lectures (e-Resources):

- https://ndl.iitkgp.ac.in
- https://www.youtube.com/watch?v=TyMkt90B0fs
- https://www.youtube.com/watch?v=4yYzQrdP5QE
- https://www.youtube.com/watch?v=5AS6cj7Uhk4
- https://www.youtube.com/watch?v=0FUYVmmfEHs
- https://www.youtube.com/watch?v=0AHu2yolmcg
- https://www.youtube.com/watch?v=aSVtCd0m57c
- https://www.youtube.com/watch?v=f8NRoUqczzc
- https://www.youtube.com/watch?v=q_GF7rs8n80
- https://www.youtube.com/watch?v=zRh3v4ccwsY
- https://www.youtube.com/watch?v=pHWPLdrwVZU

Activity Based Learning (Suggested Activities in Class)/ Practical Based learning

- Making sketches of various buildings in sketch book
- Seminar by students on selected topics in group or individually.
- Group discussion on a topic.
- Measured drawing of a monument in the nearby area.

II Semester

BASIC DESIGN AND THEORY OF DESIGN			
Course Code	**21ARC25**	CIE Marks	50
Teaching Hours/Week (L:T:S: P)	2:0:2:0	SEE Marks(viva)	50
Exam Hours	Internals	Total Marks	100
Credits	04		

Course objectives:
.OBJECTIVE: To encourage Visual creative thinking and critical orientation to design thinking and action.

Teaching-Learning Process (General Instructions)
These are sample Stress-free exercises which teachers can use to accelerate the attainment of the various course outcomes.

9. Show Video/Power point presentation to explain concepts
10. Encourage hands on practical experimentation of different ways of composition.
11. Creative Visual thinking exercise by using Elements and Principles of design.
12. Adopt multidisciplinary collaboration to understand the fundaments of all art forms.
13. Concepts will be introduced in multiple representations to abstraction.
14. Show different ways of dealing with same exercise by exposing them to various mediums.
15. Expose students to different exhibitions and performing art .

Study to develop hand & cognitive skill.

Module-1MODULE-1:

Definition of Art and role of Art in Society: Role and meaning of art, various types of arts-fine arts, performing arts, commercial arts, industrial arts, folk arts, abstract art, visual arts, spatial arts, temporal arts, pop art etc., relationship of architecture with other arts like Painting and Sculpture.

Study Tools- Any three in all the above art forms can be explored by students under the following heads:

- Observation & Study to develop hand & cognitive skill.
- Colours, Pattern & textures, and function
- Additive and Subtractive of Forms
- Freehand sketching
- Exercises of rendering techniques

Introduction to Different forms of Art

- What is art and its role in society?
- Which are the different forms of art?
- What is a work of art and how it's related to other forms of art?

Teaching-Learning Process	• Documentation any one art form from India • To observe and understand different elements and principled involved in making that art form. • Observing and documenting various skill set needed to execute that art form or the craftsmanship required to make that work of art. • Understand the creative process and use the understanding in a composition.

Module-2

1. Principles of Aesthetics and Architectural Composition 2. Contrast, harmony, accentuation, restraint in Architectural composition. Illustrations and its application to the practice of design in historical as well as contemporary building. 3. Repose, vitality, strength in Architectural composition. 4. Principles of Aesthetics and Architectural Composition	
Teaching-Learning Process	• Intangible to tangible analysis by taking our classical music composition to 3d composition using the grammar of music which are present in Principles of art and design. • Understanding the commonalities between the performing art ,Visual art and their compositions. • To learn basic design principles such as balance, symmetry, rhythm, repetition, hierarchy, unity, proportion, emphasis, contrast
Module-3	
Spatial organizations of Masses in Architecture 1: linear, radial, grid organization. Illustrations of linear, radial, grid organization in spatial organizations of masses in Architecture and its application to the practice of design with both historical as well as contemporary buildings. Study Tools- Process of Representation of natural pattern to abstraction using pure geometrical/dimensional form using various visual media. Eg. Charcoal/ pencil/crayons/oils etc. Use of 2D & 3D hands on working models to synthesize and create form to appreciate the difference between architecture and spatial organizations.	
Teaching-Learning Process	• Understanding the difference and similarity while design of a non-enclosed space, a semi-enclosed space, an enclosed space. • Analysis of spaces using – Form, colour, texture, light, ventilation, space and scale along with circulation. • Submission will include Idea generation, Study models, Sketches and drawings to achieve the desired results. • Drawings of the human body in various postures with required measurements • Study Tools- Any three can be explored • • : Observation & Study to develop hand & cognitive skill. • : Colours, Pattern & textures, and function • : Additive and Subtractive of Forms • : Freehand sketching • : Exercises of rendering techniques
Module-4	
Introduction to Abstraction: 2. Ornamentation in Architecture: Historical perspective of the use of ornament in buildings and use of ornament as a decoration to embellish parts of a building. Use and need of ornament in architectural design – different types of ornamentation in buildings. 3. Ornamentation in Architecture Criticism–Argument against ornamentation. Ideas of architect Adolf Loos (Ornament and Crime); Ornaments as economically inefficient and morally degenerate, reduction of ornament or lack of decoration as the sign of an advanced society. **Study Tools-** Structural/Material translation from concept and architectural form.	
Teaching-Learning Process	• Exercises to introduce 2D concepts to 3D forms without functional constraints and Human scale. • Declaring the conceptual theme of any composition at the beginning, before the exploring the volume using Horizontal and vertical elements or planes. • Study of patterns and use the pattern, both physical and material patterns as well

	as patterns of transformation and Integration. Appreciation of the difference between architecture and the chosen pattern.

Module-5

Style in art & Architecture: Basis for classification of styles including chronology of styles arrangement according to order that changes over time.

Evolution of styles; reflecting the emergence of new ideas as reaction to earlier styles as a result of changing of fashions, beliefs, technology etc. Popular and modern art, Art trends, periods and Isms.

Study Tools-

- : Material Study
- : Experience of architecture in basic psychological and physiological terms

Teaching-Learning Process	• Understanding the difference and similarities while the design of a non-enclosed space, a semi-enclosed space, an enclosed space. • Submission will include Idea generation, Study models, Sketches, and drawings to achieve the desired results.

Course outcome (Course Skill Set)

At the end of the course the student will be able to:

- Differentiate between Art and craft and how these are related to Architecture
- Study to develop hand & cognitive skill.

Note	• Discussions, presentations, Study models, case studies & Activities will be part of the studio work. • The portfolio covering all the progressive and final works shall be presented for Viva.

Assessment Details (both CIE and SEE)

The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%. The student has to obtain a minimum of 50% of maximum marks in CIE and 40% of maximum marks in SEE to pass. In aggregate CIE+SEE student has to score 50% of maximum marks. Semester End Exam (SEE)Viva is conducted for 50 marks. Based on this grading will be awarded.

Continuous Internal Evaluation:

5. Methods suggested: Presentation, Progressive Portfolio submissions & Discussions etc.
6. In the beginning only, the teacher has to announce the methods of CIE for the subject.

Semester End Examination:

6. Viva SEE will be conducted by University as per the scheduled timetable, with External examiners.
7. Assessment will be based on Portfolio works submission, communication skills, understanding of the subject, Creative ability and overall Presentation.

Suggested Learning Resources:

REFERENCES:

1. Form, Space and Order" by Francis DK Ching
2. Design Fundamentals in Architecture" by Parmar VS
3. Theory of Architecture by Paul Alan Johnson

4. Creating Architectural Theory by John Lang

Web links and Video Lectures (e-Resources):

- https://ndl.iitkgp.ac.in
- https://www.youtube.com/watch?v=UpfBk9dlJ8o
- https://www.youtube.com/watch?v=kH8WwdAwNpM
- https://www.youtube.com/watch?v=yyKXJhHwqWk
- https://www.youtube.com/watch?v=1BNbXBQnhGg
- https://www.youtube.com/watch?v=n4dZduYMD9E
- https://www.youtube.com/watch?v=CT97m8_YeAQ
- https://www.youtube.com/watch?v=Er06itucWtk
-

Activity Based Learning (Suggested Activities in Class)/ Practical Based learning

- Documenting/ sketches of various arts & crafts in the region
- Seminar by students on selected topics in group or individually.
- Group discussion on a topic.

II Semester

Building Structure -I			
Course Code	**21ENG26**	CIE Marks	50
Teaching Hours/Week (L:T:P: S)	3:0:0:0	SEE Marks	50
Total Hours of Pedagogy	40	Total Marks	100
Credits	3	Exam Hours	3

Course objectives:
Introduction to principles of mechanics, structural material & different force system & on structural properties.

Teaching-Learning Process (General Instructions)
These are sample Strategies, which teachers can use to accelerate the attainment of the various course outcomes.

Module-1

Different construction materials with emphasis on structural properties viz. steel , concrete, wood, glass, aluminium. Different types of loads, the structure is being subjected to as per IS 875 Part I & II.

Teaching-Learning Process	1. Theory classes to evaluate the structural properties of materials. 2. Specifications and applications as per IS Codes. 3. Documenting of learning through sketches, notes, assignments.

Module-2

Mechanics - Classification of mechanics, force, characteristics of force, classification of force system, Resultant of force, Composition of force, Axioms in mechanics, Principles of transmissibility, Moment of force, Resultant of coplanar concurrent force system, and Free body diagrams.

Teaching-Learning Process	1. Theory classes to evaluate the Basics of Mechanics. 2. Documenting of learning through sketches, notes, assignments.

Module-3

Resultant of coplanar noncurrent force system, couple & characteristics of couple, different types of loads, different types of beams, statically determinate & statically indeterminate, different types of supports, problems on support reactions, Equilibrium of Co-planar Concurrent and Non-Concurrent forces.
Note: In the numerical pertaining to support reactions, loading on the beam shall be restricted to only **point load & uniformly distributed load**].

Teaching-Learning Process	1. Theory classes to evaluate the forces of structural systems in Buildings. 2. Documenting of learning through sketches, notes, assignments.

Module-4

Center of gravity, centroid, to locate the centroid of composite section from the 1st principles. Moment of inertia, radius of gyration, parallel axis theorem, perpendicular axis theorem. Numericals on determination of moment of inertia of composite section about any defined axis.

Teaching-Learning Process	1. Theory classes to evaluate the moments Building System. 2. Documenting of learning through sketches, notes, assignments.

Module-5

Truss - Triangulation concept, different types of trusses, assumption made in the analysis of truss. Analysis of the truss by the **"Method of Joints" (Simple problems)** to calculate the dead weight of the truss from given data.

Teaching-Learning Process	1. Theory classes to evaluate the forces of structural systems in a typical truss. 2. Documenting of learning through sketches, notes, assignments.

Course outcome (Course Skill Set)

At the end of the course the students will have the ability to understand the mechanics of forces acting on rigid bodies and the structural properties.

Assessment Details (both CIE and SEE)

The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%. The minimum passing mark for the CIE is 50% of the maximum marks (50 marks). A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to each subject/ course if the student secures not less than 40% (20 Marks out of 50)in the semester-end examination(SEE), and a minimum of 50% (50 marks out of 100) in the sum total of the CIE (Continuous Internal Evaluation) and SEE (Semester End Examination) taken together

Continuous Internal Evaluation:

Three Unit Tests each of **20 Marks (duration 01 hour**)

13. First test at the end of 5th week of the semester
14. Second test at the end of the 10th week of the semester
15. Third test at the end of the 15th week of the semester

Two assignments each of **10 Marks**

16. First assignment at the end of 4th week of the semester
17. Second assignment at the end of 9th week of the semester

Group discussion/Seminar/quiz any one of three suitably planned to attain the COs and POs for **20 Marks** (**duration 01 hours**)

18. At the end of the 13th week of the semester

The sum of three tests, two assignments, and quiz/seminar/group discussion will be out of 100 marks and will be **scaled down to 50 marks**

(to have less stressed CIE, the portion of the syllabus should not be common /repeated for any of the methods of the CIE. Each method of CIE should have a different syllabus portion of the course).

CIE methods /question paper is designed to attain the different levels of Bloom's taxonomy as per the outcome defined for the course.

Semester End Examination:

Theory SEE will be conducted by University as per the scheduled timetable, with common question papers for the subject (**duration 03 hours)**

5. The question paper will have ten questions. Each question is set for 20 marks.
6. There will be 2 questions from each module. Each of the two questions under a module (with a maximum of 3 sub-questions), **should have a mix of topics** under that module.

The students have to answer 5 full questions, selecting one full question from each module

Theory paper will be out of 100 marks and will be **scaled down to 50 marks**.

.

Suggested Learning Resources:

Books

1) R.K.Bansal, " A Textbook of Engineering Mechanics", Laxmi Publications, 2008
2) S.S. Bhavikatti, " Engineering Mechanics", New Age International, 1994.
3) S. Ramamrutham, "Engineering Mechanics ", Dhanpat Rai Publishing, New Delhi, 2016.

Web links and Video Lectures (e-Resources):

1. https://ndl.iitkgp.ac.in
2. https://www.youtube.com/watch?v=CcHPzDPYkho
3. https://www.youtube.com/watch?v=Hn_iozUo9m4
4. https://www.youtube.com/channel/UCXAS_Ekkq0iFJ9dSUIkcAkw

Activity Based Learning (Suggested Activities in Class)/ Practical Based learning

- Visit to Construction yard/site to understand uses of building materials in a structure.
- Hands on experience in testing of various building materials
- Visit to large span truss buildings to understand the details of a truss.
- Watching animated videos on structural systems

II Semester

Site Surveying and Analysis			
Course Code	**21ENG27**	CIE Marks	50
Teaching Hours/Week (L:T:P: S)	0:0:2:0	SEE Marks(Term Work)	50
Total Hours of Pedagogy	25	Total Marks	100
Credits	2	Exam Hours	-

Course objectives:
To develop the knowledge and skills related to surveying and levelling principles and practice and carrying out surveys of land of medium complexity and preparation of survey plans.

Teaching-Learning Process (General Instructions)
These are sample Strategies, which teacher can use to accelerate the attainment of the various course outcomes.

Module-1

1) **Introduction to Surveying** – Definition, classification, principles of surveying, character of work, shrunk scale.
2) **Introduction to Chain Surveying Instruments –** Chain and its types, Ranging Rod, Tapes, pegs.

Teaching-Learning Process	1. Practical classes to evaluate the principles of surveying. 2. Documenting of learning through sketches, notes, assignments.

Module-2

3) **Chain Surveying 1 –** Ranging and Types of Ranging.
4) **Chain Surveying 2 –** Setting out angles, erecting perpendicular, Obstacles in chain surveying, calculation of area by offsets.

Plane Table Surveying – Accessories used advantages and disadvantages, Methods of plane table surveying (radiation and intersection).

Teaching-Learning Process	1. Practicals to demonstrate the using of survey equipments and methods of surveying. 2. Students to document learning through exercises, notes, assignments.

Module-3

5) **Levelling –** Definition, Classification, booking and reduction of levels (HI Method, Rise and Fall Method). 6) **Levelling –** Profile levelling – Calculation of depth of cutting and filling	
Teaching-Learning Process	1. Practicals to demonstrate the using of survey equipments and methods of surveying. 2. Students to document learning through exercises, notes, assignments.
Module-4	
7) **Contouring**: Characteristics of contours, direct and indirect methods of contours, interpolation and uses of contours. 8) **Introduction to Contemporary Survey Instruments** – Theodolite, Total Station, GPS Theodolite – Basic Concepts, Measuring horizontal and vertical angles Total Station – Accessories used, uses of total station and applications, Introduction to GPS	
Teaching-Learning Process	1. Practicals to demonstrate the using of survey equipments and methods of surveying. 2. Students to document learning through exercises, notes, assignments.
Module-5	
9) **Observation and Analysis of a Site –** Survey without instruments using geometry and anthropometric measures. To learn a terrain on site factors like topography, hydrology, soils, landforms, vegetation, climate and micro climate and influence of water bodies. 10) **Studying Survey Drawing –** Learning to read a land survey drawing, types of land survey drawing, scale and north, legends and symbols.	
Teaching-Learning Process	1. Students to document field learning through notes, sketches,and assignments.
Course outcome (Course Skill Set) At the end of the course the students will have ability to understand measure and analyze the topographical characteristics of a given site for its effective use in site planning.	

Assessment Details (both CIE and SEE)

The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%. The minimum passing mark for the CIE is 50% of the maximum marks (50 marks). A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to each subject/ course if the student secures not less than 40% (20 Marks out of 50)in the semester-end examination(SEE), and a minimum of 50% (50 marks out of 100) in the sum total of the CIE (Continuous Internal Evaluation) and SEE (Semester End Examination) taken together

Continuous Internal Evaluation:

1. Methods suggested: Submission of drawings done in field survey, assignment sheets, journal writing, etc., to be evaluated on weekly basis.
2. The class teacher has to decide the topics for the test. In the beginning only the teacher has to announce the methods of CIE for the subject.

Semester End Examination:

1. The student need to submit his/her works done throughout the semester, including rough sheets for Term work examination, atleast one day prior to Term work examination to the course teacher/coordinator.
2. The work will be evaluated by an external teacher appointed by the University along with Course teacher or an internal examiner.
3. The SEE mark list generated is to be signed by both internal and external examiners and submitted to VTU in sealed cover through the Principal of the institution.

Suggested Learning Resources:

Books

1) B C Punmia, " Surveying Volume I", Firewall Media, 2005
2) K R Arora,"Surveying " Standard Book House,7th edition.
3) R. Subramanian, " Fundamentals of Surveying and Levelling", Oxford Uni. Press., 2014.
4) S K Duggal," Surveying", Vol 1, 14th Edition, McGraw Hill Education, 2013.
5) TP Kanetkar, SV Kulkarni, "Surveying and Levelling(Part-1)", PuneVidyarthi Griha Prakashan, 2014.

Web links and Video Lectures (e-Resources):

1. https://ndl.iitkgp.ac.in
2. https://www.faro.com/en/Industries/Architecture-Engineering-and-Construction
3. https://www.youtube.com/watch?v=-JgCfsooiu0
4. https://www.youtube.com/watch?v=4hJs81gbl7o
5. https://www.youtube.com/watch?v=ZGx37X7KXvc
6. https://www.youtube.com/watch?v=3ZQd0_fXrnU
7. https://www.youtube.com/watch?v=mdo2HuM9ciM
8. https://www.youtube.com/watch?v=MEtAlrcjNc8
9. https://www.youtube.com/watch?v=j8poe2vvD2Q

Activity Based Learning (Suggested Activities in Class)/ Practical Based learning

- Use of modern tools and technology in surveying to be encouraged.

II Semester

Professional Writing Skills in English			
Course Code	**21EGH28**	CIE Marks	50
Teaching Hours/Week (L:T:P: S)	1:1:1	SEE Marks	50
Total Hours of Pedagogy	03 Hours/Week	Total Marks	100
Credits	02	Exam Hours	2 hour

Course objectives:

The course (21EGH28) will enable the students ,

- To Identify the Common Errors in Writing and Speaking of English.
- To Achieve better Technical writing and Presentation skillsfor employment.
- To read Technical proposals properly and make them to Write good technical reports.
- Acquire Employment and Workplace communication skills.
- To learn about Tequniqes of Information Transfer through presentation in different level.

Language Lab : To augment LSRW, grammar and Vocabulary skills (Listening, Speaking, Reading, Writing and Grammar, Vocabulary) through tests, activities, exercises etc., comprehensive web-based learning and assessment systems can be referred as per the AICTE /VTU guidelines.

Teaching-Learning Process (General Instructions)

These are sample Strategies, which teacher can use to accelerate the attainment of the various course outcomes.

- ✓ Teachers shall adopt suitable pedagogy for effective teaching - learning process. The pedagogy shall involve the combination of different methodologies which suit modern technological tools and software's to meet the present requirements of the Global employment market.
  (i) Direct instructional method (Low /Old Technology),
  (ii) Flipped classrooms (High/advanced Technological tools),
  (iii) Blended learning (combination of both),
  (iv) Enquiry and evaluation based learning,
  (v) Personalized learning,
  (vi) Problems based learning through discussion,
  (vii) Following the method of expeditionary learning Tools and techniques,
  (viii) Use of audio visual methods through language Labs in teaching of of LSRW skills.
- ✓ Apart from conventional lecture methods, various types of innovative teaching techniques through videos, animation films may be adapted so that the delivered lesson can progress the students In theoretical applied and practical skills in teaching of communicative skills in general.

Module-1

Identifying Common Errors in Writing and Speaking English :

- Advanced English Grammar for Professionals with exercises, Common errors identification in parts of speech, Use of verbs and phrasal verbs, Auxiliary verbs and their forms, Subject Verb Agreement (Concord Rules with Exercises).
- Common errors in Subject-verb agreement, Noun-pronoun agreement, Sequence of Tenses and errors identification in Tenses. Advanced English Vocabulary and its types with exercises – Verbal Analogies, Words Confused/Misused.

Teaching-Learning Process	Chalk and talk method, PowerPoint presentation to teach Communication skills (LSRW Skills), Creating real time stations in classroom discussions, Giving activities and assignments (Connecting Campus & community with companies real time situations).

Module-2	
Nature and Style of sensible writing : • Organizing Principles of Paragraphs in Documents, Writing Introduction and Conclusion, Importance of Proper Punctuation, The Art of Condensation (Precise writing) and Techniques in Essay writing, Common Errors due to Indianism in English Communication, Creating Coherence and Cohesion, Sentence arrangements exercises, Practice of Sentence Corrections activities .Importance of Summarising and Paraphrasing. • Misplaced modifiers, Contractions, Collocations, Word Order, Errors due to the Confusion of words, Common errors in the use of Idioms and phrases, Gender, Singular & Plural. Redundancies & Clichés.	
Teaching-Learning Process	Chalk and talk method, PowerPoint presentation and Animation videos to teach phonetics in Practical method, creating real time stations in classroom discussions, Giving activities and assignments (Connecting Campus & community with companies real time situations).
Module-3	
Technical Reading and Writing Practices : • Reading Process and Reading Strategies, Introduction to Technical writing process, Understanding of writing process, Effective Technical Reading and Writing Practices, Introduction to Technical Reports writing, Significance of Reports, Types of Reports. • Introduction to Technical Proposals Writing, Types of Technical Proposals, Characteristics of Technical Proposals. Scientific Writing Process. • Grammar – Voice and Speech (Active and Passive Voices) and Reported Speech, Spotting Error Exercises, Sentence Improvement Exercises, Cloze Test and Theme Detection Exercises.	
Teaching-Learning Process	Chalk and talk method, PowerPoint presentation to teach Grammar, Animation videos on communication and language skills, creating real time stations in classroom discussions, Giving activities and assignments (Connecting Campus & community with companies real time situations).
Module-4	
Professional Communication for Employment : • The Listening Comprehension, Importance of Listening Comprehension, Types of Listening, Understanding and Interpreting, Listening Barriers, Improving Listening Skills. Attributes of a good and poor listener. • Reading Skills and Reading Comprehension, Active and Passive Reading, Tips for effective reading. • Preparing for Job Application, Components of a Formal Letter, Formats and Types of official, employment, Business Letters, Resume vs Bio Data, Profile, CV and others, Types of resume, Writing effective resume for employment, Model Letter of Application (Cover Letter) with Resume, Emails, Blog Writing, Memos (Types of Memos) and other recent communication types.	
Teaching-Learning Process	Chalk and talk method, PowerPoint presentation to teach Grammar and phonetics, Animation videos on communication and language skills, creating real time stations in classroom discussions, Giving activities and assignments (Connecting Campus & community with companies real time situations).
Module-5	
Professional Communication at Workplace: • Group Discussions – Importance, Characteristics, Strategies of a Group Discussions. Group Discussions is a Tool for Selection. Employment/ Job Interviews - Importance, Characteristics, Strategies of a Employment/ Job Interviews. Intra and Interpersonal Communication Skills - Importance, Characteristics, Strategies of an Intra and Interpersonal Communication Skills. Non-Verbal Communication Skills (Body Language) and its importance in GD and PI/JI/EI. • Presentation skills and Formal Presentations by Students - Importance, Characteristics, Strategies of Presentation Skills. Dialogues in Various Situations (Activity based Practical	

Sessions in class by Students).	
Teaching-Learning Process	Chalk and talk method, Power Point presentation to teach Grammar and phonetics, Animation videos on communication and language skills, creating real time stations in classroom discussions, Giving activities and assignments (Connecting Campus & community with companies real time situations).

Course outcome (Course Skill Set)

At the end of the course(21EGH28) the student will be able :

1. To understand and identify the Common Errors in Writing and Speaking.
2. To Achieve better Technical writing and Presentation skills.
3. To read Technical proposals properly and make them to Write good technical reports.
4. Acquire Employment and Workplace communication skills.
5. To learn about Techniques of Information Transfer through presentation in different level.

Assessment Details (both CIE and SEE)

Continuous internal evaluation (CIE) needs to be conducted for 50 marks like Engineering courses. The weight age of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%. The student has to obtain a minimum of 50% of maximum marks in CIE and 40% of maximum marks in SEE to pass. MCQ Pattern (Multiple Choice Questions) Semester End Exam (SEE) is conducted for 50 marks (120 minutes duration). Based on this grading will be awarded. The student has to secure 50% marks of the course (CIE+SEE).

Continuous Internal Evaluation (CIE) :

Three Unit Tests each of **20 Marks (duration 01 hour**)

13. First test at the end of 5th week of the semester
14. Second test at the end of the 10th week of the semester
15. Third test at the end of the 15th week of the semester

All the tests are preferred similar to SEE pattern; however, the teacher may follow test pattern similar to other theory courses of Engineering

Two assignments each of **10 Marks**

1. First assignment at the end of 4th week of the semester
2. Second assignment at the end of 9th week of the semester
3. Report writing /Group discussion/Seminar any one of three suitably planned to attain the COs and POs for **20 Marks**(**duration 01 hours**)
4. At the end of the 13th week of the semester

The sum of three tests, two assignments, and quiz/seminar/group discussion will be out of 100 marks and will be **scaled down to 50 marks**

CIE methods /question paper is designed to attain the different levels of Bloom's taxonomy as per the outcome defined for the course.

Semester End Examination (SEE) :

SEE paper will be set for 100 questions of each of 01 mark. The pattern of the question paper is MCQ. The time allotted for SEE is 120 minutes**.** Marks scored are scaled down to 50 Marks. *(Time duration may be made 90 minutes to train the students for engineering / non-engineering competitive examination)*

3. Professional Writing Skills in English has become a very important component in all engineering and non-engineering competitive examinations. In exams like GRE, TOEFL, IELTS and GATE exam, all state and Central Government recruitment examinations, placement tests and other Examinations, so the pattern of question paper, in general, will be in multiple-choice question (MCQ) Pattern. So, to meet the relevance of the recruitment requirement of our Engineering students "Professional writing skill in English" Semester end examination (SEE) will be conducted in a multiple choice question (MCQ) pattern.
4. MCQ Pattern (Multiple Choice Questions) Semester End Exam (SEE) is conducted for 50 marks (120 minutes duration).

Suggested Learning Resources:

1. **A Course in Technical English,** Cambridge University Press – 2020.
2. **Functional English** (**As per AICTE 2018 Model Curriculam**) Cengage learning India Pvt Limited [Latest Revised Edition] - 2020.
3. **Communication Skills** by Sanjay Kumar and Pushp Lata, Oxford University Press - 2018. **Refer it's workbook** for activities and exercises –"Communication Skills – I (A Workbook)" published by Oxford University Press – 2018.
4. **Professional Writing Skills in English,** Infinite Learning Solutions – (Revised Edition) 2021.
5. **Technical Communication** – Principles and Practice, Third Edition by Meenakshi Raman and Sangeetha Sharma, Oxford University Press 2017.
6. **High School English Grammar & Composition** by Wren and Martin, S Chandh & Company Ltd – 2015.
7. **Effective Technical Communication** – Second Edition by M Ashraf Rizvi, McGraw Hill Education (India) Private Limited – 2018.
8. **Intermediate Grammar, Usage and Composition** by M.L.Tichoo, A.L.Subramanian, P.R.Subramanian, Orient Black Swan – 2016.

Web Links

- https://www.youtube.com/watch?v=l7QfTE2vauU
- https://www.youtube.com/watch?v=OIYDNEED4I0
-

Activity Based Learning (Suggested Activities in Class)/ Practical Based learning

- ✓ Contents related activities (Activity-based discussions)
- ✓ For active participation of students instruct the students to prepare Flowcharts and Handouts
- ✓ Organising Group wise discussions Connecting to placement activities
- ✓ Quizzes and Discussions, Seminars and assignments

II Semester

Scientific Foundations of Health			
Course Code	**21SFH19/29**	CIE Marks	50
Teaching Hours/Week (L:T:P: S)	1:0:0	SEE Marks	50
Total Hours of Pedagogy	02 Hours/Week	Total Marks	100
Credits	01	Exam Hours	60 Minutes / 01 Hour

Course objectives:

The course 21**SFH29** will enable the students:

- To know about Health and wellness (and its Beliefs)
- To acquire Good Health & It's balance for positive mind-set
- To Build the healthy lifestyles for good health for their better future
- To Create of Healthy and caring relationships to meet the requirements of MNC and LPG world
- To learn about Avoiding risks and harmful habits in their campus and outside the campus for their bright future
- To Prevent and fight against harmful diseases for good health through positive mindset

Teaching-Learning Process (General Instructions)

These are sample Strategies, which teacher can use to accelerate the attainment of the various course outcomes.

- ✓ Teachers shall adopt suitable pedagogy for effective teaching - learning process. The pedagogy shall involve the combination of different methodologies which suit modern technological tools and software's to meet the present requirements of the Global employment market.
  (i) Direct instructional method (Low /Old Technology),
  (ii) Flipped classrooms (High/advanced Technological tools),
  (iii) Blended learning (combination of both),
  (iv) Enquiry and evaluation based learning,
  (v) Personalized learning,
  (vi) Problems based learning through discussion,
  (vii) Following the method of expeditionary learning Tools and techniques,
- ✓ Apart from conventional lecture methods, various types of innovative teaching techniques through videos, animation films may be adapted so that the delivered lesson can progress the students In theoretical applied and practical skills in teaching of the concepts of Health and Wellness in general.

Module-1

<u>Good Health and It's balance for positive mindset:</u>

What is Health, Why Health is very important Now? – What influences your Health?, Health and Behaviour, Health beliefs and advertisements, Advantages of good health (Short term and long term benefits), Health and Society, Health and family, Health and Personality - Profession. Health and behaviour, Disparities of health in different vulnerable groups. Health and psychology, Methods to improve good psychological health. Psychological disorders (Stress and Health - Stress management), how to maintain good health, Mindfulness for Spiritual and Intellectual health, Changing health habits for good health. Health and personality.

Teaching-Learning Process	Chalk and talk method, Power Point presentation and YouTube videos, Animation videos methods. creating real time stations in classroom discussions. Giving activities &assignments.

Module-2	
Building of healthy lifestyles for better future: Developing a healthy diet for good health, Food and health, Nutritional guidelines for good health and well beingness, Obesity and overweight disorders and its management, Eating disorders - proper exercises for its maintenance (Physical activities for health), Fitness components for health, Wellness and physical function,	
Teaching-Learning Process	Chalk and talk method, PowerPoint presentation and YouTube videos, Animation videos methods. creating real time stations in classroom discussions. Giving activities &assignments.
Module-3	
Creation of Healthy and caring relationships : Building communication skills (Listening and speaking), Friends and friendship - education, the value of relationships and communication, Relationships for Better or worsening of life, understanding of basic instincts of life (more than a biology), Changing health behaviours through social engineering,	
Teaching-Learning Process	Chalk and talk method, PowerPoint presentation and Animation videos methods. creating real time stations in classroom discussions. Giving activities and assignments.
Module-4	
Avoiding risks and harmful habits : Characteristics of health compromising behaviors, Recognizing and avoiding of addictions, How addiction develops and addictive behaviors, Types of addictions, influencing factors for addictions, Differences between addictive people and non addictive people and their behavior with society, Effects and health hazards from addictions Such as..., how to recovery from addictions.	
Teaching-Learning Process	Chalk and talk method, PowerPoint presentation and Animation videos methods. Creating real time stations in classroom discussions. Giving activities and assignments.
Module-5	
Preventing and fighting against diseases for good health : Process of infections and reasons for it, How to protect from different types of transmitted infections such as…., Current trends of socio economic impact of reducing your risk of disease, How to reduce risks for good health, Reducing risks and coping with chronic conditions, Management of chronic illness for Quality of life, Health and Wellness of youth: a challenge for the upcoming future Measuring of health and wealth status.	
Teaching-Learning Process	Chalk and talk method, PowerPoint presentation and YouTube videos, Animation videos methods. Creating real time stations in classroom discussions. Giving activities & assignments.

Course outcome (Course Skill Set)

At the end of the course the student will be able :

CO 1: To understand Health and wellness (and its Beliefs)

CO 2: To acquire Good Health & It's balance for positive mindset

CO 3: To inculcate and develop the healthy lifestyle habits for good health.

CO 4: To Create of Healthy and caring relationships to meet the requirements of MNC and LPG world

CO 5: To adopt the innovative & positive methods to avoid risks from harmful habits in their campus & outside the
campus.

CO 6: To positively fight against harmful diseases for good health through positive mindset.

Assessment Details (both CIE and SEE)

(methods of CIE need to be defined topic wise i.e.- Tests, MCQ, Quizzes, Seminar or micro project/Course Project, Term Paper)

The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%. The student has to obtain a minimum of 40% of maximum marks in SEE and a minimum of 50% of maximum marks in CIE. Semester End Exam (SEE) is conducted for 50 marks (hours' duration). Based on this grading will be awarded.

The student has to score a minimum of 50% (50 marks out of 100) in the sum total of the CIE (Continuous Internal Evaluation) and SEE (Semester End Examination) taken together.

Continuous Internal Evaluation:

Three Unit Tests each of **20 Marks (duration 01 hour**)

16. First test at the end of 5th week of the semester
17. Second test at the end of the 10th week of the semester
18. Third test at the end of the 15th week of the semester

(All tests are similar to the SEE pattern i.e question paper pattern is MCQ)

Two assignments each of **10 Marks**

19. First assignment at the end of 4th week of the semester
20. Second assignment at the end of 9th week of the semester

Report writing /Group discussion/Seminar any one of three suitably planned to attain the COs and POs for **20 Marks**(**duration 01 hours**)

21. At the end of the 13th week of the semester

The sum of three tests, two assignments, and quiz/seminar/group discussion will be out of 100 marks and will be **scaled down to 50 marks**

CIE methods /question paper is designed to attain the different levels of Bloom's taxonomy as per the outcome defined for the course.

Semester End Examination:

Theory SEE will be conducted by University as per the scheduled timetable, with common question papers for subject

SEE paper will be set for 50 questions of each of 01 mark. The pattern of the question paper is MCQ. The time allotted for SEE is **01 hour.**

Suggested Learning Resources:

1. **Health Psychology** (Second edition) by Charles Abraham, Mark Conner, Fiona Jones and Daryl O'Connor – Published by Routledge 711 Third Avenue, New York, NY 10017.
2. **Health Psychology - A Textbook,** FOURTH EDITION by Jane Ogden McGraw Hill Education (India) Private Limited - Open University Press
3. **HEALTH PSYCHOLOGY (Ninth Edition)** by SHELLEY E. TAYLOR - University of California, Los Angeles, McGraw Hill Education (India) Private Limited - Open University Press
4. **Scientific Foundations of Health (Health & Wellness) - General Books** published for university and colleges references by popular authors and published by the reputed publisher.

9) **SWAYAM / NPTL/ MOOCS/ We blinks/ Internet sources/ YouTube videos** and other materials / notes

Activity Based Learning (Suggested Activities in Class)/ Practical Based learning

- ✓ Contents related activities (Activity-based discussions)
- ✓ For active participation of students, instruct the students to prepare Flowcharts and Handouts
- ✓ Organizing Group wise discussions and Health issues based activities
- ✓ Quizzes and Discussions
- ✓ Seminars and assignments

III Semester

ARCHITECTURAL DESIGN - III			
Course Code	**21ARC31**	CIE Marks	100
Teaching Hours/Week (L:T:P: S)	0:0:7:0	SEE Marks (VIVA)	100
Total Hours of Pedagogy	85	Total Marks	200
Credits	07	Exam Hours	---

Course objectives:
Sense of Place: Towards understanding the transformation of an architectural space into ***a Place***.

OUTLINE:

> *"Everything about this kitchen was typical of a traditional kitchen. There was nothing special about it. But, perhaps it was just the fact that it was so very much; so naturally, a kitchen that had imprinted its memory indelibly on my mind. [...] memories like these contain the deepest architectural experience that I know. They are the reservoirs of the architectural atmosphere and images I explore in my work as an architect."*
>
> — Peter Zumthor, *Thinking Architecture* (1998, p.7-8)

When we as humans create a ***'place'***, we define it in multiple ways. We attribute it with an importance and an identity. We select the siting of the ***'place'*** in a geographical location, its activities, boundaries, and social neighborhoods, we give it meaning, infuse it with memories, and give it significance.

While ***space*** is created by physical and notional boundaries, ***place*** is characterized by the forces that signify it with an "architectural atmosphere". We could attempt to describe ***place*** as the complete human spatial experience - the spectrum of how one studies a ***place*** ranges from the abstract, physical/formal ***place***, to the one that lives in one's mind and memories.

A ***place*** may be indoors or outdoors, permanent or temporary, private or layered until it becomes very public, imbued with history, meaning, values and memories or new, radical, rebellious and looking into the future.

However, it is through the eyes of architecture that ***place*** is viewed at this semester.

Teaching-Learning Process (General Instructions)
These are sample Strategies, which teacher can use to accelerate the attainment of the various course outcomes.

1) The contents of the courses shall be taught in an application-oriented manner on a scientific and design basis. The course contents shall be taught and learned in lectures, seminars, labs or workshops, studio exercises and design projects, etc.
2) In-studio exercises the teachers shall take the lead to provide tasks and offer guidance for solutions finding. The students shall work either individually or in groups.
3) In design studios, the students contribute to the processing, analysis and solving of problems of direct professional practice, attended by faculty(s) entitled to conduct the studio and examine. The results shall be defended through drawings; models and reports and evaluated through periodic assessment and finally by a jury or panel, and finally, evaluated through periodic assessment and an end semester examination or viva voce.

COURSE OF STUDY – The primary architectural goal is going from **spaces** to **places.** Hence contextual elements and factors influencing the built environment should be identified and studied in detail.

KEYWORDS – site/situation, neighbourhood, memory, identity, belonging, defining characteristics/particularity of place (activity, need, function, scale, hierarchy, perception).

MODE OF STUDY

A. EXPERIENCE

1. Visits to different ***places***, sacred places and the mundane, bridging places, edges of various places, entrance places, transitional places, dwelling places, semi-public and public places, neighbourhood built-open social spaces, informal space architecture, informal settlements, informal public architecture - to name just a few. The attempt here is to understand the *experience of a space* that can enable a person to define its particularities as *a place.* An understanding of being "inside" that particular place, versus "outside" it, needs to be explored. The interrelation and interface of formally designed spaces and informal spaces must also be included since both in tandem make up our built environment. [Space making to be portrayed for both formal and informal spaces (along with respective field studies) through different typologies of spaces - markets, settlements, worship places, eateries, etc. The idea is to explicitly make students understand that the built environment consists of formal architecture, built by architects with legal rights to land but a major part of it consists of informal spaces which crop up due to societal and spatial circumstances. Since both cannot be observed in singularity, they should be studied parallelly to have a holistic understanding of the world.]
2. Students need to experience and study at least 3 different types (including an informal space) of *places*, and what differentiates these from others.

B. EXPLORATION

1. Sketches, models, drawings, photographs, collages, short films, that can illustrate the specificity of that particular place. Architectural representation through various media that evoke the ***essence of a place***.
2. Studies of how scale, proportions, physicality (including exposure of walls, roofs, windows to the sun), direction of winds and breeze, local ecology (animal and plant life), relationships with local water bodies and groundwater, materiality and situation, affect a ***place*** and how it is perceived.
3. Studies of less tangible aspects of a ***place***, like identity, belonging, memory,

and stories, through discussions, documentation, and other media. **Their architectural representation is an important conclusion of this exploration**.

This period could include book readings, seminars, and field trips.

C. DESIGN TASKS

2 design projects (minor & major) that address the study, exploration and expression of the ***Sense of Place*** in all its aspects (suggested projects include but not limited to temporary shelters, pavilions, informal social open spaces, context specific community driven built forms like health centres) .

Example: Place: The front entrance of dwellings. Visit to a traditional neighbourhood, and a contemporary neighbourhood. What is the nature of this place? What are the moments of transience? What is the character of space before and after the front? Rangolis/kollams, thresholds, gateways, doors, verandahs/jaglis, toranas, porches.
Example: The social spaces within an informal settlement and planned residential neighbourhood, The organic space utility at a roadside tea stall and a cafe. What is the character and spirit of the place? What are the elements and forces that create the space. How does the community/people self organize themselves?

After careful study, a design task based on the sense of place in the same context can be formulated.
An emphasis on the translating of one's observations well - primarily in architectural drawing as well as in other methods that support it.

12 Weeks for all A, B, & C, including Design Tasks. These need to be scheduled in order A, B and then C.

NOTES:

1. Discussions, book reading as well as writing, seminars, field trips, and group as well as individual study are important for the development of the architecture student's understanding of essential concepts such as that of a ***Sense of Place.***

The **DESIGN TASKS** ***should be interspersed*** with the experience and exploration of the idea of ***Sense of Place***, and not necessarily attempted separately.

Course outcome (Course Skill Set)

To understand how architectural space becomes more than just a physical entity because of the way it has been located, sited, edged, layered, and imbued with values and meaning to transform it into its own entity or ***'place'*** through both informal and formal spaces.

SHAPE OF THINGS TO COME

The inquiry through exploration and creation of a place from its bare spatial existence leads the architecture student to the next phase where he/she studies the particularity of **the dwelling**.

All spaces "house" activities, whereas a dwelling has a deeper, and more specific character. As one progresses through the course, we move from a wider, more general study of architecture, to a more complex, specific, and nuanced understanding of different areas of architectural design.

Assessment Details (both CIE and SEE)

(methods of CIE need to be defined topic wise i.e.- Studio discussions, Reviews, Time problems, test, Seminar or micro project)

The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%. The student has to obtain a minimum of 50% marks individually both in CIE and 40 % marks in SEE to pass. Semester End Exam (SEE) is conducted for 100 marks (Viva-voce) and a minimum of 50% (50 marks out of 100) in the sum total of the CIE (Continuous Internal Evaluation) and SEE (Semester End Examination) taken together. Based on this grading will be awarded.

Continuous Internal Evaluation:

Methods suggested:

1. Studio discussions, Reviews, Time problems, CIE tests, Seminar or micro project,Quiz, report writing etc.
2. The class teacher has to decide the topic for the Design and Seminars if any, in the beginning only. The teacher has to announce the methods of CIE for the subject in advance in writing.

Semester End Examination:

1. The student needs to submit his/her works done throughout the semester, including rough sheets for the Viva examination, at least one day prior to the Viva work examination to the course teacher/coordinator.
2. The Viva-voce will be evaluated by an external teacher appointed by the University along with Course teacher or an internal examiner.
3. The SEE marks list generated is to be signed by both internal and external examiners and submitted to VTU in the sealed cover through the Principal of the institution.

Suggested Learning Resources:

Books

1. Steen Eiler Rasmussen, "Experiencing Architecture", MIT Press, 2nd Edition, 1962
2. Edward Relph , "Place and Placelessness", Sage Publications, 2008
3. David Seamon , "Life Takes Place", Routledge , 2018
4. Yi Fu Tuan , "Space And Place: The Perspective of Experience", Univ Of

Minnesota Press , 2001

5. Gaston Bachelard , "The Poetics of Space", French university publishing , 1958
6. D'Arcy Wentworth Thompson ,"On Growth and Form", Cambridge University Press, 1917.
7. Martin Heidegger, "Building, Dwelling, Thinking, (Poetry, Language, Thought), 1951
8. Tim Cresswell , "Place: An Introduction", John Wiley & Sons, 2014
9. Marc Auge , "Non-Places: An Introduction to Supermodernity" , Verso, 1995
10. Peter Zumthor, Brigitte Labs-Ehlert "Atmospheres: Architectural Environments. Surrounding Objects", Birkhauser, 2006
11. Christian Norberg Schulz, "Genius Loci: Towards a Phenomenology of Architecture", New York : Rizzoli , 1979
12. Christopher Alexander, "The Timeless Way of Building", Oxford University Press , 1979
13. Doreen Massey, "For Space", Sage Publications , 2005
14. Christian Norberg Schulz, "Architecture: Presence, Language, Place", 1996
15. Peter Zumthor , "Thinking Architecture", Lars Müller, 1998

Web links and Video Lectures (e-Resources):

- https://ndl.iitkgp.ac.in
- https://www.youtube.com/watch?v=zJJEpLCOa24
- https://www.completecommunitiesde.org/planning/inclusive-and-active/placemaking-intro/
- https://www.youtube.com/watch?v=IBOChA1LJMc
- https://www.youtube.com/watch?v=sw9zpH717ts
- https://www.youtube.com/watch?v=pBJprhsBUrg
- https://www.youtube.com/watch?v=4VxDoVuURNE
- https://www.youtube.com/watch?v=GvWOaKZPtWs
- https://www.youtube.com/watch?v=uLXNzhGDVr8

Activity Based Learning (Suggested Activities in Class)/ Practical Based learning

Activity 1- Understanding of how people organize themselves and create a place for them from a space. Sense of place and space is true for a formal and informal space. There is a good scope here to demarcate and study both kinds leading to a holistic understanding of the built environment.

A field study of one formal and one informal space, accompanied by a report of elements of an informal settlement / koliwadi / informal public place (including any kind of informal architecture like dhaba, chowk under a tree etc.) to understand the sense, essence (both tangible and intangible) . In addition to this, doing a comparison of both formal and informal public places (one that was designed and one that was informally accepted) and highlighting the distinctions. Study and document space planning , materials, circulation, forces, how people get attracted to the places(organic), what led to the growth and development of these informal entities and examining for any kind of interdependency between formal and the nearby informal spaces. In addition, ponder upon the health impacts of formal and informal spaces.

Example: roadside eatery/tea stall vs cafe/ tea shop, formal (mall) vs informal market

III Semester

Materials and Methods in Building Construction -III			
Course Code	**21ARC32**	CIE Marks	50
Teaching Hours/Week (L:T:P: S)	1:0:3:0	SEE Marks(VIVA)	50
Total Hours of Pedagogy	50	Total Marks	100
Credits	04	Exam Hours	----

Course objectives:

1. *To acquaint the students with construction practices pertaining to RCC, floors, roofs and flooring alternatives, masonry plastering and paint finishes.*
2. *To acquaint the students with the materials used in such construction practices, their properties, and effect on climate and life cycle of the building.*

Teaching-Learning Process (General Instructions)

These are sample Strategies, which teacher can use to accelerate the attainment of the various course outcomes.

1. The subject teacher to link the studio work with on site work by arranging site visits in the nearby areas.
2. The Subject teacher to highlight the techniques of reinforcement used in R C C works.

Module-1

Introduction to RCC Slabs: one way, two-way slabs, cantilever slabs, sloping RCC roof, one way continuous, and two ways continuous. 1. **RCC one way slab and one-way continuous slabs: Principles** and methods of construction. 2. **RCC two way slab and two-way continuous slabs:** Principles and methods of construction. 3. **RCC cantilever slabs and sloping slab**: Principles and methods of construction. 4. RCC: Qualitative understanding of basic thermal properties such as conduction, insulation, thermal mass and the material's appropriateness and/or demerits for hot climates.	
Teaching-Learning Process	Minimum one plate on each construction topic. Site visits to be arranged by studio teachers. Study of material applications in the form of a portfolio. This is for progressive marks.
Module-2	
5. **Vaults & domes I**: Principles and methods of construction including techniques and details of form-work. Construction of Masonry Vaults and Domes – Concepts of Reinforced Concrete Domes and Vaults. 6. **Vaults & domes II:** Concepts and construction of Reinforced concrete domes and vaults with formwork design. 7. Vaults & domes III: Qualitative influence of domes and vaults on building's interaction with solar heat and ventilation.	
Teaching-Learning Process	Minimum one plate on each construction topic. Site visits to be arranged by studio teachers. Study of material applications in the form of a portfolio. This is for progressive marks.
Module-3	
8. Introduction to Floor finishes including Toilet flooring: Mud flooring, Murrum flooring, and Stone flooring in marble, granite, tandur/kota stone, other flooring in mosaic, terrazzo, ceramic tiles, wooden flooring and polished concrete, low embodied (grey) energy and sustainable flooring: Laying, Fixing and Finishes. 9. Introduction to Paving: Cast in situ concrete including vacuum dewatered flooring, concrete tiles, interlocking blocks, clay tiles, brick and stone.	
Teaching-Learning Process	Minimum one plate on each construction topic. Site visits to be arranged by studio teachers. Study of material applications in the form of a portfolio. This is for progressive marks.
Module-4	

10. **Introduction to internal and external masonry plastering and paint finishes:** Materials – Paints, varnishes and distempers, emulsions, cement based paints, external reflective paints, and natural paints (Activity 1). Constituents of oil paints, characteristics of good paints, types of paints and process of painting different surfaces. Types of varnish, methods of applying varnish and French polish and melamine finish.	
Teaching-Learning Process	Minimum one plate on each construction topic. Site visits to be arranged by studio teachers. Study of material applications in the form of a portfolio. This is for progressive marks.
Module-5	
11. **Method of plastering (Internal and External):** smooth, rough, textured, grit plaster etc. Use of various finishes viz., lime, cement, plaster of Paris, buffing etc. 12. **Introduction to wet Cladding:** wet cladding in stone, marble, etc. including toilet cladding. 13. **Alternative roofing:** Jack Arch, Madras terrace, stone slab roof, inverted earthen-pot roof, 'Guna' roof (burnt clay vaulted roof), GI/tin sheet roofing, cement corrugated sheets, etc.(low cost roofs and materials in Informal households and health issues) (Activity 2) (Activity 3)	
Teaching-Learning Process	Minimum one plate on each construction topic. Site visits to be arranged by studio teachers. Study of material applications in the form of a portfolio. This is for progressive marks.

Course outcome (Course Skill Set)

1. The students will be able to understand the structural drawings of structural consultants.
2. The students will be able to check the structural works on site.

Assessment Details (both CIE and SEE)

(methods of CIE need to be define topic wise i.e.- Submission of construction drawing sheets, Journal of materials, Multiple Choice Question, Quizzes, Open book test, Seminar or micro project)

The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%. The student has to obtain a minimum of 50% marks individually both in CIE and 40% marks in SEE to pass. Semester End Exam (SEE) is conducted for 50 marks (Viva-voce). Based on this grading will be awarded.

Continuous Internal Evaluation:

1. Methods suggested: Submission of Construction sheets, Journal of Materials, Test, Written Quiz, Seminar, report writing etc.
2. The class teacher has to decide the topics for the test, Written Quiz, and Seminar. In the beginning, only the teacher has to announce the methods of CIE for the subject.

Semester End Examination:

1. The student need to submit his/her works done throughout the semester, including rough sheets for Viva-voce examination, atleast one day prior to Viva-voce examination to the course teacher/coordinator.
2. The work will be evaluated by an external teacher appointed by the University along with Course teacher or an internal examiner.
3. The SEE mark list generated is to be signed by both internal and external examiners and submitted to VTU in sealed cover through the Principal of the institution.

Suggested Learning Resources:

1) **Books**Chudley , Construction Technology, ELBS, 1993
2) Barry, Construction of Buildings, East West Press, 1999

Web links and Video Lectures (e-Resources):

- https://ndl.iitkgp.ac.in
- https://www.youtube.com/watch?v=qH9Gjd23u6E
- https://www.youtube.com/watch?v=vT6JJGlrZyU
- https://www.youtube.com/watch?v=APc0EXTw2KQ&t=1112s
- https://www.youtube.com/watch?v=2NChfTslOG4
- https://www.youtube.com/watch?v=z7K99RUlfVk&t=5s
- https://www.youtube.com/watch?v=LyngzAYIuZs
- https://www.youtube.com/watch?v=VFuw5Q5Innk
- https://www.youtube.com/watch?v=13RxjXvaVKU

Activity Based Learning (Suggested Activities in Class)/ Practical Based learning

Activity 1- Map and study vernacular as well as contemporary use of natural paints made out of natural extracts.

Activity 2- Observe and understand technical construction methods and materials (as studied in this module) in formal and informal settlements and document the same in a report.

Activity 3 - Retrofit section of the college building roof with clay pots or empty/hollow recycled plastic containers and cover with temporary tiling and qualitatively assess its influence on room temperatures experienced in the floor immediately below.

III Semester

Climatology			
Course Code	**21ARC33**	CIE Marks	50
Teaching Hours/Week (L:T:P: S)	3:0:0:0	SEE Marks	50
Total Hours of Pedagogy	40	Total Marks	100
Credits	03	Exam Hours	03

Course objectives:

To develop the knowledge required for understanding the influence of Climate on architecture including the environmental processes which affect buildings, such as thermal, lighting, etc. Similarly, to develop the understanding of how construction activities influence and impact the micro-macro climate.

Teaching-Learning Process (General Instructions)

These are sample Strategies, which teacher can use to accelerate the attainment of the various course outcomes.

1. Use of theory, activities, practicals. Numericals, assignment and tutorial for teaching.
2. Evaluation by quiz, tests, classroom activities.

Module-1

1. **Introduction to Climate-1:** The Climate-built form interaction; some examples. Elements of climate, measurement and representations of climatic data. Classifications and Characteristics of tropical climates.
2. **Introduction to Climate-2:** Major climatic zones of India. Site Climate: Effect of landscape elements on site/micro climate.
3. **Interrelation between the human built environment and the natural environment:** Historical trajectory of environmental degradation and climate change as a function of humankind's architectural and industrial interventions.
4. **Introduction to the current Climate crisis and targets-** Documentation of changes in climate, environmental conditions over time and their ramifications on the built environment and the roles and responsibilities of the profession of architecture. Develop a climate change timeline.
5. **Thermal comfort-1:** Thermal balance of the human body, basic understanding of psychrometric chart and related parameters (dry-bulb temperature, wet-bulb temperature, absolute humidity, relative humidity, enthalpy, specific volume), psychrometric basis of human thermal comfort, thermal comfort factors (including mean radiant temperature and air speed),Thermal Comfort Indices (Effective temperature, corrected effective temperature, bioclimatic chart, tropical summer index by CBRI Roorkee), Indian Model of Adaptive Comfort (IMAC) and comparison with global thermal comfort models, Measuring indoor air movement: Kata-thermometer, and measuring indoor radiation: Globe thermometer.

Teaching-Learning Process	Theory accompanied with classroom activities, quizzes and practicals demonstrating usage of different instruments.

Module-2

6. **Thermal comfort-2:** Uses of psychrometric chart for climate analysis, Calculation of Overheated and under heated period (based on air temperature only) for locations in Climatic zones and their optimization in terms of solar heating and Passive cooling desired.

7. **Sun-path diagram:** Solar geometry & design for orientation and use of solar charts in climatic design.

8. **Thermal performance of building elements:** Effect of thermo-physical properties of building materials and elements on indoor thermal environment. Convection, Radiation, concept of Sol-air temperature and Solar Gain factor. Thermal properties and performance of different materials used in construction such as Mud, Wood, Bamboo, RCC, Steel, Glass, GI, Tin, etc and relating it to Thermal Stress. Assessment of passive cooling possibilities and natural night-sky radiation of roofing materials and retrofitted radiant-barrier materials.

Teaching-Learning Process	Theory accompanied with classroom activities, periodic tests and numericals.

Module-3

9. **Thermal Heat gain or loss**: Steady state and periodic heat flow concepts (conduction, convection and radiation), conductivity, resistivity, diffusivity, emissivity, thermal capacity, time lag and 'U' value. Calculation of U value for multi-layered walls and Roof, Temperature Gradient, Inference of time lags from Graphs for walls and Roof. Construction techniques for improving thermal performance of walls and roofs. (Effect of density, Insulation, and Cavity)

Teaching-Learning Process	Theory accompanied with classroom activities, periodic tests and numericals.

Module-4

10. **Shading devices**: Optimizing Design of Shading devices effective for overheated periods while allowing solar radiation for under heated periods for different wall orientations.

11. **Natural ventilation:** Functions of natural ventilation, Stack effect due to thermal force and wind velocity. Air movements around buildings, Design considerations and effects of openings and external features on internal air flow and Wind shadows.

12. Natural/passive cooling: Introduction to passive techniques of cooling such as evaporative cooling (including basic assessment of its cooling potential using the psychrometric chart for various climatic zones), earth tubing, wind scoops, roof ponds, shaded courtyards etc.

Teaching-Learning Process	Theory accompanied with applicative classroom activities like shading device design, periodic tests and quizzes.

Module-5

13. **Day Lighting:** Nature of natural light, its transmission, reflection, diffusion, glare. Advantages and limitations in different climatic zones, North light, Daylight factor, components of Daylight devices.

14. **Climatic Design considerations 1**: Literature study of relevant traditional and contemporary building examples.

15. **Climatic Design considerations 2**: Two or more Indian case studies, including an informal settlement, example Dharavi or more local instances and one international for each climatic zone.

16. Climatic Design considerations 3: Keeping in mind the current climatic scenario and how it is changing rapidly. Understanding how design tools can help in the making of climate-friendly and resilient designs.

Teaching-Learning Process	Theory accompanied with classroom activities, case studies and numericals.

Course outcome (Course Skill Set)

At the end of the course the student will be able to :

1. Understand the elements of weather and climate, phenomena of heat flow, thermal comfort, solar shading and day lighting in an applicative manner
2. Analyse and interpret the relationships between atmospheric processes and regional-local climates.

Use climatology and its understanding of thermal comfort indices to assist them in climate-responsive building design.

Assessment Details (both CIE and SEE)

The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%. The minimum passing mark for the CIE is 50% of the maximum marks (25 marks). A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to each subject/ course if the student secures not less than 40% (20 Marks out of 50)in the semester-end examination(SEE), and a minimum of 50% (50 marks out of 100) in the CIE (Continuous Internal Evaluation) and a minimum of 50% (50 marks out of 100) in the sum total of the CIE (Continuous Internal Evaluation) and SEE (Semester End Examination) taken together. Based on this grading will be awarded.

Continuous Internal Evaluation:

Three Unit Tests each of **20 Marks (duration 01 hour**)

1. First test at the end of 5th week of the semester
2. Second test at the end of the 10th week of the semester
3. Third test at the end of the 15th week of the semester

Two assignments each of **10 Marks**

4. First assignment at the end of 4th week of the semester
5. Second assignment at the end of 9th week of the semester

Group discussion/Seminar/quiz any one of three suitably planned to attain the COs and POs for **20 Marks** (**duration 01 hours**)

6. At the end of the 13th week of the semester

The sum of three tests, two assignments, and quiz/seminar/group discussion will be out of 100 marks and will be **scaled down to 50 marks**

(to have less stressed CIE, the portion of the syllabus should not be common /repeated for any of the methods of the CIE. Each method of CIE should have a different syllabus portion of the course).

CIE methods /question paper is designed to attain the different levels of Bloom's taxonomy as per the outcome defined for the course.

Semester End Examination:

Theory SEE will be conducted by University as per the scheduled timetable, with common question papers for the subject (**duration 03 hours)**

1. The question paper will have ten questions. Each question is set for 20 marks.
2. There will be 2 questions from each module. Each of the two questions under a module (with a maximum of 3 sub-questions), **should have a mix of topics** under that module.

The students have to answer 5 full questions, selecting one full question from each module.

Theory paper will be out of 100 marks and will be **scaled down to 50 marks.**

Suggested Learning Resources:

Books

1. Koenigsberger, Manual of Tropical Housing & Buildings (Part-II), Orient Longman, Bombay, 1996.
2. Arvind Krishan, Baker & Szokolay, Climate Responsive Architecture, Tata McGraw Hill, 2002.
3. Martin Evans; Housing, Climate, and Comfort; Architectural Press (1 March 1980)

4. Donald Watson and Kenneth Labs; Climatic Building Design - Energy-Efficient Building Principles and Practice; McGraw-Hill Book Company, 1983.
5. Mili Majumdar (Editor); Energy Efficient Buildings in India; The Energy and Resources Institute, TERI (28 February 2009)
6. Baruch Givoni; Passive and Low Energy Cooling of Buildings; John Wiley & Sons (1 July 1994).
7. Energy Conservation Building Code (ECBC) 2007; Bureau of Energy Efficiency, Ministry of Power, Government of India.

Web links and Video Lectures (e-Resources):

- https://ndl.iitkgp.ac.in
- https://youtube.com/watch?v=6D4ow2WulVA
- https://www.youtube.com/watch?v=8wweKGJDoG0
- https://www.youtube.com/watch?v=yEWT_XmqCtQ
- https://www.youtube.com/watch?v=SwZ1FEgangE
- https://www.youtube.com/watch?v=Ouvk9t5T9X4
- https://www.youtube.com/watch?v=BgOy3U34muY
- https://www.youtube.com/watch?v=pCrZEJATeKQ
- https://www.youtube.com/watch?v=fnhhj4vTzPQ
- https://www.youtube.com/watch?v=YbigQjL6oKo
- https://www.youtube.com/watch?v=fhXJ_1Qiou4
- https://www.youtube.com/watch?v=hRYuUqYI3nM

- web sites of
- MNRE
- GRIHA
- IGBC
- LEED
- ISHRAE
- BEE

Activity Based Learning (Suggested Activities in Class)/ Practical Based learning

Activity 1 - Heat Waves & Modern Buildings
Activity 2 - Air Conditioners' Other side '
Activity 3 - Thermal performance in Informal settlements
Activity 4 - Thermal Comfort Conditions'
Activity 5 - Thermal Comfort Inequity
Activity 6 - Thermal Comfort Mapping
Activity 7 - Thermal Comfort Variation Over Time
Activity 8 - Thermal Comfort Zone Representation
Activity 9 - Understanding the thermal comfort gap in formal housing and informal housing.
Activity 10 - Heat Flow Analysis
Activity 11 - Conduction and a cool floor, Convection and a cot Details found in Fairconditioning's Pedagogy Manual for Architecture Teachers - Building Heat Transfer Module: http://fairconditioning.org/knowledge-resources/#204-heat-transfer
Activity 12 - Convection Inside A Room Details found in Fairconditioning's Pedagogy Manual for Architecture Teachers - Building Heat Transfer Module: http://fairconditioning.org/knowledge-resources/#204-heat-transfer
Activity 13 - Evaporative Cooling Effect from a Wet Cloth Details found in Fairconditioning's Pedagogy Manual for Architecture Teachers - Sustainable Cooling Technology Module: http://fairconditioning.org/knowledge-resources/#210-sust-cooling-technologies-1553498467
Activity 14 - Details found in Fairconditioning's Pedagogy Manual for Architecture Teachers - Sustainable Cooling Technology Module: http://fairconditioning.org/knowledge-resources/#210-sust-cooling-technologies-1553498467
Activity 15 - Details found in Fairconditioning's Pedagogy Manual for Architecture Teachers - Passive Design Module: http://fairconditioning.org/knowledge-resources/#230-passive-design-1552544785
Numerical based learning- Sol-air temperature and Solar Gain factor, Heat Gain and U-value

III Semester

History of Architecture -III			
Course Code	**21ARC34**	CIE Marks	50
Teaching Hours/Week (L:T:P: S)	3:0:0:0	SEE Marks	50
Total Hours of Pedagogy	40	Total Marks	100
Credits	03	Exam Hours	03

Course objectives:

To provide an introduction to the culture and architecture of Islamic and Colonial periods in India and to provide an understanding of their evolution in various stylistic modes, characterized by technology, ornamentation, and planning practices.

Teaching-Learning Process (General Instructions)

These are sample Strategies, which teacher can use to accelerate the attainment of the various course outcomes.

1. Use of theory, activities, sketches, drawings, assignment and tutorial for teaching.
2. Evaluation by quiz, tests, classroom activities.

Module-1

1. **Islamic Architecture –** Early phase; It's emergence in 11th century AD in India. General characteristics of Indian Islamic Style.

2. **Early Phase –I: –** Slave and Khilji phase – a) Monumental: Quawat Ul Islam, mosque and tomb of Iltumish , Qutub Minar , Alai Minar. b) Civic space: Enlargement of Quwaat Ul Islam Complex and Alai Darwaza.

3. **Early Phase –II: -** Tugluq , Sayyid & Lodi dynasties. – Architectural character-
   a) Monumental arch : Tomb of Ghia–Suddin Tugluq, Tomb of Firoz shah Tugluq, Shish Gumbad & Mubarak shah Sayyid's tomb. b) Civic Space : Khirkhi masjid Delhi, Firoz Shah kotla – public and private space, madrassa design with Firoz shah's tomb.

Teaching-Learning Process	1) The teacher can use PPTs, Videos to discuss the buildings, style of architecture. 2) The students need to sketch the buildings for its unique qualities. 3) Quizzes, models, seminars from students can be encouraged.

Module-2

4. **Provincial style – I –** Jaunpur and Bengal – Architectural character
   a) Monumental arch : Atala and Jami masjid Bengal – Adina masjid Pandua, Ek Lakhi Tomb
   b) Civic Space : Elements like entrance pylon : Jaunpur, Dakhil – Darwaza at Gaur, space within & outside of examples like Gunmount or Badasona Masjid.

5. **Provincial style – II –** Ahmedabad and Bijapur – Architectural characteristics-a) Monumental arch:Ahmedabad, Vavs of Gujarat: Bijapur- Golgumbaz, Ibrahim Rauza, Jami masjid. B) Civic space: Ahmedabad-Sarkhej complex, Teen darwaza. Bijapur-Ibrahim Rauza, Bauli (Water tank). c) Domestic architecture.

Teaching-Learning Process	1) The teacher can use PPTs, Videos to discuss the buildings, style of architecture. 2) The students need to sketch the buildings for its unique qualities. 3) Quizzes, models, seminars from students can be encouraged.

Module-3

6. **Provincial style – III-** Bidar and Gulbarga-General Character. a)Monumental: Bidar-Jami masjid. Gulbarga-Jami masjid. B) Civic space: Treatment of space within mosque and enclosed space for gathering at both places. c) Domestic: Bidar-Madrassa of Mond, Gawan.

7. **Moghul Architecture-I** –Architectural Character. a)Monumental arch: Humayun's tomb, Fatehpursikri layout, Jami masjid, Diwan-I-khas, Tomb of Salim chisti. B)Civic space- Buland darwaza, Garden(Humayun's tomb). c) Domestic- Fatehpursikri, Birbal's house, Jodhabai's palace.

Teaching-Learning Process	1) The teacher can use PPTs, Videos to discuss the buildings, style of architecture. 2) The students need to sketch the buildings for its unique qualities. 3) Quizzes, models, seminars from students can be encouraged.

Module-4

8. **Mughal Architecture-II** –a) Monumental arch: Akbar's tomb, Taj mahal, Itmaud Daula b) Civic space: Mughal Gardens, Diwan-I-am, Red Fort, Meena bazaar, Red Fort, Guesthouse (Taj mahal complex) c) Domestic: Public elements like 'Serai'-traveler's shelters, Nobles' houses etc.

9. **Colonial Architecture-I** – Early phase-Establishment of forts, warehouses etc-Building typologies and general architectural character of Colonial Indian Architecture.

Teaching-Learning Process	1) The teacher can use PPTs, Videos to discuss the buildings, style of architecture. 2) The students need to sketch the buildings for its unique qualities. 3) Quizzes, models, seminars from students can be encouraged.

Module-5

Colonial Architecture-II – Study of Examples a) Monumental- Governor's house, Calcutta, Town hall, Victoria Terminus (Chhatrapati Shivaji Station) Mumbai, Madras Club, Pacchiappa College Chennai, Mayo Hall, Museum, and Central College Bangalore.

Deputy Commissioner's Office, Palace, Mysore, Examples from Hubli and Dharwad, Karnataka. b)Civic spaces: Parade Ground ,MG Road, Bangalore, Civic spaces around Mysore Palace c) Domestic Bungalows from Calcutta, Chennai, Bangalore and Mysore Railway Stations, Administrative Buildings etc

11. **Colonial Architecture-III** – a) Design of New Capital of Delhi- Contributions of Edward Lutyens, Herbert Baker(Rashtrapati Bhavan), Layout of New Delhi, Parliament House, North Block and South Block at Rashtrapathi Bhavan. B) Monumental: Civic space-Rajpath, Janpath, India Gate etc.

12. **Colonial Architecture-IV** – Examples from Goa-Se Cathedral, Cathedral of Bom Jesus (Monumental Architecture). Architecture from Pondicherry-Indian and French Quarters(Domestic Architecture). Brief summary of Dutch and Danish settlements.

NOTE: *The following may be made a part of progressive marks:*

1) A Portfolio containing analysis of spaces, functions, and forms (Individual submission).
2) Group studies through Photographic documentation of local/ regional examples or study models of the examples.

Teaching-Learning Process	1) The teacher can use PPTs, Videos to discuss the buildings, style of architecture. 2) The students need to sketch the buildings for its unique qualities. 3) Quizzes, models, seminars from students can be encouraged.

Course outcome;

1) The students will be able to learn and compare various styles of Architecture.
2) The students will be able to appreciate the scale of buildings.

Assessment Details (both CIE and SEE)

The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%. The minimum passing mark for the CIE is 50% of the maximum marks (25 marks). A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to each subject/ course if the student secures not less than 40% (20 Marks out of 50)in the semester-end examination(SEE), and a minimum of 50% (50 marks out of 100) in the CIE (Continuous Internal Evaluation) and a minimum of 50% (50 marks out of 100) in the sum total of the CIE (Continuous Internal Evaluation) and SEE (Semester End Examination) taken together. Based on this grading will be awarded.

Continuous Internal Evaluation:

Three Unit Tests each of **20 Marks (duration 01 hour**)

First test at the end of 5th week of the semester

Second test at the end of the 10th week of the semester

Third test at the end of the 15th week of the semester

Two assignments each of **10 Marks**

First assignment at the end of 4th week of the semester

Second assignment at the end of 9th week of the semester

Group discussion/Seminar/quiz any one of three suitably planned to attain the COs and POs for **20 Marks** (**duration 01 hours**)

At the end of the 13th week of the semester

The sum of three tests, two assignments, and quiz/seminar/group discussion will be out of 100 marks and will be **scaled down to 50 marks**

(to have less stressed CIE, the portion of the syllabus should not be common /repeated for any of the methods of the CIE. Each method of CIE should have a different syllabus portion of the course).

CIE methods /question paper is designed to attain the different levels of Bloom's taxonomy as per the outcome defined for the course.

Semester End Examination:

Theory SEE will be conducted by University as per the scheduled timetable, with common question papers for the subject (**duration 03 hours)**

The question paper will have ten questions. Each question is set for 20 marks.

There will be 2 questions from each module. Each of the two questions under a module (with a maximum of 3 sub-questions), **should have a mix of topics** under that module.

The students have to answer 5 full questions, selecting one full question from each module..

Theory paper will be out of 100 marks and will be **scaled down to 50 marks.**

Suggested Learning Resources:

Books

1) Tadgel, C. History of Architecture in India, Phaidon Press, 1990
2) Brown, Percy. Indian Architecture, Islamic Period, Taraporavala and sons, 1987.
3) Indian Architecture (Islamic Period)- Satish Grover

Web links and Video Lectures (e-Resources):

- https://ndl.iitkgp.ac.in
- https://www.youtube.com/watch?v=0kyhYqLEFm8
- https://www.youtube.com/watch?v=Nr1LAUg5M64
- https://www.youtube.com/watch?v=9gqxLZ-vC6s

Activity Based Learning (Suggested Activities in Class)/ Practical Based learning

1) Sketching of the historical buildings
2) Measured drawing of a monument in the nearby area.

III Semester

Building Services –I(Water Supply and Sanitation)			
Course Code	**21ARC35**	CIE Marks	50
Teaching Hours/Week (L:T:P: S)	3:0:0:0	SEE Marks	50
Total Hours of Pedagogy	40	Total Marks	100
Credits	03	Exam Hours	3

Course objectives:

1. *To impart the knowledge and skills required for understanding the role of essential services of water supply and sanitation and their integration with architectural design.*
2. *To understand sustainability issues of water supply and sanitation systems.*

Teaching-Learning Process (General Instructions)

These are sample Strategies, which teacher can use to accelerate the attainment of the various course outcomes.

Site Visits to:

1. Water Treatment Plants, Sewage Treatment Plants, LPG & HSD Yards.
2. High Rise Residential Building – Plumbing (water supply, drainage)
3. Commercial Buildings like IT Campus, Hotel & Hospital for acquaintance of installation & space requirements.
4. Informal settlements

Assignment Submissions for Progressive Marks:

a) *Layout of Water supply and Sanitation with all fixtures in Kitchen, Bath and Utility for a small Residence i.e. Plan and Section, Terrace plan with Rainwater down take pipes, Sump and OHT calculation design.*

b) *Schematic diagram of similar study for a Basement floor.*

c) *Portfolio on*

I. *Solid waste management and*

II. *Fire fighting schematic plans*

Module-1

2) **Introduction to Environment and Health Aspects:** History of Sanitation with respect to human civilization, Importance of Health, Hygiene Cleanliness, Waterborne, Water-related, Water based, Epidemic diseases, Conservancy to water carriage system, Urban and Rural sanitation

Water Supply: Source of Water supply – Municipal, bore well, river, etc, Quantity of water for different usages like Domestic, Hot water, Flushing, Gardening, Commercial, Industrial Applications, Assessment of requirement for different uses, Quality of supply for different uses as per national and international standards, Treatment of water for different uses, filtration, softening, disinfection, Storage and pumping – gravity system, hydro-pneumatic system, Distribution of water to fixture and fittings, schematic diagrams, Swimming pool, water bodies, Efficient usage of water

Teaching-Learning Process	1) Visit to a water treatment plant 2) Quizzes on the various issues of water supply.

Module-2

3) **Sewerage System:** Assessment of sewage generated, Collection of sewage / wastewater from all sources, schematic diagram, Conveyance of sewage – gully trap, chamber, manhole, intercepting trap, grease traps, backflow preventer, Materials of construction of sewerage network – PVC, uPVC, HDPE, corrugated PP pipes, Objective of Sewage treatment, type of treatment, aerobic, anaerobic, Ventilation of STP, Space requirements.

4) **Storm water Management:** Assessment, quantification of rainfall, flood control measures, Drainage system – piped drains, open drains, Recharging of storm water, Harvesting of roof top water, first flush, pre treatment, Drainage of basements, podium, paved areas, Collection, Reuse of water within the project, reduction of the load on municipal system, landscape drainages and Rainwater harvesting.

Teaching-Learning Process	1) Visit to a sewage treatment plant at a city level 2) Quizzes on the various issues of sewage and storm water management.

Module-3

5) **Plumbing:** Water supply piping – hot, cold, flushing water, Piping in sunken areas, false ceiling areas, shaft sizes, Drainage – floor traps, drains, P-trap, bottle traps, Single stack, two stack, cross venting, fixture venting, Material of construction like GI, PPR, PB, CPVC, Composite pipes, Copper, Flow control Valves – Gate valve, Globe valves, butterfly valves, Pressure Reducing valves & station, Pipe supports, hangers, fixing, plumbing of small houses.

Teaching-Learning Process	1) Visit to a construction site for various works of plumbing installations. 2) Sketches, Drawings and measurements on site for various fixtures and installations.

Module-4

6) **Sanitary Fixtures, Fittings & Wellness:** Soil appliances – Water closets, Bidet, urinals, Cisterns, Flush valve, Waste appliances – wash basin, sink, dishwasher, washing machine, Hot water system – Geysers, boilers, heat pump, Bath & water fixtures – Taps, mixers, single lever, quarter turn, bathtub, multi-jet bath, rain showers, health faucets, Wellness products : Sauna bath, steam bath, Jacuzzi, single and double stack system.

7) **Solid Waste Management:** Assessment of waste, Waste to wealth concept, Municipal waste, garden waste, organic & inorganic, Commercial waste, Medical waste & Industrial waste, Collection, segregation, treatment, disposal, Organic waste – Biomethanation, Vermicomposting, Organic waste converter.

Teaching-Learning Process	1) Visit to a construction site for various works of drainage. 2) Sketches, Drawings and measurements on site for various fixtures.

Module-5

8) **Introduction to Fire and Life safety:** Causes of fire, reasons for loss of life due to fire, development of fire, fire classification of buildings, Fire water storage requirements, Fire control room, Code of practices, Idea of smoke detectors, Fire alarms, Wet risers, Fire escape stair case, equipment used eg: snorkel ladder, materials used to fight fire, Fire rating and Hydrants.

9) **Special requirements:** Solar Hot Water Generation, Central LPG Supply System, Medical Gases Supply, Storage of High Speed Diesel, Central Vacuum and Waste Collection.	
Teaching-Learning Process	1) Visit to a construction site for various works of fire safety applications 2) Sketches, Drawings and measurements on site for various service and space requirements for an architect.

Course outcome (Course Skill Set)

1) The students will be able to understand the importance of the services of water supply, sanitary and other necessities in a building.
2) The students will be able to analyse the space requirements and other technical aspects of various services in a building.

Assessment Details (both CIE and SEE)

The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%. The minimum passing mark for the CIE is 50% of the maximum marks (25 marks). A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to each subject/ course if the student secures not less than 40% (20 Marks out of 50)in the semester-end examination(SEE), and a minimum of 50% (50 marks out of 100) in the CIE (Continuous Internal Evaluation) and a minimum of 50% (50 marks out of 100) in the sum total of the CIE (Continuous Internal Evaluation) and SEE (Semester End Examination) taken together. Based on this grading will be awarded.

Continuous Internal Evaluation:

Three Unit Tests each of **20 Marks (duration 01 hour**)

7. First test at the end of 5th week of the semester
8. Second test at the end of the 10th week of the semester
9. Third test at the end of the 15th week of the semester

Two assignments each of **10 Marks**

10. First assignment at the end of 4th week of the semester
11. Second assignment at the end of 9th week of the semester

Group discussion/Seminar/quiz any one of three suitably planned to attain the COs and POs for **20 Marks** (**duration 01 hours**)

12. At the end of the 13th week of the semester

The sum of three tests, two assignments, and quiz/seminar/group discussion will be out of 100 marks and will be **scaled down to 50 marks**

(to have less stressed CIE, the portion of the syllabus should not be common /repeated for any of the methods of the CIE. Each method of CIE should have a different syllabus portion of the course).

CIE methods /question paper is designed to attain the different levels of Bloom's taxonomy as per the outcome defined for the course.

Semester End Examination:

Theory SEE will be conducted by University as per the scheduled timetable, with common question papers for the subject (**duration 03 hours)**

3. The question paper will have ten questions. Each question is set for 20 marks.
4. There will be 2 questions from each module. Each of the two questions under a module (with a maximum of 3 sub-questions), **should have a mix of topics** under that module.

The students have to answer 5 full questions, selecting one full question from each module.

Theory paper will be out of 100 marks and will be **scaled down to 50 marks.**

.

Suggested Learning Resources:

Books

1) Deshpande, RS. A Text Book of Sanitary Engineering, Vol:1, United Books, Pune, 1959.

2) Birdie, G. S. and Birdie J. S. Water Supply and Sanitary Engineering, DhanpatRai Publications, 2010

Web links and Video Lectures (e-Resources):

- https://ndl.iitkgp.ac.in
- https://www.youtube.com/watch?v=KMP9-49I1U4
- https://www.youtube.com/watch?v=0_ZcCqqpS2o
- https://www.youtube.com/watch?v=FvPakzqM3h8
- https://www.youtube.com/watch?v=CdnZXvE4SKc
- https://www.youtube.com/watch?v=LBy9OuIaycc

Activity Based Learning (Suggested Activities in Class)/ Practical Based learning

Activity 1:

Identify a metropolitan city, a Tier-2 city and a village. Study the following designs - Waste management, water supply, sewerage, fire infrastructure and life safety systems, storm water, other developmental infrastructures. Document the similarities and differences. Study the network of lakes, rivers in the same city and their condition now. Document the impact of development on the well being of lakes, rivers and human health aspects. Create a photo collage also to support the documentation.
Incorporate sustainable service systems in the design project.

III Semester

Building Structure -II

Course Code	**21ARC36**	CIE Marks	50
Teaching Hours/Week (L:T:P: S)	3:0:0:0	SEE Marks	50
Total Hours of Pedagogy	40	Total Marks	100
Credits	03	Exam Hours	03

Course objectives:

Introduction to Mechanics & Materials in building construction.

Teaching-Learning Process (General Instructions)

These are sample Strategies, which teacher can use to accelerate the attainment of the various course outcomes.

1) The teacher can use PPTs, Videos to discuss forces acting on a building component.
2) The students need to sketch the forces acting on building elements for its unique qualities.
3) Quizzes, models, seminars from students can be encouraged.

Module-1

Simple Stresses & Strains: Basic concept of simple stress and compound stress , deformation Definition and discussion on Simple stress, deformation, strain ,elasticity, ductility, brittleness , Hooke's law ,fatigue and factor of safety Numerical problems on calculation of simple stress and deformation in bars of uniform and varying c/s subjected to tensile and compressive loads.

Teaching-Learning Process	1) The teacher can use PPTs, Videos to discuss stresses acting on a building component. 2) The students need to sketch the stresses acting on building elements for its unique qualities. 3) Quizzes, models, seminars from students can be encouraged.

Module-2

Modulus of Elasticity (E), Modulus of Rigidity (C), and Bulk modulus (K), Poisson's ratio, relationship between elastic constants , Temperature effects on Structures Numerical problems on calculation of elastic constants, deformation of composite bars subjected to compressive and tensile loads

Teaching-Learning Process	1) The teacher can use PPTs, Videos to discuss topics and load acting on various building components 2) The students need to sketch the forces acting on building components and typical solutions in a simple building. 3) Quizzes, models, seminars from students can be encouraged.

Module-3

Elastic Stability of Columns

Column- Strut -length of column-Effective length of column-slenderness ratio-short column and long column-failure of short column - failure of long column- Critical load or Crippling load on long column- Euler's theory of Long columns with

assumptions and formula for Critical load- concept of safe load. Numerical problems on calculation of critical load and safe load using Euler's-Formula for long columns of solid and hollow circular and rectangular c/s.	
Teaching-Learning Process	1) The teacher can use PPTs, Videos to discuss stability of columns. 2) The students need to sketch the stresses acting on building components and typical solutions in a simple building. 3) Quizzes, models, seminars from students can be encouraged.
Module-4	
Shear Force diagram SFD and Bending moment diagram BMD Concept of shear force and bending moment in a beam subjected to external loads- sign convention-pure bending-point of contra flexure - point of zero shear Numerical problems on drawing SFD and BMD for Cantilever , Simply supported and overhanging beams subjected to concentrated load and uniformly distributed load (u d l) , location of point of contra flexure.	
Teaching-Learning Process	1) The teacher can use PPTs, Videos to discuss SFD and BMD 2) The students need to sketch columns to understand slenderness ratio. 3) Quizzes, models, seminars from students can be encouraged.
Module-5	
Stresses in Beams Concept of bending stress and Shear stress developed in beams subjected to bending - Simple bending equation with assumptions -Neutral Axis-Section modulus, Equation for calculation of shear stress. Numerical problems on Calculation and sketching of variation of bending stress and shear stress across the c/s of beam. (Rectangular, T , I sections)	
Teaching-Learning Process	1) The teacher can use PPTs, Videos to discuss stresses in Beams. 2) The students need to sketch various types of beams to understand stresses and deflection. 3) Quizzes, models, seminars from students can be encouraged.
Course outcome (Course Skill Set) At the end of the course the students will have the ability to understand the effect of various forces on R C C Structure.	

Assessment Details (both CIE and SEE)

The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%. The minimum passing mark for the CIE is 50% of the maximum marks (25 marks). A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to each subject/ course if the student secures not less than 40% (20 Marks out of 50)in the semester-end examination(SEE), and a minimum of 50% (50 marks out of 100) in the CIE (Continuous Internal Evaluation) and a minimum of 50% (50 marks out of 100) in the sum total of the CIE (Continuous Internal Evaluation) and SEE (Semester End Examination) taken together. Based on this grading will be awarded.

Continuous Internal Evaluation:

Three Unit Tests each of **20 Marks (duration 01 hour**)

First test at the end of 5th week of the semester

Second test at the end of the 10th week of the semester

Third test at the end of the 15th week of the semester

Two assignments each of **10 Marks**

First assignment at the end of 4th week of the semester

Second assignment at the end of 9th week of the semester

Group discussion/Seminar/quiz any one of three suitably planned to attain the COs and POs for **20 Marks** (**duration 01 hours**)

At the end of the 13th week of the semester

The sum of three tests, two assignments, and quiz/seminar/group discussion will be out of 100 marks and will be **scaled down to 50 marks**

(to have less stressed CIE, the portion of the syllabus should not be common /repeated for any of the methods of the CIE. Each method of CIE should have a different syllabus portion of the course).

CIE methods /question paper is designed to attain the different levels of Bloom's taxonomy as per the outcome defined for the course.

Semester End Examination:

Theory SEE will be conducted by University as per the scheduled timetable, with common question papers for the subject (**duration 03 hours)**

The question paper will have ten questions. Each question is set for 20 marks.

There will be 2 questions from each module. Each of the two questions under a module (with a maximum of 3 sub-questions), **should have a mix of topics** under that module.

The students have to answer 5 full questions, selecting one full question from each module..

Theory paper will be out of 100 marks and will be **scaled down to 50 marks.**

Suggested Learning Resources: Books

1) B.S.Basavarajaih& P. Mahadevappa, "Strength of Materials", Universities Press, 3rd editn. 2010.
2) Dr. S. Ramamrutham& R. Narayan "Strength of Materials", DhanpatRai Publ., 8th edi. 2014.
3) William A. Nash, "Strength of Materials", McGraw-Hill Education; 6th edition, 2013.
4) R.K.Bansal, "Strength of Materials", Laxmi Publications; 6th edition (2017).
5) R.S.Khurmi& N. Khurmi, " Strength of Materials", S Chand Pub., revised edition 2006

Web links and Video Lectures (e-Resources):

- https://ndl.iitkgp.ac.in
- https://www.youtube.com/watch?v=arr_xwk-JsM
- https://www.youtube.com/watch?v=WWky4D2LHtk

Activity Based Learning (Suggested Activities in Class)/ Practical Based learning

1) Visit to a construction site to analyse various forces acting on different components of a building.
2) Seminar by students in groups on their learnings.

III Semester

Samskrutika Kannada			
Course Code	**21KSK37**	CIE Marks	50
Teaching Hours/Week (L:T:P: S)	0:1:0:0	SEE Marks	50
Total Hours of Pedagogy	13	Total Marks	100
Credits	01	Exam Hours	01

Course objectives:

Teaching-Learning Process (General Instructions)
These are sample Strategies, which teacher can use to accelerate the attainment of the various course outcomes.

Module-1

Teaching-Learning Process	

Module-2

Teaching-Learning Process	
Module-3	
Teaching-Learning Process	
Module-4	
Teaching-Learning Process	
Module-5	
•	
Teaching-Learning Process	
Course outcome (Course Skill Set)	

Assessment Details (both CIE and SEE)

The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%. The minimum passing mark for the CIE is 50% of the maximum marks (25 marks). A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to each subject/ course if the student secures not less than 40% (20 Marks out of 50)in the semester-end examination(SEE), and a minimum of 50% (50 marks out of 100) in the CIE (Continuous Internal Evaluation) and a minimum of 50% (50 marks out of 100) in the sum total of the CIE (Continuous Internal Evaluation) and SEE (Semester End Examination) taken together. Based on this grading will be awarded.

Continuous Internal Evaluation:

Three Unit Tests each of **20 Marks (duration 01 hour**)

First test at the end of 5th week of the semester

Second test at the end of the 10th week of the semester

Third test at the end of the 15th week of the semester

Two assignments each of **10 Marks**

First assignment at the end of 4th week of the semester

Second assignment at the end of 9th week of the semester

Group discussion/Seminar/quiz any one of three suitably planned to attain the COs and POs for **20 Marks** (**duration 01 hours**)

At the end of the 13th week of the semester

The sum of three tests, two assignments, and quiz/seminar/group discussion will be out of 100 marks and will be **scaled down to 50 marks**

(To have less stressed CIE, the portion of the syllabus should not be common /repeated for any of the methods of the CIE. Each method of CIE should have a different syllabus portion of the course).

CIE methods /question paper is designed to attain the different levels of Bloom's taxonomy as per the outcome defined for the course.

Semester End Examination:

Theory SEE will be conducted by University as per the scheduled timetable, with common question papers for the subject (**duration 03 hours)**

5. The question paper will have ten questions. Each question is set for 20 marks.
6. There will be 2 questions from each module. Each of the two questions under a module (with a maximum of 3 sub-questions), **should have a mix of topics** under that module.

The students have to answer 5 full questions, selecting one full question from each module..

Suggested Learning Resources:

Books

Web links and Video Lectures (e-Resources):

- https://ndl.iitkgp.ac.in
-

Activity Based Learning (Suggested Activities in Class)/ Practical Based learning

III Semester

Balake Kannada			
Course Code	**21KBN37**	CIE Marks	50
Teaching Hours/Week (L:T:P: S)	0:1:0:0	SEE Marks	50
Total Hours of Pedagogy	13	Total Marks	100
Credits	01	Exam Hours	01

Course objectives:

Teaching-Learning Process (General Instructions)
These are sample Strategies, which teacher can use to accelerate the attainment of the various course outcomes.

Module-1

Teaching-Learning Process	

Module-2

Teaching-Learning Process	
Module-3	
Teaching-Learning Process	
Module-4	
Teaching-Learning Process	
Module-5	
•	
Teaching-Learning Process	
Course outcome (Course Skill Set)	

Assessment Details (both CIE and SEE)

The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%. The minimum passing mark for the CIE is 50% of the maximum marks (25 marks). A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to each subject/ course if the student secures not less than 40% (20 Marks out of 50)in the semester-end examination(SEE), and a minimum of 50% (50 marks out of 100) in the CIE (Continuous Internal Evaluation) and a minimum of 50% (50 marks out of 100) in the sum total of the CIE (Continuous Internal Evaluation) and SEE (Semester End Examination) taken together. Based on this grading will be awarded.

Continuous Internal Evaluation:

Three Unit Tests each of **20 Marks (duration 01 hour**)

First test at the end of 5th week of the semester

Second test at the end of the 10th week of the semester

Third test at the end of the 15th week of the semester

Two assignments each of **10 Marks**

First assignment at the end of 4th week of the semester

Second assignment at the end of 9th week of the semester

Group discussion/Seminar/quiz any one of three suitably planned to attain the COs and POs for **20 Marks** (**duration 01 hours**)

At the end of the 13th week of the semester

The sum of three tests, two assignments, and quiz/seminar/group discussion will be out of 100 marks and will be **scaled down to 50 marks**

(to have less stressed CIE, the portion of the syllabus should not be common /repeated for any of the methods of the CIE. Each method of CIE should have a different syllabus portion of the course).

CIE methods /question paper is designed to attain the different levels of Bloom's taxonomy as per the outcome defined for the course.

Semester End Examination:

Theory SEE will be conducted by University as per the scheduled timetable, with common question papers for the subject (**duration 03 hours)**

7. The question paper will have ten questions. Each question is set for 20 marks.
8. There will be 2 questions from each module. Each of the two questions under a module (with a maximum of 3 sub-questions), **should have a mix of topics** under that module.

The students have to answer 5 full questions, selecting one full question from each module.

Suggested Learning Resources:

Books

Web links and Video Lectures (e-Resources):

- https://ndl.iitkgp.ac.in
-

Activity Based Learning (Suggested Activities in Class)/ Practical Based learning

III Semester

ELECTIVE- 1			
Course Code	**21ARC38X**	CIE Marks	100
Teaching Hours/Week (L:T:P: S)	2:0:0:0	SEE Marks	--
Total Hours of Pedagogy	25	Total Marks	100
Credits	02	Exam Hours	--

Course objectives:

1) To gain experience in aspects of Architecture not offered in the regular curriculum.
2) To study particular areas of the curriculum in greater depth.
3) To explore career opportunities in the allied fields.

Teaching-Learning Process (General Instructions)

These are sample Strategies, which teacher can use to accelerate the attainment of the various course outcomes.

1) The teacher may use conventional method or an innovative method to deal with the subject.
2) The students need to work with hands on experiences to gain an expertise of the chosen field.
3) The teacher needs to use performance assessments to develop real life skills in the students.

a. ARCHITECTURAL PHOTOGRAPHY

OBJECTIVE

To impart the skills of taking aesthetically appealing and creative architectural photographs through the use of appropriate cameras/ lenses and lighting conditions.

OUTLINE

1. Introduction to architectural photography. Various types of compositions, framing, silhouette photography.
2. Use of various cameras, lenses and accessories, handling of equipment.
   a . SLR,DSLR cameras, lenses for different focal lengths for various contexts
   b. Use of wide angle, normal, tele, zoom, macro, close up lenses.
   c. Filters- UV, Skylight, colour filters, special effect filter.
3. Shutter speeds- slow, normal and high and their various applications.
4. Apertures- use of various apertures to suit different lighting conditions and to enhance depth of fields.
5. Selection of ISO rating to match various lighting conditions.
6. Optimizing selection of shutter speed, aperture and ISO.
7. Twilight and night photography.
8. Various uses of photography- documentation, presentations, competitions, lectures, etc.
9. Creative photography/ photo renderings, for special effects using software.
10. Play of light and shadows to achieve dramatic pictures.
11. Effects of seasons, inclusion of greenery, foliage, clouds, human scale etc.

12. Architectural photography as a profession, law on photography.

REFERENCES:

1. Schulz, Adrian. Architectural Photography: Composition, Capture, and Digital Image Processing, Rocky Nook, 2012.
2. McGrath, Norman . Photographing Buildings Inside and Out, Watson-Guptill Publications, 1993.

b. VERNACULAR ARCHITECTURE
OBJECTIVE:

To inculcate an appreciation of vernacular architecture; as an expression of local identity and indigenous traditions of the culture. Vernacular architecture and environment are deeply interconnected, studying vernacular methods through the environmental responsiveness view point.

OUTLINE:

The course would be conducted through seminars and field work.

1. Introduction to the approaches and concepts to the study of vernacular architecture, history and organisation of vernacular buildings of different regions in the Indian context; with an understanding of forms, spatial planning, cultural aspects, symbolism, colour, art, materials of construction and construction techniques. Study of factors that shape the architectural character and render the regional variations of vernacular architecture - geographic, climatic, social, economic, political and religious aspects, local materials and skills available in the region etc.

2. Methods of observation, recording, documenting and representing vernacular architecture with examples.

3. Study and documentation of vernacular architecture of selected building typologies. Rigorous documentation, accuracy in measuring, collating the recorded information and drawing them up in specified formats and scales are part of this module.

4. A critical review of the relevance and application of vernacular ideas in contemporary times. An appraisal of architects who have creatively innovated and negotiated the boundaries of 'tradition' while dynamically responding to the changing aspirations and lifestyles of the world around.

5. Case Study of how vernacular materials can help ease climatic challenges.

6. Design Activity - design an informal settlement using vernacular elements. Mapping old vernacular materials and how they have evolved (different contexts) and thus how it can be applied for informal settlements today.

REFERENCES:

1. Carter, T., & Cromley, E. C. Invitation to Vernacular Architecture: A Guide to the Study of Ordinary Buildings and Landscapes. Knoxville: The University of

Tennessee Press. 2005

2. Cooper, I. Traditional buildings of India. Thames and Hudson Ltd, London, 1998
3. Oliver, P. Encyclopaedia of Vernacular Architecture of the World, Cambridge University Press, 1997

c. VISUAL COMMUNICATION

OBJECTIVE: *To impart the techniques of visual communication.*

OUTLINE:

1. Visual communication used in day to day life, print, electronic media, advertisement and in art / architecture context - differences and similarities.
2. Understanding meaning generation process in visual language.
3. Devices of visual language - space, context, scale, associate, transform, crop, frame, distort, abstract, fragment, exaggerate, and subvert, irony.
4. Pictograms and ideograms.
5. Understanding the differences between logo and symbol. Process of logo creation.
6. Hierarchy in visual content being presented.
7. Relationship between text and images and their interrelationships.
8. Cultural context of meaning generation and aesthetic principles involved.

REFERENCES:

1. Barnes, Susan B. An Introduction to Visual Communication: From Cave Art to Second Life, Peter Lang Publishing Inc, 2011
2. Bo Bergström, Essentials of Visual Communication, Laurence King Publishing, 2009

OPEN ELECTIVE:

The college has the discretion to offer an open elective in the areas/subject/fie other than already covered under the syllabus. The college can decide to offer need based electives depending on the availability of the expertise. However, the college will require to submit the title of such electives with the course outline stating learning objectives and mode of delivering the content to the Registrar/ Registrar (evaluation) within the 15 days of the commencement of the semester

Course outcome (Course Skill Set)

1) To develop desired knowledge and skill in a particular domain of Architecture
2) To develop an understanding of the processes required for the particular subject.
3) To develop an expertise in the chosen field for career enhancement.

Assessment Details (CIE)

(methods of CIE need to be defined topic wise i.e.- Studio/ Class room/Tutorial discussions, Reviews, Time problems, test, Seminar or micro project)

The weightage of Continuous Internal Evaluation (CIE) is 100% and there is no Semester End Exam (SEE) .The student has to obtain a minimum of 50% marks in CIE and is conducted for 100 marks. Based on the CIE marks grading will be awarded.

Continuous Internal Evaluation:

Methods suggested:

1. Studio discussions, Reviews, Time problems, CIE tests, Seminar or micro project, Quiz, report writing etc.
2. The class teacher has to decide the course of learning for the Elective subject, in the beginning only. The teacher has to announce the methods of CIE for the subject in advance in writing.

Semester End Examination:

There is no Semester End Exam (SEE) The CIE marks list generated is to be signed by the internal examiners and submitted to VTU as per the procedure through the Principal of the institution.

Web links and Video Lectures (e-Resources):

- https://ndl.iitkgp.ac.in
- https://www.youtube.com/watch?v=OtZAku_co3w
- https://www.youtube.com/watch?v=XkDKjARcZjw
- https://www.youtube.com/watch?v=_a-QGF4p__c
- https://www.youtube.com/watch?v=xoQOB_XaJBM
- https://www.youtube.com/watch?v=Y9ixRTTx5iU

Activity Based Learning (Suggested Activities in Class)/ Practical Based learning

1) Students need to explore and meet an expert to understand the subject in a greater depth.
2) Students need to work with hands on experiences to develop desired skills in the field..

III Semester

SOCIAL CONNECT & RESPONSIBILITIES			
Course Code	**21UH39**	**CIE Marks**	**50**
Teaching Hours week (L:T:P:S)	1:0:0:0	SEE Marks	50
Total Hours of Pedagogy	15	Total Marks	100
Credits	01	Exam Hours	01
Department	Management Studies / Engineering Department		
Offered for	3rd Semester		
Prerequisite	Nil		

Objectives: The Course will

- Enable the student to do a deep drive into societal challenges being addressed by NGO(s), social enterprises & the government and build solutions to alleviate these complex social problems through immersion, design & technology.
- Provide a formal platform for students to communicate and connect to their surroundings.
- Enable to create of a responsible connection with society.

Learning Outcomes: The students are expected to have the ability to :

1. Understand social responsibility
2. Practice sustainability and creativity
3. Showcase planning and organizational skills

Contents:

The course is mainly activity-based that will offer a set of activities for the student that enables them to connect with fellow human beings, nature, society, and the world at large. The course will engage students in interactive sessions, open mic, reading groups, storytelling sessions, and semester-long activities conducted by faculty mentors. In the following a set of activities planned for the course have been listed :

Module-I

Plantation and adoption of a tree: Plantation of a tree that will be adopted for four years by a group of B.Tech/ B Arch. students. They will also make an excerpt either as a documentary or a photo blog describing the plant's origin, its usage in daily life, and its appearance in folklore and literature.

Module-II

Heritage walk and crafts corner: Heritage tour, knowing the history and culture of the city, connecting to people around through their history, knowing the city and its craftsman, photo blog and documentary on evolution and practice of various craft forms.

Module-III

Organic farming and waste management: usefulness of organic farming, wet waste management in neighbouring villages, and implementation in the campus.

Module-IV

Water Conservation: knowing the present practices in the surrounding villages and implementation in the campus, documentary or photo blog presenting the current practices.
Module-V
Food Walk City's culinary practices, food lore, and indigenous materials of the region used in cooking.
Activities **Jamming session, open mic, and poetry:** Platform to connect to others. Share the stories with others. Exhibit the talent like playing instruments, singing, one-act play, art-painting, and fine art. **PEDAGOGY** The pedagogy will include interactive lectures, inspiring guest talks, field visits, social immersion, and a course project. Applying and synthesizing information from these sources to define the social problem to address and take up the solution as the course project, with your group. Social immersion with NGOs/social sections will be a key part of the course. Will all lead to the course project that will address the needs of the social sector? **COURSE TOPICS:** The course will introduce social context and various players in the social space, and present approaches to discovering and understanding social needs. Social immersion and inspiring conversional will culminate in developing an actual, idea for problem-based intervention, based on an in-depth understanding of a key social problem. A total of 14 hrs engagement per semester is required for the 3rd semester of the B.E. /B.Tech/ B Arch program. The students will be divided into 10 groups of 35 each. Each group will be handled by two **faculty mentors**. Faculty mentors will design the activities (particularly Jamming sessions open mic ,and poetry) **Faculty mentors** have to design the evaluation system.

GRADING PLAN: Type of Evaluation	**Weightage (in)**
Quizzes	10
Assignments (Paper(I/II)	15
Hackathons (2)	30
Technology Demonstration	15
Stake Holder Presentation	15
Final Demos & Terms paper (based on social immersion)	15

IV Semester

ARCHITECTURAL DESIGN - IV			
Course Code	**21ARC41**	CIE Marks	100
Teaching Hours/Week (L:T:P: S)	0:0:7:0	SEE Marks(VIVA)	100
Total Hours of Pedagogy	90	Total Marks	200
Credits	7	Exam Hours	----

Course objectives:

From space to dwelling: An understanding of what it means to dwell in a space/s and to further explore as to why and how people choose to dwell together.

This semester follows on the heels of the past one, where students have attempted to understand the nature of places with shared memories and purposes.

Teaching-Learning Process (General Instructions)

These are sample Strategies, which teacher can use to accelerate the attainment of the various course outcomes.

1) The contents of the courses shall be taught in an application-oriented manner on a scientific and design basis. The course contents shall be taught and learned in lectures, seminars, labs or workshops, studio exercises and design projects, etc.
2) In-studio exercises the teachers shall take the lead to provide tasks and offer guidance for solutions finding. The students shall work either individually or in groups.
3) In design studios, the students contribute to the processing, analysis and solving of problems of direct professional practice, attended by faculty(s) entitled to conduct the studio and examine. The results shall be defended through drawings; models and reports and evaluated through periodic assessment and finally by a jury or panel, and finally, evaluated through periodic assessment and an end semester examination or viva voce.

Three component approach to the Design Studio:

A) TRAVEL FOR SITE VISITS: Learning from visiting various settings: urban and rural, traditional, contemporary, permanent and temporary, to introduce them first hand to students.

B) SEMINARS: Seminars are intended to expose the students to a range of real issues that are integral to their understanding of house-form. These should lead students to explore different approaches to house-form.

C) DESIGN TASKS: Emphasis in teaching and learning is placed on bridging the gap between the imaginative and conceptual, the material and formal. Projects should involve activities that encourage students to develop techniques for identifying and negotiating competing demands and prioritizing and ordering variables. An essential part of the studio process should be peer reviews and reviews by practicing architects.

A. The Dwelling: How spaces change when people stake claim over them, and what boundaries are drawn between what is private and the many stages between that and the common public space?.

What it means to arrive "home", and what is the nature of that feeling of belonging that one gets when we "arrive" and are welcomed in to a familiar space?.

We enquire into the nature of a dwelling space, and what is the nature of spaces outside them? Common rangolis, porches, verandahs, balconies, paths, pavements, plinths, wells, washing areas, vrindavanas, backyards, parking spaces for carts, cattle, and vehicles. We need to enquire in the nature of the spaces in-between these.

Picking from memories, can we recollect and draw spaces that endure, ones that recall the same feelings and create similar expectations as before? Which spaces and behaviours have changed, and which remain. Which are in transition?

B. Dwelling Together:

Explore as to why people live together, and how we have lived together in the past. Questions to be addressed here are:
How do we make common decisions?
What do we share, and when, where and how does it change to the more intimate, personal space?
Which spaces are "designed"? What is the meaning of "organic" growth? What is the meaning of Vernacular Architecture?
What is the meaning of the term "sustainable"?

Assignment-1: SITE VISITS

1) Two site visits to observe, discuss and document existing residential settlements (formal and informal[1]), housing projects.
2) The emphasis should be on both conceptual understanding and accurately measured drawing. However, scale and proportion need to be observed carefully, as a method of understanding buildings.
3) Attention should be given to community spaces/common areas, the kind of materials, quality of environment and the emergent grouping of individual dwellings.
4) Sketches and documentation should show observations and inferences from the studies.

Assignment-2: SEMINARS

1) To understand the architect as the facilitator: the architect's role in the process of building a dwelling community.
2) To understand some issues related to group housing/dwelling or settlements like basic services [lighting, ventilation & water supply] and building regulation.
3) To explore the character of community spaces and their significance in housing projects [points of discussion could include different ways of occupying land: rentals, ownership, temporary squatting, organic settlements, informal urban settlements].

- Indigenous building technologies, Post Independence Housing: Otto Koenigsberger.

4) Studying housing projects in India [Laurie Baker, BV Doshi, Charles Correa, MN AshishGanju, Raj Rewal, Shilpa Sindoor, Revathi Kamath] and other contemporary housing projects from around the world

Assignment-3: PROJECTS

One major project (from formal (apartment) settlements be taken as design project) (Activity) and one minor/time (looking at an informal settlement or vernacular parts of the city or rural setting for settlement/community study and design) assignment to be tackled in the semester. Project work could be done in the following four stages of activity interspersed with seminars.

1. Introduction to the initial design parameters which include choice of:

a. Geography/situation (context),
b. Understanding the dwellers, their lifestyle, and social context, and the materials used locally
c. Exploring ways in which dwellers come together to live in a small community.
d. Sustainable design principles and sustainable services (eg. storm water harvesting, waste water reuse, solar power, etc.) integration.

2. Explore issues of community, public and private realms, edge conditions, communication and connectedness.

3. Enquire into individual and family/user group needs and aspirations.

4. The emphasis in the studio has to be on **inclusion** and **integration** of differences in age, gender, mobility, health, economic status. In today's world, there is a need to make buildings equitable to all at the outset, and we should begin with our dwellings.
5. Suggested plot size: From 1500 - 3000 sqm

Teaching-Learning Process	

Course outcome (Course Skill Set)
the student will be able to:

- Get an introduction into the field of Architectural Design viz. a viz. the duality & the tension that exists between the form and function of a space.
- Make responsible choices for design development
- Get a perspective on design of spaces in formal and informal settlements.

Assessment Details (both CIE and SEE)

(methods of CIE need to be defined topic wise i.e.- Studio discussions, Reviews, Time problems, test, Seminar or micro project)

The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%. The student has to obtain a minimum of 50% marks individually both in CIE and 40 % marks in SEE to pass. Semester End Exam (SEE) is conducted for 100 marks (Viva-voce) and a minimum of 50% (50 marks out of 100) in the sum total of the CIE (Continuous Internal Evaluation) and SEE (Semester End Examination) taken together. Based on this grading will be awarded.

Continuous Internal Evaluation:

Methods suggested:

1. Studio discussions, Reviews, Time problems, CIE tests, Seminar or micro project, Quiz, report writing etc.
2. The class teacher has to decide the topic for the Design and Seminars if any, in the beginning only. The teacher has to announce the methods of CIE for the subject in advance in writing.

Semester End Examination:

1. The student needs to submit his/her works done throughout the semester, including rough sheets for the Viva examination, at least one day prior to the Viva work examination to the course teacher/coordinator.
2. The Viva-voce will be evaluated by an external teacher appointed by the University along with Course teacher or an internal examiner.
3. The SEE marks list generated is to be signed by both internal and external examiners and submitted to VTU in the sealed cover through the Principal of the institution.

Suggested Learning Resources:

Books

I. Amos Rapoport , "House Form and Culture", Prentice-Hall, 1969
II. Christopher Alexander, "Pattern Language", Oxford University Press, 1977
III. Christopher Alexander, "A Timeless Way of Building", Oxford Uni. Press , 1979
IV. Gautam Bhatia, "Laurie Baker, Life, Work, Writings", Viking , 1991
V. Dick Van Gameren & Rohan Verma, "Designs for Housing: Charles Correa", 2018
VI. Atul Deulgaonkar, "Laurie Baker, Truth in Architecture", Jyotsna Prakashan , 2015
VII. Otto Koenigsberger, "Manual of Tropical Housing and Building", 1975
VIII. Geoffrey Bawa, The Complete Works, 2002

Web links and Video Lectures (e-Resources):

- https://ndl.iitkgp.ac.in
- https://www.youtube.com/watch?v=ly8orBNiNQM
- https://www.youtube.com/watch?v=k4dVgbuxBAw

Activity Based Learning (Suggested Activities in Class)/ Practical Based learning

the class be divided into two groups, one takes the formal housing (apartment for Middle-income groups) and the other takes the Informal settlement (rehabilitation/redesign/retrofitting for low-income groups - affordable housing)

IV Semester

Materials and Methods in Building Construction -IV			
Course Code	**21ARC42**	CIE Marks	50
Teaching Hours/Week (L:T:P: S)	1:0:3:0	SEE Marks(VIVA)	50
Total Hours of Pedagogy	50	Total Marks	100
Credits	04	Exam Hours	----

Course objectives:

To acquaint the students with construction practices pertaining to RCC framing systems, and other building elements such as metal doors and windows(In Steel and Aluminium)

Teaching-Learning Process (General Instructions)

These are sample Strategies, which teacher can use to accelerate the attainment of the various course outcomes.

Minimum one plate on each construction topic. Site visits to be arranged by studio teachers. Study of material application in the form of portfolio.

Module-1

1. **Introduction to Advanced RCC roofs:** Moment framed, Flat slab and Flat plate, Filler slabs, Waffle slab.
2. **RCC Moment framed:** Principles and methods of construction including detailing of Reinforcement.
3. **RCC Flat Plate & Slab:** Principles and methods of construction including detailing of Reinforcement.

Teaching-Learning Process	Minimum one plate on each construction topic. Site visits to be arranged by studio teachers. Study of material application in the form of portfolio.

Module-2

4. **RCC filler slabs**: Principles and methods of construction. Introduction to different filler materials, Mangalore tiles, Burnt Clay Bricks, Hollow Concrete blocks, Stabilized Hollow Mud blocks, Clay pots, Coconut shells etc.
5. **RCC Waffle slabs**: Principles and methods of construction

Teaching-Learning Process	Minimum one plate on each construction topic. Site visits to be arranged by studio teachers. Study of material application in the form of portfolio.

Module-3

6. **Structural steel as a building material:** Types, properties, uses, manufacturing methods. Life cycle and environmental impact of steel
7. **Steel construction:** Steel columns/Stanchions/beam construction; Principles and methods of construction. (Reuse and repurpose of steel construction and demolition waste).

Teaching-Learning Process	Minimum one plate on each construction topic. Site visits to be arranged by studio teachers. Study of material application in the form of portfolio.
Module-4	
8. **Steel doors and windows:** Study of joinery details. 9. **Steel doors for garages and workshops:** uses and manufacturing methods. 10. **Collapsible gate and rolling shutters:** uses and manufacturing methods.	
Teaching-Learning Process	Minimum one plate on each construction topic. Site visits to be arranged by studio teachers. Study of material application in the form of portfolio.
Module-5	
11. **Aluminium as a building material:** Types, properties, uses, manufacturing methods and Life cycle environmental impact of aluminium (including its thermal properties, energy needs during construction phase). Detailing of aluminium partitions. 12. **Aluminium doors and windows:** Casement, Pivot, Sliding type: Study of joinery details. (Reuse and repurpose of Aluminium construction and demolition waste).	
Teaching-Learning Process	Minimum one plate on each construction topic. Site visits to be arranged by studio teachers. Study of material application in the form of portfolio.

Course outcome (Course Skill Set)

1. The students will be able to understand the critical aspects of structural systems in RCC.
2. The student will be able to relate architectural drawings to structural consultant's drawings.
2. The students will be able to appreciate and use of other materials like steel, Aluminium for buildings.

Assessment Details (both CIE and SEE)

(methods of CIE need to be define topic wise i.e.- Submission of construction drawing sheets, Journal of materials, Multiple Choice Question, Quizzes, Open book test, Seminar or micro project)

The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%. The student has to obtain a minimum of 50% marks individually both in CIE and 40% marks in SEE to pass. Semester End Exam (SEE) is conducted for 50 marks (Viva-voce). Based on this grading will be awarded.

Continuous Internal Evaluation:

1. Methods suggested: Submission of Construction sheets, Journal of Materials, Test, Written Quiz, Seminar, report writing etc.
2. The class teacher has to decide the topics for the test, Written Quiz, and Seminar. In the beginning, only the teacher has to announce the methods of CIE for the subject.

Semester End Examination:

1. The student need to submit his/her works done throughout the semester, including rough sheets for Viva-voce examination, atleast one day prior to Viva-voce examination to the course teacher/coordinator.

2. The work will be evaluated by an external teacher appointed by the University along with course teacher or an internal examiner.

3. The SEE mark list generated is to be signed by both internal and external examiners and submitted to VTU in sealed cover through the Principal of the institution.

Suggested Learning Resources:

Books;

1) Chudley , Construction Technology, ELBS, 1993
2) Barry, Construction of Buildings, East West Press, 1999

Web links and Video Lectures (e-Resources):

- https://ndl.iitkgp.ac.in
- https://www.youtube.com/watch?v=kjmPv1d1ohM
- https://www.youtube.com/watch?v=_JMtIkNkzbk
- https://www.youtube.com/watch?v=VdhOO3N2E00
- https://www.youtube.com/watch?v=_XL2KXnuj0Q
- https://www.youtube.com/watch?v=hCEvmTSBj4Y

Activity Based Learning (Suggested Activities in Class)/ Practical Based learning

Activity 1- Site visit to observe flat slab, filler slab and other type of roofs

Activity 2- Observe and understand technical construction methods and materials (as studied in this module) and document the same in a report.

Activity 3 – Visit to local workshop or a construction site to observe the steel and Aluminium components are made and document the same in a report.

IV Semester

History of Architecture -IV			
Course Code	**21ARC43**	CIE Marks	50
Teaching Hours/Week (L:T:P: S)	3:0:0:0	SEE Marks	50
Total Hours of Pedagogy	40	Total Marks	100
Credits	03	Exam Hours	3

Course objectives:
To study the evaluation of Greek, Roman, Byzantine, Medieval and Gothic architecture through critical analysis of appropriate examples.

Teaching-Learning Process (General Instructions)
These are sample Strategies, which teacher can use to accelerate the attainment of the various course outcomes.

1. Use of theory, activities, sketches, drawings, assignment and tutorial for teaching.
2. Evaluation by quiz, tests, classroom activities.

Module-1

1. Classical Greek Architecture 1: Critical appreciation of works and synoptic study of architectural characteristic features from the Greek early periods.
2. Classical Greek Architecture 2: Critical appreciation of works and synoptic study of architectural characteristic features from the Greek later periods, Doric, ionic and Corinthian orders and optical correction.
3. Greek architecture Typologies: Study of principles of design of Greek buildings through study of three kinds of Architecture: a) Monumental (Built to impress and Last) ex. Parthenon, Theatre at Epidauros. b) Domestic (Built to inhabit): House of Colline, House of Masks, etc. and c) Civic space: The Agora and Acropolis.

Teaching-Learning Process	1) The teacher can use PPTs, Videos to discuss the buildings, style of architecture. 2) The students need to sketch the buildings for its unique qualities. 3) Quizzes, models, seminars from students can be encouraged.

Module-2

4. Introduction to Roman Architecture: Critical appreciation of works and synoptic study of architectural characteristic features from the Roman periods. Study of Tuscan and composite orders.
5. Roman architecture Typologies 1: Study of principles of design of Roman buildings through study of proportion, composition, visual effects etc. in Monumental (Built to impress and last) Pantheon, Colosseum, Thermae of Caracalla, Pont du Gard, Nimes, Basilica of Trajan.

Teaching-Learning Process	1) The teacher can use PPTs, Videos to discuss the buildings, style of architecture. 2) The students need to sketch the buildings for its unique qualities. 3) Quizzes, models, seminars from students can be encouraged.

Module-3

6. **Roman architecture Typologies 2:** Study of principles of design of Roman buildings through study of Domestic (Built to inhabit)-House, villa and apartments.
7. Roman architecture Typologies 3: Study of principles of design of Roman buildings through study of Civic space with elements like triumphal arch, Column of Trajan(Septimius Severus), Roman Forum.
8. Early Christian: Evolution of architecture parallel to the evolution of religious practices. Study of principles of design of buildings through study of three kinds of Architecture: a) Monumental b) Domestic (Built to inhabit) and c) Civic space.

Teaching-Learning Process	1) The teacher can use PPTs, Videos to discuss the buildings, style of architecture. 2) The students need to sketch the buildings for its unique qualities. 3) Quizzes, models, seminars from students can be encouraged.

Module-4

9. **Byzantine:** Study of principles of design of buildings through study of its Architecture: a) Monumental; Hagia Sophia b) Domestic (Built to inhabit) and c) Civic space-St.Marks Venice.

10. Medieval: Study of principles of design of buildings through study of its Architecture: a) Monumental; Pisa Cathedral, the Campanile and Baptistery, Angouleme Cathedral b) Domestic (Built to inhabit) and c) Civic space; Pisa.

Teaching-Learning Process	1) The teacher can use PPTs, Videos to discuss the buildings, style of architecture. 2) The students need to sketch the buildings for its unique qualities. 3) Quizzes, models, seminars from students can be encouraged.

Module-5

11. Gothic: Study of principles of design of buildings through study of its Architecture: a) Monumental; Notre Dame, Paris. b) Domestic (Built to inhabit) and c) Civic space;

12. Gothic: Study of Gothic Architecture, typical characteristics including the pointed arch, the ribbed vault and the flying buttress, aesthetic elements with examples like Chartres Cathedral: French High Gothic style

NOTE: Progressive marks to include Submission of sketch book, study models relating to structure, aesthetics and building typology resulting from different functions.

Teaching-Learning Process	1) The teacher can use PPTs, Videos to discuss the buildings, style of architecture. 2) The students need to sketch the buildings for its unique qualities. 3) Quizzes, models, seminars from students can be encouraged.

Course outcome (Course Skill Set)

1) The students will be able to learn and compare various styles of Architecture.
2) The students will be able to appreciate the scale of buildings.

Assessment Details (both CIE and SEE)

The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%. The minimum passing mark for the CIE is 50% of the maximum marks (25 marks). A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to each subject/ course if the student secures not less than 40% (20 Marks out of 50)in the semester-end examination(SEE), and a minimum of 50% (50 marks out of 100) in the the CIE (Continuous Internal Evaluation) and a minimum of 50% (50 marks out of 100) in the sum total of the CIE (Continuous Internal Evaluation) and SEE (Semester End Examination) taken together. Based on this grading will be awarded.

Continuous Internal Evaluation:

Three Unit Tests each of **20 Marks (duration 01 hour**)

First test at the end of 5th week of the semester

Second test at the end of the 10th week of the semester

Third test at the end of the 15th week of the semester

Two assignments each of **10 Marks**

First assignment at the end of 4th week of the semester

Second assignment at the end of 9th week of the semester

Group discussion/Seminar/quiz any one of three suitably planned to attain the COs and POs for **20 Marks** (**duration 01 hours**)

At the end of the 13th week of the semester

The sum of three tests, two assignments, and quiz/seminar/group discussion will be out of 100 marks and will be **scaled down to 50 marks**

(to have less stressed CIE, the portion of the syllabus should not be common /repeated for any of the methods of the CIE. Each method of CIE should have a different syllabus portion of the course).

CIE methods /question paper is designed to attain the different levels of Bloom's taxonomy as per the outcome defined for the course.

Semester End Examination:

Theory SEE will be conducted by University as per the scheduled timetable, with common question papers for the subject (**duration 03 hours)**

The question paper will have ten questions. Each question is set for 20 marks.

There will be 2 questions from each module. Each of the two questions under a module (with a maximum of 3 sub-questions), **should have a mix of topics** under that module.

The students have to answer 5 full questions, selecting one full question from each module.

Theory paper will be out of 100 marks and will be **scaled down to 50 marks.**

Suggested Learning Resources:

Books:

1. Bannister Fletcher , "History of Architecture", CBS Publishers, 1992
2. Henri Stierlin, "Architecture of the world - Greece", Herron Books 1994
3. Henri Stierlin, "Architecture of the world - The Roman Empire", Taschen Pub., 1997 .
4. Henri Stierlin , "Architecture of the world - Romanesque", Taschen Pub., 2008.
5. James Stevens Curl," Classical Architecture", W. W. Norton & Company; Reissue edition, 2003.

Robert Adam, " Classical Architecture", Harry N. Abrams; 1st edition, 1991

Web links and Video Lectures (e-Resources):

- https://ndl.iitkgp.ac.in
- https://www.youtube.com/watch?v=6bDrYTXQLu8
- https://www.youtube.com/watch?v=yGPevxwITBE
- https://www.youtube.com/watch?v=M8adUsbspfw

Activity Based Learning (Suggested Activities in Class)/ Practical Based learning

1) Sketching of the historical buildings from a Book
2) Group or Individual seminar on a building
3) Quizzes, debates on a selected topic

IV Semester

Building Services -II (Electrical Services and Illumination)			
Course Code	**21ARC44**	CIE Marks	50
Teaching Hours/Week (L:T:P: S)	3:0:0:0	SEE Marks	50
Total Hours of Pedagogy	40	Total Marks	100
Credits	03	Exam Hours	3

Course objectives:

: *To introduce students to electrical services and illumination and to sensitize them with respect to their integration into Architectural Design.*
To introduce students to the green building councils of India and codes (BEE, GRIHA, IGBC).
To sensitize students about the energy consumption and carbon emissions of different electrical equipment, technologies and lighting.
To address energy requirements in different socio-economic sections of the society.
Introduction and study of renewable energy systems.

Teaching-Learning Process (General Instructions)

These are sample Strategies, which teacher can use to accelerate the attainment of the various course outcomes.

1. Use of theory, activities, sketches, drawings, assignment and tutorial for teaching.
2. Evaluation by quiz, tests, classroom activities.

Module-1

Electrical Services - Electricity Generation; Transmission and Distribution

1. **Introduction to Electrical Services**: Introduction to commonly used terminology – Voltage, Current, Power, Connected Load, Max. Demand, Load Factors, Diversity Factor Etc.; Importance of Electrical Services and Its implications on building design; Introduction to Codes and Standards like National Building Code, National Electric Code (including Renewable/Clean energy/ Green Building codes), IS Codes, State Electricity Board and Chief Electrical Inspectorate Guidelines
2. **Supply and distribution of electricity to buildings:** Brief introduction to various Sources for Electricity generation. Introduction to Transmission and Distribution system (from generation to Building's main) - Cables–HT/LT, Voltage Levels, Sub-Stations, Ring Main Units, Metering Panels, HT Panel, Transformers.
3. **Green Power Generation and minimising ecological imbalance through sustainable Green technologies for the safety of people.**

Teaching-Learning Process	1) The teacher can use PPTs, Videos to discuss Electrical services in a buildings,.

	2) The students can visit an electrical substation to understand electrical distribution in an area with details. 3) Quizzes, models, seminars from students can be encouraged.

Module-2

Electrical Services - Internal Electrical distribution systems and Renewable Energy Systems

4. **Residential Building internal electrical distribution system & Commercial Building internal electrical distribution system:** Power Requirement, Incoming Power Source Voltage, RMU, Transformers, HT Metering & Sub Metering Panels, LT Panels, Rising Mains, Sub-Mains, Circuit-Mains, Generators, UPS requirements, Server power requirements, Point Wiring, Point Matrix, Utility Loads, Wiring Systems, Wiring Installation systems, sustainable (solar/wind powered) electrical generation and distribution systems in high rise buildings (Activity 1, 2 and 3)
5. **Introduction to Renewable Energy Systems (On-Site and Off-Site)**: Understanding the primary importance of thermal load reduction (i.e. reducing artificial cooling and heating energy needs in buildings) as a prerequisite for Net Zero Energy Building Design. Solar, Wind, Bio-Mass, Achieving Net Zero Building Design through utilization of above natural resources; Energy Conservation techniques in Electrical systems. (Activity 4)

Teaching-Learning Process	1) The teacher can use PPTs, Videos to discuss Electrical services in a building. 2) The students need to draw an electrical layout of a building with details. 3) Quizzes, models, seminars from students can be encouraged.

Module-3

Electrical Services - Protection Systems

6. **Switchgear & Protection Devices – Fuses, Breakers:** Miniature Circuit Breakers; Earth

   Leakage Circuit Breakers; Moulded Case Circuit Breakers & Air Circuit Breakers and Protection Relays.
7. **Earthing& Lightning Protection System:** Definition, Purpose; Types of Earthing Systems, Factors affecting selection and system specification - Type of Soil, water table, soil resistivity etc. Brief about new advances in earthing systems; Lightning system design - Factors affecting the system specification, basic rules as per NBC and other relevant codes.

Teaching-Learning Process	1) The teacher can use PPTs, Videos to discuss Electrical systems in buildings. 2) The students to sketch the protection systems employed in a building. 3) Quizzes, models, seminars from students can be encouraged.

Module-4

ILLUMINATION

8. **Fundamentals:** Quality & Quantity of Lighting; Recommended Lux Levels; Type of Lamps – Incandescent, Discharge Lamps, Fluorescent, CFL, LED and OLED. Integration of Day lighting with Artificial Lighting, Control Systems, Laws of illumination, high energy and low energy (sustainable) lighting.
9. **Techniques, Principles and Applications:** Lighting Methods - Ambient, Task & Accent lighting; Systems of Luminaries - Up-Lighting, Down-Lighting, Spot Lighting etc.; Street Lighting, Façade Lighting, Landscape Lighting, Architectural Typologies; Preparation of Lighting Layout.

Teaching-Learning Process	1) The teacher can use PPTs, Videos to discuss Illumination services in buildings. 2) The students to sketch the illumination systems employed in a building. 3) Quizzes, models, seminars from students can be encouraged.

Module-5

EXTRA LOW VOLTAGE SYSTEMS AND LOAD ESTIMATION

10. **Extra Low Voltage systems:** Telephone; Data & Cable TV Networking; Service provider requirements; Point matrix for Individual residential / Apartment.
11. **Electrical Layout Design and Load Estimation**: Residential Electrical Layout Design (using symbols as per IS codes), Compliance to local building codes; and Electrical Load Calculations.

Teaching-Learning Process	**Case studies:** Typical Layouts & Layout Generation for Lighting, Transformers Yards, Generator Rooms, Lighting layouts for shops/clinic. **Site Visits**: Sub-Stations, Transformer Yards, Generator Yards and Panel Rooms etc. of Multi- storied Residential Buildings/Campus, Hotels, Hospital & IT Buildings etc. (Activity 5)

Course outcome (Course Skill Set)

1) The students will be able to learn the importance of electrical services in a building.
2) The students will be able to appreciate the importance of electrical services in buildings.
3) The students will be able to do the service drawings and coordinate with electrical consultant's services in buildings.

Assessment Details (both CIE and SEE)

The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%. The minimum passing mark for the CIE is 50% of the maximum marks (25 marks). A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to each subject/ course if the student secures not less than 40% (20 Marks out of 50)in the semester-end examination(SEE), and a minimum of 50% (50 marks out of 100) in the CIE (Continuous Internal Evaluation) and a minimum of 50% (50 marks out of 100) in the sum total of the CIE (Continuous Internal Evaluation) and SEE (Semester End Examination) taken together. Based on this grading will be awarded.

Continuous Internal Evaluation:

Three Unit Tests each of **20 Marks (duration 01 hour**)

First test at the end of 5th week of the semester
Second test at the end of the 10th week of the semester
Third test at the end of the 15th week of the semester

Two assignments each of **10 Marks**

First assignment at the end of 4th week of the semester
Second assignment at the end of 9th week of the semester

Group discussion/Seminar/quiz any one of three suitably planned to attain the COs and POs for **20 Marks** (**duration 01 hours**)

At the end of the 13th week of the semester

The sum of three tests, two assignments, and quiz/seminar/group discussion will be out of 100 marks and will be **scaled down to 50 marks**

(to have less stressed CIE, the portion of the syllabus should not be common /repeated for any of the methods of the CIE. Each method of CIE should have a different syllabus portion of the course).

CIE methods /question paper is designed to attain the different levels of Bloom's taxonomy as per the outcome defined for the course.

Semester End Examination:

Theory SEE will be conducted by University as per the scheduled timetable, with common question papers for the subject (**duration 03 hours)**

9. The question paper will have ten questions. Each question is set for 20 marks.
10. There will be 2 questions from each module. Each of the two questions under a module (with a maximum of 3 sub-questions), **should have a mix of topics** under that module.

The students have to answer 5 full questions, selecting one full question from each module.

Theory paper will be out of 100 marks and will be **scaled down to 50 marks.**

Suggested Learning Resources:

Books

1. L.Uppal ; Electrical Wiring, Estimating & Costing.
2. Aly. S. Dadras (1995), Electrical Systems for Architects by N.G.A.R.B. McGraw-Hill.
3. Anwari ; Basic Electrical Engineering.
4. National electric Code, Indian Electricity Rules 1956, Energy Conservation and Building Code.
4. Handbook of Lighting Design by RuedigerGanslandt, Harald Hofmann; ERCO Edition
5. Fundamentals of Lighting by Susan M. Winchip.
6. National Building Code, 2016 – Part 8 (Section 1, 2, 6).

7. Code of Practice for Interior Illumination (IS 3646-1 (1992); Indian Standard - BIS.

Web links and Video Lectures (e-Resources):

- https://ndl.iitkgp.ac.in
- https://www.youtube.com/watch?v=8DEap6exAB0
- https://www.youtube.com/watch?v=qY_VzvksNa8
- https://www.youtube.com/watch?v=ofWq03WPeK0
- https://www.youtube.com/watch?v=IebflvdLVvM
- https://www.youtube.com/watch?v=5cr71HlSw6k

Activity Based Learning (Suggested Activities in Class)/ Practical Based learning

Activity 1: Energy Audit of Own Shelter using electricity bill**,** Students will get an idea about the most energy intensive devices in their homes, and how they can reduce energy consumption from these devices.

Activity 2: Calculate the EPI (energy performance index) of college building. Students will be able to compare the energy performance of the college building with the EPI benchmark set by the Bureau of Energy Efficiency (BEE) for institutes.

Activity 3 - study and comparison of solar powered and fossil fuel powered residential and commercial building

Activity 4 - Study the current landscape and government programs and 2030 climate targets in the context of clean or renewable energy. Critically, analyze the effect of India's solar plans.

Activity 5 - Energy calculation of a residential complex vs. informal settlement vs. mall, draw comparisons and the narrative of inequitable energy consumption and climate injustice

IV Semester

Building Structure -III			
Course Code	**21ARC45**	CIE Marks	50
Teaching Hours/Week (L:T:P: S)	3:0:0:0	SEE Marks(Viva)	50
Total Hours of Pedagogy	40	Total Marks	100
Credits	03	Exam Hours	----

Course objectives:

1) *To understand the fundamental principles and structural behaviour of concrete buildings in withstanding gravity, lateral (seismic and wind), and other environmental forces.*
2) *To understand the mechanics of reinforced concrete, and the ability to design and proportion structural concrete members including slabs, beams, and columns.*

Teaching-Learning Process (General Instructions)

These are sample Strategies, which teacher can use to accelerate the attainment of the various course outcomes.

1) The teacher can use PPTs, Videos to discuss Reinforced Cement Concrete and its application in buildings.
2) The students need to sketch various RCC components in a simple on building
3) Quizzes, models, seminars from students can be encouraged.

Module-1

1) Introduction to Reinforced Cement Concrete.
2) Properties of materials - with emphasis on cement, fine aggregates, coarse aggregates, admixtures

Teaching-Learning Process	1) The teacher can use PPTs, Videos to discuss Reinforced Cement Concrete and its application in buildings. 2) The students need to visit sites and Concrete lab to understand the properties of RCC mix design. 3) Quizzes, models, seminars from students can be encouraged.

Module-2

3) Mechanics of Reinforced Cement Concrete
4) Loads on the structure as per IS 875
5) Concrete structural system design

Teaching-Learning Process	1) The teacher can use PPTs, Videos to discuss mechanics of Reinforced Cement Concrete. 2) The students need to visit sites and Concrete lab to understand the properties of RCC mix design. 3) Quizzes, models, seminars from students can be encouraged.

Module-3

6) Design of one way continuous slab - as per IS 456[using the BM coefficients given in IS 456]
7) Design of singly reinforced continuous beam as per IS 456 (using the BM & SF coefficient given in IS 456).

Teaching-Learning Process	1) The teacher can use PPTs, Videos to discuss application of Reinforced Cement Concrete for slabs and Beams. 2) The students to design slabs and Beams in class using IS 456 codes 3) Quizzes, models, seminars from students can be encouraged.

Module-4

8) Design of Tee beam as per IS 456 - using limit state philosophy.
9) Design of staircase as per IS 456 - using limit state philosophy.

Teaching-Learning Process	1) The teacher can use PPTs, Videos to discuss application of Reinforced Cement Concrete for slabs and Beams. 2) The students to design Tee Beams and staircases in class using IS 456 codes 3) Quizzes, models, seminars from students can be encouraged.

Module-5

10) Design of Axially loaded short columns.
11) Design of isolated column footing.
12) Data given drawing for different cases viz.
    a. Singly reinforced beam
    b. Doubly reinforced beam
    c. One way slab
    d. Two way slab - for at least 2 cases
    e. Staircase detailing (dog legged staircase)
    f. Cantilever slab.

Teaching-Learning Process	1) The teacher can use PPTs, Videos to discuss application of Reinforced Cement Concrete for columns and footings. 2) The students to design Columns and footings in class using IS 456 codes 3) Quizzes, models, seminars from students can be encouraged.

Course outcome (Course Skill Set)

1) The students will be able to learn the importance of R C C in a building.
2) The students will be able to analyse the forces acting in structural system in buildings.
3) The students will be able to understand the IS Codes and expect the structural drawings for buildings are complied with the codes.

Assessment Details (both CIE and SEE)

The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%. The minimum passing mark for the CIE is 50% of the maximum marks (25 marks). A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to each subject/ course if the student secures not less than 40% (20 Marks out of 50)in the semester-end examination(SEE), and a minimum of 50% (50 marks out of 100) in the CIE (Continuous Internal Evaluation) and a minimum of 50% (50 marks out of 100) in the sum total of the CIE (Continuous Internal Evaluation) and SEE (Semester End Examination) taken together. Based on this grading will be awarded.

Continuous Internal Evaluation:

Three Unit Tests each of **20 Marks (duration 01 hour**)

First test at the end of 5th week of the semester

Second test at the end of the 10th week of the semester

Third test at the end of the 15th week of the semester

Two assignments each of **10 Marks**

First assignment at the end of 4th week of the semester

Second assignment at the end of 9th week of the semester

Group discussion/Seminar/quiz any one of three suitably planned to attain the COs and POs for **20 Marks** (**duration 01 hours**)

At the end of the 13th week of the semester

The sum of three tests, two assignments, and quiz/seminar/group discussion will be out of 100 marks and will be **scaled down to 50 marks**

(to have less stressed CIE, the portion of the syllabus should not be common /repeated for any of the methods of the CIE. Each method of CIE should have a different syllabus portion of the course).

CIE methods /question paper is designed to attain the different levels of Bloom's taxonomy as per the outcome defined for the course.

Semester End Examination:

1. The student needs to submit his/her works done throughout the semester, including rough sheets for the Viva examination, at least one day prior to the Viva work examination to the course teacher/coordinator.
   1. The Viva-voce will be evaluated by an external teacher appointed by the University along with Course teacher or an internal examiner.
   2. The SEE marks list generated is to be signed by both internal and external examiners and submitted to VTU in the sealed cover through the Principal of the institution.

Suggested Learning Resources:

Books

1) Dr. S. Ramamrutham, "Design of Reinforced Concrete Structures", DhanpatRaiPublishing Co Pvt Ltd, January 2010.
2) Dr.H.J.Shah, "Reinforced Concrete Vol 1 (Elementary Reinforced Concrete)", Charotar Publishing House Pvt. Ltd.; 11th Edition edition (2016)
3) Dr.S.S. Bhavikatti, "Design Of R.C.C. Structural Elements", Volume1., New Age International, 2007
4) IS 456-2000 Plain and Reinforced Concrete - Code of Practice
5) SP 34 (1987): Handbook on Concrete Reinforcement and Detailing

Web links and Video Lectures (e-Resources):

• https://ndl.iitkgp.ac.in • https://www.youtube.com/watch?v=HLj5xhvAh1s • https://www.youtube.com/watch?v=M7Q3Jaqqdt4 • https://www.youtube.com/watch?v=tyHfmrOO_fk •
Activity Based Learning (Suggested Activities in Class)/ Practical Based learning 1) Visit to a construction site to evaluate Various RCC components in a building. 2) Seminar by students in groups on their learnings.

IV Semester

Constitution of India & Professional Ethics			
Course Code	**21CIP46**	CIE Marks	50
Teaching Hours/Week (L:T:P: S)	1:1:0:0	SEE Marks	50
Total Hours of Pedagogy	25	Total Marks	100
Credits	01	Exam Hours	1

Course objectives:

- To know the fundamental political structure & codes, procedures, powers, and duties of Indian government institutions, fundamental rights, directive principles, and the duties of citizens.
- To understand engineering ethics and their responsibilities, identify their individual roles and ethical responsibilities towards society.

Teaching-Learning Process (General Instructions)
These are sample Strategies, which teacher can use to accelerate the attainment of the various course outcomes.

Teachers shall adopt suitable pedagogy for effective teaching - learning process. The pedagogy shall involve the combination of different methodologies which suit modern technological tools and software's to meet the present requirements of the Global employment market.

(i) Direct instructional method (Low /Old Technology),
(ii) Flipped classrooms (High/advanced Technological tools),
(iii) Blended learning (combination of both),
(iv) Enquiry and evaluation based learning,
(v) Personalized learning,
(vi) Problems based learning through discussion,
(vii) Following the method of expeditionary learning Tools and techniques,
1. Apart from conventional lecture methods, various types of innovative teaching techniques through videos, animation films may be adapted so that the delivered lesson can enhance the students in theoretical applied and practical skills in teaching of 21CIP39/49 in general.

Module-1

Introduction to Indian Constitution: Definition of Constitution, Necessity of the Constitution, Societies before and after the Constitution adoption. Introduction to the Indian constitution, Making of the Constitution, Role of the Constituent Assembly. Preamble of Indian Constitution & Key concepts of the Preamble. Salient features of India Constitution.

Teaching-Learning Process	Chalk and talk method, Videos, Power Point presentation to teach. Creating real time stations in classroom discussions, Giving activities and assignments (Connecting Campus & community with administration real time situations).

Module-2

Fundamental Rights (FR's), Directive Principles of State Policy (DPSP's) and Fundamental Duties (FD's) : Fundamental Rights and its Restriction and limitations in different Complex Situations. DPSP's and its present relevance in Indian society. Fundamental Duties and its Scope and significance in Nation building.

Teaching-Learning Process	Chalk and talk method, Videos, Power Point presentation to teach. Creating real time stations in classroom discussions, Giving activities and assignments (Connecting Campus & community with administration real time situations).

Module-3

Union Executive: Parliamentary System, Union Executive – President, Prime Minister, Union Cabinet, Parliament - LS and RS, Parliamentary Committees, Important Parliamentary Terminologies. Supreme Court of India, Judicial Reviews and Judicial Activism.	
Teaching-Learning Process	Chalk and talk method, Videos, Power Point presentation to teach. Creating real time stations in classroom discussions, Giving activities and assignments (Connecting Campus & community with administration real time situations).
Module-4	
State Executive & Elections, Amendments and Emergency Provisions: State Executive, Election Commission, Elections & Electoral Process. Amendment to Constitution (Why and How) and Important Constitutional Amendments till today. Emergency Provisions.	
Teaching-Learning Process	Chalk and talk method, Videos, Power Point presentation to teach. Creating real time stations in classroom discussions, Giving activities and assignments (Connecting Campus & community with administration real time situations).
Module-5	
Professional Ethics: Definition of Ethics & Values. Professional & Engineering Ethics. Positive and Negative aspects of Engineering Ethics. Clash of Ethics, Conflicts of Interest. The impediments to Responsibility. Professional Risks, Professional Safety and liability in Engineering. Trust & Reliability in Engineering, Intellectual Property Rights (IPR's).	
Teaching-Learning Process	Chalk and talk method, Videos, Power Point presentation to teach. Creating real time stations in classroom discussions, Giving activities and assignments (Connecting Campus & community with administration real time situations).
Course outcome (Course Skill Set) At the end of the course the student should : CO 1: Have constitutional knowledge and legal literacy. CO 2: Understand the profession and Professional ethics and responsibilities of an Architect/Engineer / Management person.	

Assessment Details (both CIE and SEE)

The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%. The minimum passing mark for the CIE is 50% of the maximum marks (25 marks). A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to each subject/ course if the student secures not less than 40% (20 Marks out of 50)in the semester-end examination(SEE), and a minimum of 50% (50 marks out of 100) in the CIE (Continuous Internal Evaluation) and a minimum of 50% (50 marks out of 100) in the sum total of the CIE (Continuous Internal Evaluation) and SEE (Semester End Examination) taken together. Based on this grading will be awarded.

Continuous Internal Evaluation:

Three Unit Tests each of 20 Marks (duration 01 hour)

First test at the end of 5th week of the semester

Second test at the end of the 10th week of the semester

Third test at the end of the 15th week of the semester

Two assignments each of 10 Marks

First assignment at the end of 4th week of the semester

Second assignment at the end of 9th week of the semester

Group discussion/Seminar/quiz any one of three suitably planned to attain the COs and POs for 20 Marks **(duration 01 hours)**

At the end of the 13th week of the semester

The sum of three tests, two assignments, and quiz/seminar/group discussion will be out of 100 marks and will be **scaled down to 50 marks**

CIE methods /question paper is designed to attain the different levels of Bloom's taxonomy as per the outcome defined for the course.

Semester End Examination:

SEE will be conducted by University as per the scheduled timetable, with common question papers for the subject.

- The question paper will have 50 questions. Each question is set for 01 mark.
- SEE Pattern will be in MCQ Model (Multiple Choice Questions) for 50 marks. Duration of the examination is 01 Hour.

Suggested Learning Resources:
Books

"Constitution of India & Professional Ethics" Published by Prasaranga or published on VTU website with the consent of the university authorities VTU Belagavi.

Web links and Video Lectures (e-Resources):

- https://www.youtube.com/watch?v=sDstf8ockUo
- https://www.youtube.com/watch?v=vq2Q1_v6TNU
- https://www.youtube.com/watch?v=F3vdNGFG0LI&list=PLG_pOUNcDW47N8PwD380xECTQtG3hTzJu
- https://www.youtube.com/watch?v=uH8GqBB-rLQ
- https://www.youtube.com/watch?v=3PsH0-mfWzQ

Activity Based Learning (Suggested Activities in Class)/ Practical Based learning

1) Group discussions, Seminars, Quizzes in class room.

IV Semester

Computer Application in Architecture -I			
Course Code	21ARC47	CIE Marks	100
Teaching Hours/Week (L:T:P: S)	0:0:0:4	SEE Marks	--
Total Hours of Pedagogy	50	Total Marks	100
Credits	04	Exam Hours	-

Course objectives:

To develop and train students to use computers and digital media as tools to explore, develop, evaluate and present architectural ideas. To equip the student with a range of digital tools and techniques in 2D drafting, 3D modelling, and vector graphics.

Teaching-Learning Process (General Instructions)

These are sample Strategies, which teacher can use to accelerate the attainment of the various course outcomes.

1) The teacher can use PPTs, Videos to discuss commands, tools and other application in making a drawing.
2) The students need to practice the commands and tools in a simple building drawing.
3) Quizzes, virtual models, seminars from students can be encouraged.

Module-1

1. Introduction to 2D drafting software: Using latest version of relevant CAD software:

a. 2D commands, viewports, dimensions, annotations. Time problem introduction;

Classroom exercises such as measured drawing of studio (windows, doors and staircases included), architecture School (windows, doors and staircases included) etc.

b. Understanding layers, paper space Vs model space, line weights, print set up and Modelling of Walls, Doors, Windows, Stairs etc.

2. 2D drafting: Presentation of time problem; plan, sections, elevations of a floor of a single storied building of II / III semester architectural design studio project.

Teaching-Learning Process	1) The teacher can use PPTs, Videos to discuss commands, tools and other application in making a drawing.

	2) The students need to practice the commands and tools in a simple building drawing. 3) Practice the use of layers in a drawing.
Module-2	
3. Introduction to 3D modelling: Latest version of relevant 3D modelling software – software interface, demonstration of 3D modelling commands required to convert 2D project (of 2D drafting) into 3D as a time-problem. 4. Simple 3D modelling: Presentation of time problem; drawing quickly with basic shapes in 3D, viewing models in 3D, adding detail to Models in 3D space, use of cameras, material applications. Presenting models.	
Teaching-Learning Process	1) The teacher can use PPTs, Videos to discuss commands, tools and other application in making a 3D drawing. 2) The students need to practice the 3D commands and tools in a simple building drawing. 3) Practice the use of 3D modelling in a drawing.
Module-3	
5. Rendering & Visualization: Presentation of time problem, generating 3D Model and introduction to concepts of visualization using rendering engines such as V-Ray. Flamingo, 3D studio Max or any other appropriate software. 6. Introduction to concepts of **Building Information Modelling** (BIM) using REVIT or other relevant BIM software.	
Teaching-Learning Process	1) The teacher can use PPTs, Videos to discuss rendering tools and other application in visualization. 2) The students need to practice the rendering software in a simple building drawing. 3) Practice the use of 3D modelling with rendering in a drawing.
Module-4	
7. Introduction to graphics editing tools: a. Introduction to appropriate techniques to model walls, insert fenestration, curtain walls & staircases. b. Lecture and Classroom exercise to convert into BIM project, relationship of other Industry standard file types (.dwg for AutoCAD or Trimble Sketch up input files or from any other relevant software.). c. Lecture and Classroom exercise to further utilize rendering and visualization	

Teaching-Learning Process	1) The teacher can use PPTs, Videos to discuss graphics editing tools and other application in visualization. 2) The students need to practice the BIM software in a simple building drawing. 3) Practice the use of various applications in BIM software in a project work.

Module-5

8. a. Concepts of image scanning, image editing, effects and filters.
   b. Classroom exercise to demonstrate use of Image editing for simple architecture design project projects. For e.g., rendering of 2D drawings, adding nature to 3D visualizations.

9. Graphics editing tools: – Presentation of any simple project to illustrate skills attained in 2D drafting, 3D modelling, graphics editing tool.

NOTE: A portfolio of exercises and assignments done in the class to be submitted for progressive marks.

Teaching-Learning Process	1) The teacher can use PPTs, Videos to discuss Image editing works. 2) The students need to practice the imaged editing in a simple building drawing. 3) Practice the use of various graphics editing tools in a project work.

Course outcome (Course Skill Set)

1) The students will be able to learn the computer aided drafting and designing.
2) The students will be able to use the learnings for their academic projects in higher classes.

Assessment Details (both CIE and SEE) `

(methods of CIE need to be defined topic wise i.e.- Studio/lab discussions, Reviews, Time problems, test, Seminar or micro project)

The weightage of Continuous Internal Evaluation (CIE) is 100% and there is no Semester End Exam (SEE) .The student has to obtain a minimum of 50% marks in CIE and is conducted for 100 marks. Based on the CIE marks grading will be awarded.

Continuous Internal Evaluation:

Methods suggested:

1. Studio discussions, Reviews, Time problems, CIE tests, Seminar or micro project,Quiz, report writing etc.
2. The class teacher has to decide the topic for the Design and Seminars if any, in the beginning only. The teacher has to announce the methods of CIE for the subject in advance in writing.

Semester End Examination:

1. There is no Semester End Exam (SEE) The CIE marks list generated is to be signed by the internal examiners and submitted to VTU as per the procedure through the Principal of the institution.

Suggested Learning Resources:

Books:

1. Website and training material of relevant Image/Graphics editing software
2. Learning resources on Building Information Management (BIM).
3. Vast amount of CAD learning resources available on the Internet.
4. Vast amount of learning resources for Graphics editing tools available on the Internet.

Web links and Video Lectures (e-Resources):
• https://ndl.iitkgp.ac.in • https://www.youtube.com/watch?v=p-qA3SlLDfA • https://www.youtube.com/watch?v=9j9ZAEXB3Z8 • https://www.youtube.com/watch?v=hO865EIE0p0 • https://www.youtube.com/watch?v=34AZCGIXToA
Activity Based Learning (Suggested Activities in Class)/ Practical Based learning 1. The students are encouraged to make a project of previous semester Architectural Design in to a computer aided drawings 2D & 3D with rendering and photo editing. 2. students are encouraged to use Building Energy Modelling Software and Sustainable Cooling System Modelling Tools (e.g. ISHRAE's Smart Energy Software) to enable students to estimate energy conservation and climate impact mitigation of their design projects through integration of passive design features such as insulation, shading, thermal mass, appropriate window-wall-ratios etc. and sustainable cooling systems (including direct and indirect evaporative cooling, radiant cooling, structure cooling) in the above project.

IV Semester

Elective-2			
Course Code	**21ARC48X**	CIE Marks	100
Teaching Hours/Week (L:T:P: S)	2:0:0:0	SEE Marks	--
Total Hours of Pedagogy	25	Total Marks	100
Credits	02	Exam Hours	----

Course objectives:

1) To gain experience in aspects of Architecture not offered in the regular curriculum.
2) To study particular areas of the curriculum in greater depth.
3) To explore career opportunities in the allied fields.

Teaching-Learning Process (General Instructions)

These are sample Strategies, which teacher can use to accelerate the attainment of the various course outcomes.

1) The teacher may use conventional method or an innovative method to deal with the subject.
2) The students need to work with hands on experiences to gain an expertise of the chosen field.
3) The teacher needs to use performance assessments to develop real life skills in the students.

a. ENVIRONMENT RESPONSIVE ARCHITECTURE

OBJECTIVE: *To develop awareness and familiarity with green design and its integration with Architectural design.*

OUTLINE:

1) **Introduction to Green Buildings**: Why make Buildings Green? Concept and necessity.
2) **Green Building Rating System**: The seven categories in the rating system : Sustainable Sites, Water Efficiency, Energy & Atmosphere, Materials & Resources,

Indoor Environmental Quality, Innovation in Design and Regional Priority.

3) **Introduction to a design exercise (Project application):** Design of a small building with an objective to integrate categories of green building rating.

4) **Sustainable Sites**: Site Specific Design; Development Density and Community Connectivity, Alternative Transportation, Site Development, Storm water Design and Heat Island Effect.

5) **Water Efficiency:** Innovative Wastewater Treatment and Reuse and Water Use Reduction and Re-use factors.

6) **Energy and Atmosphere**: Optimization of Energy Performance, On-site Renewable Energy, Enhanced Commissioning and Green Power. To apply the principles of Solar Passive Architecture to design of buildings.

7) **Materials and Resources**: Building Reuse: Maintain Existing Walls, Floors, and Roof, Construction Waste Management, Materials Reuse, Recycled Content, Regional Materials and Certified Wood.

8) **Indoor Environmental Quality**: Construction Indoor Air Quality Management Plan and Daylight and Views. Rating Systems: GRIHA and LEED Systems.

9) **Regional Priority**: To provide incentive for project teams to address geographically significant environmental local issues. Introduction to passive techniques of cooling such as evaporative cooling, earth tubing, wind scoops, roof ponds, shaded courtyards etc.

10) Review of a design project considering various factors listed above.

Activity Based Learning: Calculate the carbon footprint of material used in building a formal house and an informal house. Include the carbon footprint of functions/ operations of the respective houses. Reflect on the scores and analyze the reasons. Document how lifestyles of residents of formal and informal houses contribute to carbon footprint.

REFERENCES:

1. Steemers, Koen and Steane, Mary Ann. Environmental Diversity in Architecture, Spon Press, 2004.
2. McGlynn, Sue et al,. Responsive Environments, Architectural Press, 2008

b. PRODUCT DESIGN

OBJECTIVES:

1) *To introduce the students to the discipline of Product Design*
2) *To develop basic skills required in handling simple product design projects*

OUTLINE:

Preamble:

We live in a world of objects. Objects can have meanings, carry associations or be symbols of more abstract ideas. These objects are predominantly functional in nature, some are purely symbolic / decorative in nature and there are a few which combine both the functional with the symbolic and decorative.

Great Architecture has demonstrated this fusion of the functional with the symbolic through the ages. Product design, on a smaller scale, seeks to blend the technical with the aesthetic, the utilitarian with the emotional delight; the dialogue between what people need / want vs what people will buy / discard.

1. **Product design as a noun**: the set of properties of an artifact, consisting of the discrete properties of the form (i.e., the aesthetics of the tangible good and/or service) and the function (i.e., its capabilities) together with the holistic properties of the integrated form and function.
2. **Product design as a verb**: the process of creating a new product to be sold by a business to its customers. A very broad concept, it is essentially the efficient and effective generation and development of ideas through a process that leads to new products.
3. **Product design process**: from idea generation to commercialization; concept, development, detail; materiality, technicality, Imageability.
4. Relationship between Design, Technology and Product.
5. History of product design as a discipline, the various theories of design via study of design practices.
6. Mode and method of Design Process as applicable to product ideation and development.
7. Materials and manufacturing process and its influence on product ideation and development.
8. Influence of ergonomics on product ideation and development.
9. Impact of culture i.e. the aesthetics on product ideation and development, the dialogue between people's aspirations and people's needs.
10. Relationship and difference between craft based and mass manufactured products.
11. Market as a tool for product promotion.
12. Indian aesthetic sense and its influence on product ideation and development.
13. Influence of product design on other disciplines like automobile styling,

furniture, jewellery, toys, systems design, computer interfaces, etc.

Class assignments / exercises:

Short projects along with a time problem will be tackled in the class exploring the influences of design process, and ergonomics on the product ideation and development.

The student will also study the product changes that will occur through the choices made of materials, manufacturing process, and marketing techniques.

Discussions, video presentations, seminars and case studies will cover all the other topics

Activity Based Learning: Study a few houses in Informal settlements. Based on their requirements, design a multipurpose product or spatial resolution that can help informal household dwellers makes their small spaces more multi functional. (Could be an architectural system, furniture, modular low cost housing, etc.)

REFERENCES:

1. Alexander, Christopher ,Notes on the Synthesis of Form, Harvard University Press, 1964
2. Morris, R, The fundamentals of product design, AVA Publishing 2009

c. HERITAGE DOCUMENTATION

OBJECTIVE: *To understand the character of a settlement, street, building, spaces, materials through a process of measured drawings and photographic documentation.*

OUTLINE:

1. Introduction to Documentation

- Need for Documentation undertaken? Tools for Documentation available, Methodology, Importance of Archival research, Old Photographs, Maps etc

2. Site work

- Secondary information on the /street/heritage
- Reconnaissance survey of the /street/heritage building;
- Mapping of the street
- Identification of selected typology of structures for detailed measured drawing
- Recording of measurements- horizontal, vertical, measuring angles, marking center lines, datum, notations, building orientation
- Legend of materials used; Structural details and joineries

- Details of various elements – openings, ornamental details
- Mapping activities in various locations
- Supporting sketches
- Information on people, surroundings, climate, Access to site

3. **Preparation of Drawings**

- Developing drawings from the field data – Plans at various levels, Building floor plans, Reflected ceiling plans, roof plans, all elevations, relevant sections.
- Drawings of details such as openings, ornamental details, joineries

4. **Analysis:**

- Analysis as tools for understanding and interpreting the measured drawings
- Activity Based Learning: Documentation of an old Heritage structure (or any local informal settlement) redevelopment / up gradation/ rehabilitation program and the consequences on livelihoods, current informal architecture, increased vulnerabilities of the community, etc.

REFERENCES:

1) Building Craft Lab- DICRC, CEPT University

OPEN ELECTIVE:

The college has the discretion to offer an open elective in the areas/subject/fie other than already covered under the syllabus. The college can decide to offer need based electives depending on the availability of the expertise. However, the college will require to submit the title of such electives with the course outline stating learning objectives and mode of delivering the content to the Registrar/Registrar (evaluation) within the 15 days of the commencement of the semester.

Course outcome (Course Skill Set)

1) To develop desired knowledge and skill in a particular domain of Architecture
2) To develop an understanding of the processes required for the particular subject.
3) To develop an expertise in the chosen field for career enhancement.

Assessment Details (CIE)

(methods of CIE need to be defined topic wise i.e.- Studio/ Class room/Tutorial discussions, Reviews, Time problems, test, Seminar or micro project)

The weightage of Continuous Internal Evaluation (CIE) is 100% and there is no Semester End Exam (SEE) .The student has to obtain a minimum of 50% marks in CIE and is conducted for 100 marks. Based on the CIE marks grading will be awarded.

Continuous Internal Evaluation:

Methods suggested:

1. Studio discussions, Reviews, Time problems, CIE tests, Seminar or micro project, Quiz, report writing etc.
2. The class teacher has to decide the course of learning for the Elective subject, in the beginning only. The teacher has to announce the methods of CIE for the subject in advance in writing.

Semester End Examination:

1. There is no Semester End Exam (SEE) The CIE marks list generated is to be signed by the internal examiners and submitted to VTU as per the procedure through the Principal of the institution.

Web links and Video Lectures (e-Resources):

- https://ndl.iitkgp.ac.in
- https://www.youtube.com/watch?v=AU2wTudKmX8
- https://www.youtube.com/watch?v=n6rPyLZiqlE
- https://www.youtube.com/watch?v=KCcvnMb8vNY
- https://www.youtube.com/watch?v=I0dGT5uzWEU

Activity Based Learning (Suggested Activities in Class)/ Practical Based learning

1) Students need to explore and meet an expert to understand the subject in a greater depth.
2) Students need to work with hands on experiences to develop desired skills in the field.

IV Semester

Universal Human Values and Professional Ethics			
Course Code	**21UH49**	CIE Marks	50
Teaching Hours/Week (L:T:P: S)	0:2:0:0	SEE Marks	50
Total Hours of Pedagogy	25	Total Marks	100
Credits	01	Exam Hours	1

Course objectives:

This introductory course input is intended:

1. To help the students appreciate the essential complementarity between 'VALUES' and 'SKILLS' to ensure sustained happiness and prosperity which are the core aspirations of all human beings.
2. To facilitate the development of a Holistic perspective among students towards life and profession as well as towards happiness and prosperity based on a correct understanding of the Human reality and the rest of existence. Such a holistic perspective forms the basis of Universal Human Values and movement towards value-based living in a natural way.
3. To highlight plausible implications of such a Holistic understanding in terms of ethical human conduct, trustful and mutually fulfilling human behaviour and mutually enriching interaction with Nature.

This course is intended to provide a much-needed orientational input in value education to the young enquiring minds.

Teaching-Learning Process (General Instructions)

These are sample Strategies, which teacher can use to accelerate the attainment of the various course outcomes.

These are sample Strategies, which teacher can use to accelerate the attainment of the various course outcomes.

1. The methodology of this course is explorational and thus universally adaptable. It involves a systematic and rational study of the human being vis-à-vis the rest of existence.
2. The course is in the form of 20 lectures (discussions)
3. It is free from any dogma or value prescriptions.
4. It is a process of self-investigation and self-exploration, and not of giving sermons. Whatever is found as truth or reality is stated as a proposal and the students are facilitated to verify it in their own right, based on their Natural Acceptance and subsequent Experiential Validation – the whole existence is the lab and every activity is a source of reflection.
5. This process of self-exploration takes the form of a dialogue between the teacher and the students to begin with, and then to continue within the student in every activity, leading to continuous self-evolution.

6. This self-exploration also enables them to critically evaluate their pre-conditionings and present beliefs

Module-1

Right Understanding, Relationship and Physical Facility (Holistic Development and the Role of Education)

Understanding Value Education, Self-exploration as the Process for Value Education, Continuous Happiness and Prosperity – the Basic Human Aspirations, Happiness and Prosperity – Current Scenario, Method to Fulfil the Basic Human Aspirations

Teaching-Learning Process	Introduction to Value Education- Chalk and talk method, Discussion, Sharing of experiences, Live Examples and videos

Module-2

Harmony in the Human Being (4 hours)

Understanding Human being as the Co-existence of the Self and the Body, Distinguishing between the Needs of the Self and the Body, The Body as an Instrument of the Self, Understanding Harmony in the Self, Harmony of the Self with the Body, Programme to ensure self-regulation and Health

Teaching-Learning Process	Introduction to the concepts- Chalk and talk method, Discussion, Sharing of experiences, Live Examples and videos

Module-3

Harmony in the Family and Society (4hours) Harmony in the Family – the Basic Unit of Human Interaction, 'Trust' – the Foundational Value in Relationship, 'Respect' – as the Right Evaluation, Other Feelings, Justice in Human-to-Human Relationship, Understanding Harmony in the Society, Vision for the Universal Human Order	
Teaching-Learning Process	Introduction to the concepts- Chalk and talk method, Discussion, Sharing of experiences, Live Examples and videos
Module-4	
Harmony in the Nature/Existence (4 hours) Understanding Harmony in the Nature, Interconnectedness, self-regulation and Mutual Fulfilment among the Four Orders of Nature, Realizing Existence as Co-existence at All Levels, The Holistic Perception of Harmony in Existence	
Teaching-Learning Process	Introduction to the concepts- Chalk and talk method, Discussion, Sharing of experiences, Live Examples and videos
Module-5	
Implications of the Holistic Understanding – a Look at Professional Ethics (4 hours) Natural Acceptance of Human Values, Definitiveness of (Ethical) Human Conduct, A Basis for Humanistic Education, Humanistic Constitution and Universal Human Order, Competence in Professional Ethics, Holistic Technologies, Production Systems and Management Models-Typical Case Studies, Strategies for Transition towards Value-based Life and Profession	
Teaching-Learning Process	Introduction to the concepts- Chalk and talk method, Discussion, Sharing of experiences, Live Examples and videos

Course outcome (Course Skill Set)

By the end of the course, students are expected to become more aware of themselves, and their surroundings (family, society, nature); they would become more responsible in life, and in handling problems with sustainable solutions, while keeping human relationships and human nature in mind.

They would have better critical ability. They would also become sensitive to their commitment towards what they have understood (human values, human relationship and human society). It is hoped that they would be able to apply what they have learnt to their own self in different day-to-day settings in real life, at least a beginning would be made in this direction.

Therefore, the course and further follow up is expected to positively impact common graduate attributes like:

1. Holistic vision of life
2. Socially responsible behaviour
3. Environmentally responsible work
4. Ethical human conduct
5. Having Competence and Capabilities for Maintaining Health and Hygiene
6. Appreciation and aspiration for excellence (merit) and gratitude for all

Assessment Details (both CIE and SEE)

The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%. The minimum passing mark for the CIE is 50% of the maximum marks (25 marks). A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to each subject/ course if the student secures not less than 40% (20 Marks out of 50)in the semester-end examination(SEE), and a minimum of 50% (50 marks out of 100) in the sum total of the CIE (Continuous Internal Evaluation) and SEE (Semester End Examination) taken together.

Continuous Internal Evaluation:

Three Unit Tests each of 20 Marks (duration 01 hour)

First test at the end of 5th week of the semester

Second test at the end of the 10th week of the semester

Third test at the end of the 15th week of the semester

Two assignments each of 10 Marks

First assignment at the end of 4th week of the semester

Second assignment at the end of 9th week of the semester

Group discussion/Seminar/quiz any one of three suitably planned to attain the COs and POs for **20 Marks** (**duration 01 hours**)

At the end of the 13th week of the semester

The sum of three tests, two assignments, and quiz/seminar/group discussion will be out of 100 marks and will be **scaled down to 50 marks**

(to have less stressed CIE, the portion of the syllabus should not be common /repeated for any of the methods of the CIE. Each method of CIE should have a different syllabus portion of the course).

CIE methods /question paper is designed to attain the different levels of Bloom's taxonomy as per the outcome defined for the course.

Semester End Examination:

Theory SEE will be conducted by University as per the scheduled timetable, with multiple choice question papers for the subject (**duration 01 hour)**

Suggested Learning Resources:

Books

-READINGS:

Text Book and Teachers Manual

a. The Textbook

A Foundation Course in Human Values and Professional Ethics, R R Gaur, R Asthana, G P Bagaria, 2ndRevised Edition, Excel Books, New Delhi, 2019. ISBN 978-93-87034-47-1

b. The Teacher's Manual

Teachers" Manual for *A Foundation Course in Human Values and Professional Ethics*, R R Gaur, R Asthana, G

Reference Books

1. JeevanVidya: EkParichaya, A Nagaraj, JeevanVidyaPrakashan, Amarkantak, 1999.
2. Human Values, A.N. Tripathi, New Age Intl. Publishers, New Delhi, 2004.
3. The Story of Stuff (Book).
4. The Story of My Experiments with Truth - by Mohandas Karamchand Gandhi
5. Small is Beautiful - E. F Schumacher.
6. Slow is Beautiful - Cecile Andrews
7. Economy of Permanence - J C Kumarappa
8. Bharat Mein Angreji Raj – Pandit Sunderlal
9. Rediscovering India - by Dharampal

10. Hind Swaraj or Indian Home Rule - by Mohandas K. Gandhi
11. India Wins Freedom - Maulana Abdul Kalam Azad
12. Vivekananda - Romain Rolland (English)
13. Gandhi - Romain Rolland (English)
14. Sussan George, 1976, How the Other Half Dies, Penguin Press. Reprinted1986, 1991
15. Donella H. Meadows, Dennis L. Meadows, Jorgen Randers, William W.Behrens III, 1972, Limits to Growth –
Club of Rome's report, UniverseBooks.
16. ANagraj,1998,JeevanVidyaEkParichay,DivyaPathSansthan,Amarkantak.
17. PLDhar,RRGaur,1990,ScienceandHumanism,CommonwealthPublishers.
18. ANTripathy,2003,HumanValues,NewAgeInternationalPublishers.
19. SubhasPalekar, 2000, How to practice Natural Farming, Pracheen (Vaidik)KrishiTantraShodh,Amravati.
20. EGSeebauer&RobertL.Berry,2000,FundamentalsofEthicsforScientists&Engineers ,Oxford University Press
21. M Govindrajran, S Natrajan & V.S. Senthil Kumar, Engineering Ethics(including HumanValues),EasternEconomy Edition,PrenticeHallofIndia Ltd.
22. BPBanerjee,2005,Foundationsof EthicsandManagement,ExcelBooks.
23. B LBajpai,2004,Indian Ethosand Modern Management,New RoyalBookCo., Lucknow. Reprinted 2008.

Web links and Video Lectures (e-Resources):

1. Value Education websites, https://www.uhv.org.in/uhv-ii, http://uhv.ac.in, http://www.uptu.ac.in
2. **Story of Stuff, http://www.storyofstuff.com**
3. **Al Gore, An Inconvenient Truth, Paramount Classics, USA**
4. **Charlie Chaplin, Modern Times, United Artists, USA**
5. **IIT Delhi, Modern Technology – the Untold Story**
6. Gandhi A., Right Here Right Now, Cyclewala Productions
7. https://www.youtube.com/channel/UCQxWr5QB_eZUnwxSwxXEkQw
8. https://fdp-si.aicte-india.org/8dayUHV_download.php
9. https://www.youtube.com/watch?v=8ovkLRYXIjE
10. https://www.youtube.com/watch?v=OgdNx0X923I
11. https://www.youtube.com/watch?v=nGRcbRpvGoU
12. https://www.youtube.com/watch?v=sDxGXOgYEKM

Activity Based Learning (Suggested Activities in Class)/ Practical Based learning

1) Video watching on ethics topic to sensitise the students
2) Assignments, Group discussions
3) Participations in seminars, conferences on relevant topics for greater understanding of ethics and human values
5) Participation in Guest/expert lectures to sensitise the students.

V Semester

ARCHITECTURAL DESIGN - V			
Course Code	**21ARC51**	CIE Marks	100
Teaching Hours/Week (L:T:P: S)	0:0:8:0	SEE Marks(VIVA)	100
Total Hours of Pedagogy	95	Total Marks	200
Credits	8	Exam Hours	----

Course objectives:

1) *To understand the need for creating architecture as an envelope to system dependent program.*
2) *To understand the use of green technologies and materials developed in other fields as a precursor to creating architecture.*
3) *To identify and understand the role of sustainable systems and services in the design of buildings; significance of passive/natural cooling systems, material and construction techniques; climatic factors.*
4) *Introduction to development Regulations (building byelaws and rules); circulation networks (people, vehicular access), site planning.*
5) *To explore Computer Aided Design techniques to generate drawings and models to better understand envelopes and systems in architecture, including the impact of envelope design on building cooling energy needs.*
6) *To understand the (thematic) abstract, organic character of architecture (symbolism, aesthetics, identity) in the public domain; influence of environmental, socio-cultural, economic dimensions; user perception.*

OUTLINE:

(a) *Familiarize with the impact of technology, utilities, and regulations in shaping architecture*
(b) *Understand the various complex parameters to be considered while designing in the public domain*

Teaching-Learning Process (General Instructions)
These are sample Strategies, which teacher can use to accelerate the attainment of the various course outcomes.

1) The contents of the courses shall be taught in an application-oriented manner on a scientific and design basis. The course contents shall be taught and learned in lectures, seminars, labs or workshops, studio exercises and design projects, etc.
2) In-studio exercises the teachers shall take the lead to provide tasks and offer guidance for solutions finding. The students shall work either individually or in groups.
3) In design studios, the students contribute to the processing, analysis and solving of problems of direct professional practice, attended by faculty(s) entitled to conduct the studio and examine. The results shall be defended through drawings; models and reports and evaluated through periodic assessment and finally by a jury or panel, and finally, evaluated through periodic assessment and an end semester examination or viva voce.

MODE OF STUDY*:* 3 component approach to the Design Studio:

A. **Literature review and case studies:** Learning from detailed study and analysis of building systems and envelopes (and understanding the underlying building

physics of systems and envelopes) ; character of public buildings through literature review and visiting buildings in varied settings (urban, contemporary, permanent and temporary).

B. **Seminars:** Seminars are intended to review parallel academic studies completed up to and during 5th semester studies in Building Construction/ Structures/ history/ computer graphics, climatology/services and its importance and integration with the studio.

C. **Design Projects:** Studio projects shall emphasize the non-linear **interdisciplinary design process** encountered in Architectural design and the importance of other fields of knowledge in Architectural Design. The Design Studio will give prominence to bridging the gap between innovations in materials and techniques of construction. An essential part of the studio process should be peer reviews and reviews by consultants in the field of Structures, Utilities and Services.

D. The Design studio will also give importance to include and encourage the use of passive design features, natural cooling systems, sustainable active cooling system using natural and low global warming potential refrigerants, vernacular, local, and low embodied energy/carbon materials and sustainable water, waste management systems.

Assignment-1: Case Study

1. Detailed review of each of the building types: retail/hospitality/transport/traditional informal market. Students are split into four groups; each group assigned to perform a case study of one building type. Short study trips to observe, discuss and document building types: retail/hospitality/transport/markets, building projects in the vicinity of their colleges.
2. The emphasis should be on conceptual understanding and accurate measured drawing.
3. Attention should be given to Structures, Utilities and Services and Sustainable and Passive energy systems.
4. Sketches and documentation should show observations and inferences from the studies.

Assignment-2: Seminars

1. Overview by a PHE, MECH/Elec., HVAC (including sustainable HVAC technologies including radiant cooling, direct evaporative and indirect evaporative cooling, structure cooling, vapour absorption cooling and natural refrigerant air conditioning), fire fighting, storm water, water recycling, waste and solar consultant on what to expect and practical rules of thumb to help students plan.
2. Overview by a Structural consultant on large span structural systems in parallel academic studies of 5th semester in Materials and Methods in Building Construction

– V and Building Structures -IV.

3. Discussion on innovations in green sustainable materials and techniques of construction and passive energy systems.

Assignment-3: Projects

One major project and one minor/time problem to be tackled in the semester. Projects shall be of urban scale with multiple functions and a need for imagery as one of the architectural goals. It encompasses response to the local context, locally adapted passive design features and cooling systems, natural cooling systems, materials and sustainable architectural design and systems (Activity 1). Museums, art galleries, theme-based hotels, transport interchanges, terminals and shopping, Industrial structures areas can be chosen.

Project work could be done in 3 stages of activity interspersed with seminars.

1) Introduction to the initial design parameters which include choice of;

    a. *Geography/situation (context),*
    b. *User Group/development model,*
    c. *Development guidelines (byelaws).*

2) Approaches and strategies to address issues of community, public and private realms, edge conditions, communication and connectivity. This could result in the generation of diagrams/models exploring attitudes to site, allocation of built and unbuilt volumes and communication and connectivity.

3) The design shall be sensitive to the needs of disabled, aged people and children.

4) The design shall also be sensitive to existing social and economic systems at the site for e.g. existing informal settlements, markets, land usage patterns, etc. The design should consider the existing site complexes and issues and inclusive of the same.

5) The student shall consider appropriate application of passive design principles (ventilation, insulation, shading, thermal mass etc.), passive, natural and sustainable cooling systems along with sustainable active cooling systems.

It is recommended that site sizes should not be larger than 1 acre to allow for intensive study. However the Design studio faculty shall determine the extent of the site size.

Projects shall be of urban scale with multiple functions; identity of public building (aesthetics, symbolic character, meaning, and environmental response) will be one of the architectural goals. Museums, art galleries, theme- based hotels, transport interchanges, terminals, shopping areas, informal markets can be chosen. Design emphasis shall be on the use of innovations in green materials and techniques of construction. Concurrently or sequentially, another project shall be attempted with utilities and service dominant buildings with a focus on sustainable systems like pharmaceutical manufacturing units or medical facilities or traditional skill based workshops or communities e.g., weaving, potter community, waste picker community, etc.. Consultants in the field of utilities and services shall be called as part of studio review.

Alternatively projects involving large span structures like industrial structures may be attempted. Design emphasis shall be on the skins and support of structural systems and resulting architectural form, space and experience.

NOTE:

- One major project and one minor/ time problem to be tackled in the semester.
- Detailing of architectural features of the major project like entrance lobby, skylights and staircases has to be attempted.
- Submission shall comprise duly drawn/drafted site plans, elevations, section views, models etc.

SHAPE OF THINGS TO COME – 6TH SEMESTER

This studio should equip a student to tackle the 6th Semester program like Institutional projects of higher learning, vocational training or a small-scale campus.

Teaching-Learning Process	Discussions, presentations, and case studies will cover three typologies. The portfolio covering all the assignments shall be presented for term work.

Course outcome (Course Skill Set)

the student will be able to:

- Get an introduction into the field of Architectural Design with respect to sustainable Design solutions.
- Make responsible choices for design development.
- Get a perspective on design of multi functional spaces in formal and informal settlements.

Assessment Details (both CIE and SEE)

(methods of CIE need to be defined topic wise i.e.- Studio discussions, Reviews, Time problems, test, Seminar or micro project)

The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%. The student has to obtain a minimum of 50% marks individually both in CIE and 40 % marks in SEE to pass. Semester End Exam (SEE) is conducted for 100 marks (Viva-voce) and a minimum of 50% (50 marks out of 100) in the sum total of the CIE (Continuous Internal Evaluation) and SEE (Semester End Examination) taken together. Based on this grading will be awarded.

Continuous Internal Evaluation:

Methods suggested:

1. Studio discussions, Reviews, Time problems, CIE tests, Seminar or micro project, Quiz, report writing etc.
2. The class teacher has to decide the topic for the Design and Seminars if any, in the beginning only. The teacher has to announce the methods of CIE for the subject in advance in writing.

Semester End Examination:

- The student needs to submit his/her works done throughout the semester, including rough sheets for the Viva examination, at least one day prior to the Viva work examination to the course teacher/coordinator.
- The Viva-voce will be evaluated by an external teacher appointed by the University along with Course teacher or an internal examiner.
- The SEE marks list generated is to be signed by both internal and external examiners and submitted to VTU in the sealed cover through the Principal of the institution.

Suggested Learning Resources:

Books

1. Richard Patrick Parlour (200); "Building services: A Guide to Integrated Design: Engineering for Architects"; 3rd Edition - Integral Publishing.
2. Paul Tymkow; Building Services Design for Energy Efficient Buildings.
3. Russell Fortmeyer, Charles Linn; Kinetic Architecture: Designs for Active Envelopes.
4. Michael Fox; Interactive Architecture: Adaptive World (Architecture Briefs).
5. Prof. A.K.Bansal ; Solar Passive Design.

Web links and Video Lectures (e-Resources):

- https://ndl.iitkgp.ac.in
- https://www.youtube.com/watch?v=rRtFCvzf-Ow
- https://www.youtube.com/watch?v=5DsP-qH_PBM
- https://www.youtube.com/watch?v=c2FYFuML71Y
- https://www.youtube.com/watch?v=26QcRDAGWLY

Activity Based Learning (Suggested Activities in Class)/ Practical Based learning
Activity 1: Research and document a building or a campus or a gated community which has implemented several sustainable passive design techniques and approaches (such as waste water, storm water, passive design, energy generation, materials, etc).

V Semester

Materials and Methods in Building Construction -V			
Course Code	**21ARC52**	CIE Marks	50
Teaching Hours/Week (L:T:P: S)	1:0:3:0	SEE Marks(VIVA)	50
Total Hours of Pedagogy	50	Total Marks	100
Credits	04	Exam Hours	----

Course objectives:

This course will further student's understanding of the logic and details of construction technologies of complex systems and their impact on production of complex buildings. This course will also bring in the aspect of environmental impact, energy intensiveness, carbon emissions and circularity (recyclability) of each material studied.

Teaching-Learning Process (General Instructions)

These are sample Strategies, which teacher can use to accelerate the attainment of the various course outcomes.

1. The subject teacher to link the studio work with on site work by arranging site visits in the nearby areas.
2. The Subject teacher to highlight the techniques of various types of steel trusses including PEMB structures.

Module-1

1) **Introduction to Steel plane Trusses:** Construction of Steel trusses for various spans, ridged truss, saw tooth truss with lattice girders, roof lighting, aluminium sheet and profiled MS sheet cladding and roof fixing details**.** Energy intensiveness and recyclability of steel as a material can be studied.

2) **Detailing of Steel trusses:** Tubular and L-angle trusses with 8-16m spans.

Teaching-Learning Process	Minimum one plate on each construction topic. Site visits to be arranged by studio teachers. Study of material applications in the form of a portfolio.

Module-2

3) **Introduction to pre-engineering metal buildings -** its manufacturing and assembly process, details, market study and most importantly the materials energy intensiveness and its impact on the environment.

4) **Detailing of a Pre-engineered building:** Including Roof fixing details with aluminium sheet and profiled MS sheet cladding.

5) **Introduction to large span roofs:** Shell roof, vaults folded plate, geodesic domes, space frame, tensile structures, pneumatic structures, etc.

Teaching-Learning Process	Minimum one plate on each construction topic. Site visits to be arranged by studio teachers. Study of material applications in the form of a portfolio.

Module-3

6) **Detailing of hyperbolic paraboloid shell roof:** Principles and methods of construction including form-work techniques and reinforcement details.

7) **Detailing of folded plate and cylindrical shell roof:** Principles and methods of construction including form-work techniques and reinforcement details.

8) **Detailing of a geodesic domes:** Principles and methods of construction with explorations using physical models.

Teaching-Learning Process	Minimum one plate on each construction topic. Site visits to be arranged by studio teachers. Study of material applications in the form of a portfolio.

Module-4

9) **Detailing of a space frame;** Principles and methods of construction with explorations using physical models.

10) **Tensile structures and pneumatic structures:** Principles and methods of construction with explorations using physical models.

Teaching-Learning Process	Minimum one plate relating to each construction topic. Site visits to be arranged by studio teachers. Study of material applications in the form of portfolio.

Module-5

11) **Plastics as a building material:** types, properties, use, energy intensiveness, environmental impact assessment and recycling and up cycling of plastics such as polycarbonates, acrylics, PVC polymer films, and fibre reinforced plastic**.** Application and details.

12) **Waterproof components:** Water Proofing elements, construction chemicals and additives, adhesives, Polystyrenes, sealants. Detailing of waterproofing of basement, toilets, terrace garden, plaster of Paris, gypsum, French drains etc.

13) **Environment friendly materials:** Bamboo**,** Adobe, Stabilised Mud Block, Green

	innovations and materials developed out of waste, sustainable materials available in the current market, study of case studies of sustainable institutional/public buildings. Designing and detailing utilising above materials.
Teaching-Learning Process	Minimum one plate relating to each construction topic. Site visits to be arranged by studio teachers. Study of material applications in the form of portfolio.

Course outcome (Course Skill Set)

1. The students will be able to understand the structural possibilities to cover large spans with different trusses.
2. The students will be able to appreciate and use different materials in building construction.

Assessment Details (both CIE and SEE)

(methods of CIE need to be define topic wise i.e.- Submission of construction drawing sheets, Journal of materials, Multiple Choice Question, Quizzes, Open book test, Seminar or micro project)

The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%. The student has to obtain a minimum of 50% marks individually both in CIE and 40 % marks in SEE to pass. Semester End Exam (SEE) is conducted for 50 marks (Viva-voce) and a minimum of 50% (50 marks out of 100) in the sum total of the CIE (Continuous Internal Evaluation) and SEE (Semester End Examination) taken together. Based on this grading will be awarded

Continuous Internal Evaluation:

1. Methods suggested: Submission of Construction sheets, Journal of Materials, Test, Written Quiz, Seminar, report writing etc.
2. The class teacher has to decide the topics for the test, Written Quiz, and Seminar. In the beginning, only the teacher has to announce the methods of CIE for the subject.

Semester End Examination:

1. The student need to submit his/her works done throughout the semester, including rough sheets for Viva -voce examination, atleast one day prior to Viva voce examination to the course teacher/coordinator.

2. The work will be evaluated by an external teacher appointed by the University along with Course teacher or an internal examiner.

Suggested Learning Resources:

Books

1) Emitt& Gorse (2006), "Barry's Advanced Construction of Buildings", Second Edition, Wiley India Pvt. Ltd.
2) Francis, D.K. (2008), "Building Construction Illustrated", Fourth Edition, Wiley India Pvt. Ltd.
3) Mackay, J.K. (2015), "Building Construction", Fourth Edition, Pearson India.
4) Roy Chudley (2014), "Construction Technology" Second Edition, Pearson India.
5) Barry R. (1999) – Volume 3 & 4, "The Construction of Buildings", Fourth Edition, East-West Press Pvt Ltd., New Delhi.
6) Lyons Arthur (2014), "Materials for Architects and Builders", Fifth Edition: 2014, Routledge.

Varghese P.C. (2015), "Building Materials", Second Edition, PHI Learning Pvt. Ltd.

Web links and Video Lectures (e-Resources):

- https://ndl.iitkgp.ac.in
- https://www.youtube.com/watch?v=m3WsWcObNJo
- https://www.youtube.com/watch?v=kFjhz9aEvdo
- https://www.youtube.com/watch?v=nukB3qDckaE

Activity Based Learning (Suggested Activities in Class)/ Practical Based learning

Activity 1- Site visit and study large span trusses through sketches, photos, make a report of the study.

Activity 2- Observe and understand technical construction methods and materials for space frames, tensile and pneumatic structures and document the same in a report.

Activity 3 – Site visit to a basement construction for water proofing. Discuss with an expert and document the findings in a report.

V Semester

History of Architecture -V			
Course Code	**21ARC53**	CIE Marks	50
Teaching Hours/Week (L:T:P: S)	3:0:0:0	SEE Marks	50
Total Hours of Pedagogy	40	Total Marks	100
Credits	03	Exam Hours	3

Course objectives:

To provide an introduction to the culture and architectural currents of Western Architecture during Renaissance, Baroque, Neo Classical and Modern periods. To identify the socio-cultural changes aptly reflected in the typology of buildings through this phase.

Teaching-Learning Process (General Instructions)

These are sample Strategies, which teacher can use to accelerate the attainment of the various course outcomes.

1. Use of theory, activities, sketches, drawings, assignment and tutorial for teaching.
2. Evaluation by quiz, tests, classroom activities.

Module-1

1) **Introduction to Renaissance Architecture:** Background and influences on Renaissance Architecture. Characteristics of Renaissance Architecture in general. Monumental, public and residential spaces.

2) **Renaissance Architecture Examples:** St Andrea, Mantua and Palazzo Rucellai by Leon Alberti, Villa Rotunda (Capra) by Palladio, (New) St Peters' Rome by Michelangelo and others, St Paul's London by Sir Christopher Wren. Baroque Architecture: General characteristics of Baroque. Eg: St Peters' Piazza by Bernini. Monumental, public and residential spaces.

3) **1750-1900 Transitional Period Architecture:** A brief account of the situation before the changeover to Modern architecture in Europe. Palladian Revival in Britain, Greek revival and Gothic Revival. Transitional Period Examples: Chiswick House, London, Mere worth castle, Kent, St Pancras Church, London, West Minister Palace, London, Arc de Triomphe, Paris. Monumental, public and residential spaces.

Teaching-Learning Process	1) The teacher can use PPTs, Videos to discuss the buildings, style of architecture. 2) The students need to sketch the buildings for its unique qualities. 3) Quizzes, models, seminars from students can be encouraged.

Module-2

4) **Impact of Industrial Revolution in Europe**: The Social, economic and political changes effected, new requirements, functions, new materials and technological developments. New proto types-Ex. Bridges, Expositions, Factories and Railway stations-Use of metal and glass. palace. Monumental, public and residential spaces.

5) **Early Modern Architecture I**: Modern movement-Arts and crafts, Art-Nouveau, Italian futurism-The Chicago School and rise of early sky scrapers-Ex Monadnock building, Carson pierre Scott, store in New York-Public and private spaces Casa Mila, , Sagrada Familia church etc.

Teaching-Learning Process	1) The teacher can use PPTs, Videos to discuss the buildings, style of architecture. 2) The students need to sketch the buildings for its unique qualities. 3) Quizzes, models, seminars from students can be encouraged.

Module-3

6) **Early Modern Architecture II:** Destijl movement, Brutalian and Bahaus, Schroder House, Ronchamp, Modern sky scraper, Mies Van der Rohe (Glass and Steel), Bahaus School design-Examples for the above movements for Public and private spaces and Monumental approach(eg Sky scrapers)- IIT Campus buildings- Public and private spaces.
7) **Modern Architecture III:** Influence of concepts and ideas generated by FL Wright - Robie House, Falling Waters, Guggenheim Museum, Johnson Wax Tower. Le Corbusier-Villa Savoy, Domino House, Five points of Architecture. Mies Van der Rohe-Less is more, minimalism, Glass and steel tower - Seagram.

8) **Modern Architecture IV:** Walter Gropius, Bahaus building, Fagus shoe Factory, Harward campus, Team approach. Louis Sullivan-Chicago Auditorium, Wain Wright Building, Theory of Sky scrapers. Alvar Aalto and his works.

Teaching-Learning Process	1) The teacher can use PPTs, Videos to discuss the buildings, style of architecture. 2) The students need to sketch the buildings for its unique qualities. 3) Quizzes, models, seminars from students can be encouraged.

Module-4

9) **Modern Architecture V:** International style, works of Eero Sarinen- TWA and Kennedy Airports. Richard Neutra- Lovell Beach House. Phillip Johnson- Glass House, Museum Building. Oscar Niemeyar-Work in Brazilia- Legislature building and Church. Monumental, public and private spaces.

10) **Modern Movement-VI:** New Ideas – Archigram Britain-Walking City, Floating City etc. Kenzo Tange- Japan-Floating City and Shimbon Office Building. Moshe Safdie- Housing in Isreal. Sir Buck

Minster Fuller-US Pavilion in Expo-67, Dymaxion Car, Bucki Dome- Public and private Building and spaces.	
Teaching-Learning Process	1) The teacher can use PPTs, Videos to discuss the buildings, style of architecture. 2) The students need to sketch the buildings for its unique qualities. 3) Quizzes, models, seminars from students can be encouraged.
Module-5	
11) **Modern Movement-VII:** Brutalism- Works of Le Corbusier, Peter and Allison Smith, James Sterling-Udse of Raw concrete, Ron champ, Nun's Quarters-Lyon, Library-Oxford University, elementary School by Smithsons- development of Corporate Sky Scrapers- New York- Having multiple uses and tinted glass cladding, Rock Feller Centre-New York-Public and Private examples. 12) **Modern Movement-VIII:** Parallel movement-Soviet Union of 1920"s- Constructivist movement, Modernism and works of Vladimir Tatlin- contributions of Engineers like Pierre Luigi Nervi-Rome Olympic Buildings, Pirelli Tower Italy, Gustave Eiffel-Eiffel Tower, bridges, Statue of Liberty base, Candela etc. **NOTE:** Progressive Marks A) individual presentation by a Student on one topic. B) Group studies of chosen issues. C) Impact of modernism on India.	
Teaching-Learning Process	1) The teacher can use PPTs, Videos to discuss the buildings, style of architecture. 2) The students need to sketch the buildings for its unique qualities. 3) Quizzes, models, seminars from students can be encouraged.
Course outcome (Course Skill Set) 1) The students will be able to learn and compare various styles of Architecture. 2) The students will be able to appreciate the scale of buildings. 3) The students will be able to link the development from pre history to modern times.	

Assessment Details (both CIE and SEE)

The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%. The minimum passing mark for the CIE is 50% of the maximum marks (25 marks). A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to each subject/ course if the student secures not less than 40% (20 Marks out of 50)in the semester-end examination(SEE), and a minimum of 50% (50 marks out of 100) in the CIE (Continuous Internal Evaluation) and a minimum of 50% (50 marks out of 100) in the sum total of the CIE (Continuous Internal Evaluation) and SEE (Semester End Examination) taken together. Based on this grading will be awarded.

Continuous Internal Evaluation:

Three Unit Tests each of **20 Marks (duration 01 hour**)

First test at the end of 5th week of the semester

Second test at the end of the 10th week of the semester

Third test at the end of the 15th week of the semester

Two assignments each of **10 Marks**

First assignment at the end of 4th week of the semester

Second assignment at the end of 9th week of the semester

Group discussion/Seminar/quiz any one of three suitably planned to attain the COs and POs for **20 Marks** (**duration 01 hours**)

At the end of the 13th week of the semester

The sum of three tests, two assignments, and quiz/seminar/group discussion will be out of 100 marks and will be **scaled down to 50 marks**

(to have less stressed CIE, the portion of the syllabus should not be common /repeated for any of the methods of the CIE. Each method of CIE should have a different syllabus portion of the course).

CIE methods /question paper is designed to attain the different levels of Bloom's taxonomy as per the outcome defined for the course.

Semester End Examination:

Theory SEE will be conducted by University as per the scheduled timetable, with common question papers for the subject (**duration 03 hours)**

- The question paper will have ten questions. Each question is set for 20 marks.
- There will be 2 questions from each module. Each of the two questions under a module (with a maximum of 3 sub-questions), **should have a mix of topics** under that module.
- The students have to answer 5 full questions, selecting one full question from each module.
- Theory paper will be out of 100 marks and will be **scaled down to 50 marks.**

Suggested Learning Resources:

Books:

1) Frampton Kenneth; "Modern Architecture – A Critical History".
2) Fletcher, Bannister; "A History of Architecture".
3) Siegfried Gideon; "Time, Space and Architecture".

Web links and Video Lectures (e-Resources):

- https://ndl.iitkgp.ac.in
- https://www.youtube.com/watch?v=1ek1SI1oAwU
- https://www.youtube.com/watch?v=sY7ZpGriNZA
- https://www.youtube.com/watch?v=8iGx5Z6CW9w
- https://www.youtube.com/watch?v=h-MXnqqNfOY

Activity Based Learning (Suggested Activities in Class)/ Practical Based learning

1) Sketching of the historical buildings from a Book.
2) Group or Individual seminar on a building.
3) Quizzes, debates on a selected topic.

V Semester

Sociology & Building Economics			
Course Code	**21ARC54**	CIE Marks	50
Teaching Hours/Week (L:T:P: S)	3:0:0:0	SEE Marks	50
Total Hours of Pedagogy	40	Total Marks	100
Credits	03	Exam Hours	3

Course objectives:

To familiarize students with the basic concepts of sociology and economics and their influence on architecture and the environment and vice versa.

To guide students in critically analyzing common social and economic narratives to catalyse them to work towards just architectural endeavours.

Teaching-Learning Process (General Instructions)

These are sample Strategies, which teacher can use to accelerate the attainment of the various course outcomes.

1. Use of social theories to understand group behaviour, attitude, values and beliefs,
2. Using case study methods to make concepts or contexts clear.
3. Evaluation by quiz, tests, classroom activities.

Module-1

1. **Introduction to Sociology**: Definition of Sociology; Nature, Scope and Utility of Sociology; Branches of Sociology; Relation of Sociology and its branches to architecture and the built environment.

2. **Elements of Society**: Biosocial and Socio cultural associations; Definitions of sociological terms: society, community, family, culture; Difference between society and community; Different family structures and architectural responses to different family types in and outside India (examination of different housing typologies responding to different family types – traditional and contemporary); Relation between culture and built form (exploration of architectural examples.

Teaching-Learning Process	1) The teacher can use PPTs, Videos to discuss the concepts in sociology. 2) The students need to do assignments for better understanding of the concepts. 3) Quizzes, debates, seminars from students can be encouraged.

Module-2

3. **Communities**: Origin, growth and nature of settlements and communities. Their characteristics and spatial patterns.

4. **Urban and Rural Communities**: Definitions of the terms "urban" and "rural". The social, economic, ecological and spatial characteristics associated with urban and rural settlements Social, ecological and economic relations and interdependencies between urban and rural settlements. Urban sociology and rural sociology.

5. **Cities and Society**: Urbanization – definition; causes and effects (exploring social, and economic factors influencing migration to urban areas) (Theory 1). Effects of urbanization on rural areas. Impact of growing urbanization on urban life, viz. health, housing, transportation. Different types of migration. The impact of migration on urban form. The origin and characteristics of slums in European, American and Indian cities. Official definition of slums as per Census of India. Understanding cities as socio-ecological systems (Theory 2). Governmental and non-governmental approaches to engaging with issues regarding slums in Indian cities.

6. **Social Research**: The need for research; the research process; ethics of social research; scope of social research. Difference between methodology and methods. Types of research methods: qualitative, quantitative, mixed research methods. Sources of research data: primary and secondary sources. Secondary data sources include literature review, official and unofficial documents. Primary data sources use methods such as field surveys, questionnaires, different types of interviews (open-ended / closed / structured / semi- structured), Participatory Rural Appraisal (PRA) and Rapid Rural Appraisal techniques[2]and case study approach.

Teaching-Learning Process	1) The teacher can use PPTs, Videos to discuss the concepts in sociology. 2) The students need to do assignments for better understanding of the concepts. 3) Quizzes, debates, seminars from students can be encouraged.

Module-3

7. **Economics**: Definition of economics; Definitions of terms: Goods; Utility, Value, Price and Wealth. The relationship of economics with the built environment and land use.
8. **Economic organization of society**: Different economic systems: capitalism; socialism, communism, mixed-economies. Primary, secondary and tertiary sectors of economy: agriculture, mining, manufacturing, banking, marketing, transport and service sectors. Factors of production: land, labour, capital and entrepreneurship. Relevance of factors of production to architecture and construction practice.

Teaching-Learning Process	1) The teacher can use PPTs, Videos to discuss the concepts in sociology. 2) The students need to do assignments for better understanding of the concepts. 3) Quizzes, debates, seminars from students can be encouraged.
Module-4	
9. **Economics and the market**: Production and Consumption, wants and needs and their characteristics. Concepts of economics: Opportunity cost; Laws of supply and demand; Laws of increasing, diminishing and constant returns; Standard of living. Analysis of the housing market in Indian cities to understand the dynamics of urban housing supply and demand in formal and informal settlements. Analysis of affordable housing.	
Teaching-Learning Process	1) The teacher can use PPTs, Videos to discuss the concepts in Economics. 2) The students need to do assignments for better understanding of the concepts. 3) Quizzes, debates, seminars from students can be encouraged.
Module-5	
10. **Urban land values**: Various social, ecological, and economic factors affecting the value of urban land in formal and informal spaces. Difference between land use and land cover. Studying the characteristics of developed land in the city and real estate development vision prevailing in cities (Activity 2) .The Bid Rent theory that defines the relationship between location and land value. Theoretical city models based on land use and land value. 11. **Building Costs**: Cost and cost indices. Total cost of construction. Time value of money. Different sources of financing for buildings.	
Teaching-Learning Process	1) The teacher can use PPTs, Videos to discuss the concepts in Urban Economics. 2) The students need to do assignments for better understanding of the concepts. 3) Quizzes, debates, seminars from students can be encouraged.
Course outcome (Course Skill Set) 1) The students will be able to apply the sociological issues in Architecture practice. 2) The students will be able to evaluate the importance of Economics in building construction.	

Assessment Details (both CIE and SEE)

The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%. The minimum passing mark for the CIE is 50% of the maximum marks (25 marks). A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to each subject/ course if the student secures not less than 40% (20 Marks out of 50)in the semester-end examination(SEE), and a minimum of 50% (50 marks out of 100) in the CIE (Continuous Internal Evaluation) and a minimum of 50% (50 marks out of 100) in the sum total of the CIE (Continuous Internal Evaluation) and SEE (Semester End Examination) taken together. Based on this grading will be awarded.

Continuous Internal Evaluation:

Three Unit Tests each of **20 Marks (duration 01 hour**)

First test at the end of 5th week of the semester

Second test at the end of the 10th week of the semester

Third test at the end of the 15th week of the semester

Two assignments each of **10 Marks**

First assignment at the end of 4th week of the semester

Second assignment at the end of 9th week of the semester

Group discussion/Seminar/quiz any one of three suitably planned to attain the COs and POs for **20 Marks** (**duration 01 hours**)

At the end of the 13th week of the semester

The sum of three tests, two assignments, and quiz/seminar/group discussion will be out of 100 marks and will be **scaled down to 50 marks**

(to have less stressed CIE, the portion of the syllabus should not be common /repeated for any of the methods of the CIE. Each method of CIE should have a different syllabus portion of the course).

CIE methods /question paper is designed to attain the different levels of Bloom's taxonomy as per the outcome defined for the course.

Semester End Examination:

Theory SEE will be conducted by University as per the scheduled timetable, with common question papers for the subject (**duration 03 hours)**

- The question paper will have ten questions. Each question is set for 20 marks.
- There will be 2 questions from each module. Each of the two questions under a module (with a maximum of 3 sub-questions), **should have a mix of topics** under that module.
- The students have to answer 5 full questions, selecting one full question from each module.
- Theory paper will be out of 100 marks and will be **scaled down to 50 marks.**

Suggested Learning Resources:

Books

1. Openstax College (2012) Introduction to Sociology. Openstax College.
2. Samuelson, P. and Nordhaus, W. (2010) Economics. Mcgraw-Hill Education.
3. Yin, Robert K. (2014) Case Study Research Design and Methods (5th Ed.). Thousand Oaks, CA:Sage.
4. Groat, Linda N. and David Wang (2013) Architectural Research Methods (2nd Ed.). John Wiley & Sons.
5. Jones, Paul (2011). The Sociology of Architecture: Constructing Identities. Liverpool, University Press.
6. Niva, V., Taka, M., &Varis, O. (2019). Rural-urban migration and the growth of informal settlements: A socio-ecological system conceptualization with insights through a "water lens". *Sustainability*, *11*(12), 3487.

7. DePaul, M. (2012). Climate change, migration, and megacities: addressing the dual stresses of mass urbanization and climate vulnerability. Paterson Review of International Affairs, 12, 145-162.
8. Shah, A., &Lerche, J. (2020). Migration and the invisible economies of care: Production, social reproduction and seasonal migrant labour in India. Transactions of the Institute of British Geographers, 45(4), 719-734.
9. Marschall, S. (1998). Architecture as empowerment: The participatory approach in contemporary architecture in South Africa. Transformation, (35).
10. Mann, Thorbjoern (1992) Building Economics for Architects. Wiley.
11. Du Plessis, C. (2008). Understanding cities as social-ecological systems.
12. McHale, M. R., Pickett, S. T., Barbosa, O., Bunn, D. N., Cadenasso, M. L., Childers, D. L., ...& Zhou, W. (2015). The new global urban realm: complex, connected, diffuse, and diverse social-ecological systems. *Sustainability*, *7*(5), 5211-5240.
13. Douthwaite, R. (1993). *The Growth Illusion: How Economic Growth Has Enriched the Few, Impoverished the Many, and Endangered the Planet*. Council Oak Books, 1350 East 15th Street, Tulsa, OK 74120. (Chp 14)
14. Gibson-Graham, J. K., Hill, A., & Law, L. (2016). Re-embedding economies in ecologies: resilience building in more than human communities. *Building Research & Information*, *44*(7), 703-716.
15. Nagendra, H., Sudhira, H. S., Katti, M., &Schewenius, M. (2013). Sub-regional assessment of India: effects of urbanization on land use, biodiversity and ecosystem services. In Urbanization, biodiversity and ecosystem services: Challenges and opportunities (pp. 65-74). Springer, Dordrecht.
16. Schumacher, E. F. 1973. Small is beautiful; economics as if people mattered. New York: Harper & Row.
17. Jackson, Tim. 2016. Prosperity without Growth. 2nd ed. London, England: Routledge.
18. Raworth, K. (2017). Doughnut economics: seven ways to think like a 21st-century economist. London: Random House.
19. Meadows, D. H., & Randers, J. (2013). Limits to growth. Chelsea Green Publishing

Web links and Video Lectures (e-Resources):

- https://ndl.iitkgp.ac.in
- https://www.youtube.com/watch?v=azZ7cEa-V7A
- https://www.youtube.com/watch?v=lUUgIE9HZLE&list=PLVLoWQFkZbhXhD4Aj5QnT1lBvPleHOM8e
- https://www.youtube.com/watch?v=DQq-zJPSf4U
- https://www.youtube.com/watch?v=IyLwxnGVZjI

Activity Based Learning (Suggested Activities in Class)/ Practical Based learning

Activity 1: Introduction to life cycle costs of a building: This aims at expanding the definition of costs as being solely economic in nature. It aims to trigger thinking that encapsulates the environmental costs of buildings in addition to economic costs.

Activity 2: Initiating understanding towards economy driven development:
Students are asked to read article/articles that critiques conventional notions of city development and emphasises the need for people and ecology centric development.
eg: https://thewire.in/urban/our-cities-prioritise-real-estate-over-ecological-sustainability
Students are then divided in groups and asked to analyse the driving factors for these social, ecological and economic injustices provoked by such activities and propose alternatives to evade the negative implications of the development activity they read about.

V Semester

Building Services –III

(AIR-CONDITIONING, MECHANICAL TRANSPORTATION and FIRE PROTECTION)

Course Code	**21ARC55**	CIE Marks	50
Teaching Hours/Week (L:T:P: S)	3:0:0:0	SEE Marks	50
Total Hours of Pedagogy	40	Total Marks	100
Credits	03	Exam Hours	3

Course objectives:

To develop the knowledge and skills required for understanding the mechanical services in buildings and their integration with architectural design.

Teaching-Learning Process (General Instructions)

These are sample Strategies, which teacher can use to accelerate the attainment of the various course outcomes.

1. Use of theory, activities, sketches, drawings, assignment and tutorial for teaching.
2. Evaluation by quiz, tests, classroom activities.

Module-1

MECHANICAL VENTILATION AND AIR-CONDITIONING - Introduction

1) **Social and Environmental Issues related to conventional Refrigeration and Air-conditioning:** Climate Change and energy poverty implications of energy consumption and refrigerants use by conventional Vapor-Compression based RAC technologies, role of air conditioning in accelerating fossil fuel extraction and precipitting the humanitarian injustices of the exploitative coal mining economy, Global and Indian environmental, energy efficiency and green building policies, laws and rules warranting a trajectory shift in the RAC economy, introduction to Thermal comfort as an 'ends' and cooling systems as a 'means', Socio-economic and environmental benefits of a Negawatt approach to energy conservation vs. a Megawatt approach towards power generation. (Activity 1) (Activity 2)

2) **Introduction to Mechanical Ventilation:** Need for mechanical ventilation for spaces like Basements, Kitchen, Toilets, etc. Guidelines as per NBC / ISHRAE: Types of ventilation systems.

3) **Introduction to Systems for Thermal Comfort:** Psychrometric processes for achieving thermal comfort, Direct and Indirect Evaporative Cooling (Sensible Cooling)**, Air-conditioning (Cooling and Dehumidification)**, Air & Refrigeration cycles, Basics of Load Calculations, Zoning and Air Distribution, Heating system (Activity 3) (Activity 4) (Activity 5)

Teaching-Learning Process	1) The subject teacher can use PPTs & Videos to teach basics of the topics 2) The students need to work on the assignments given by the teacher. 3) Quizzes, models, seminars from students can be encouraged.

Module-2
COOLING SYSTEMS 4) **Cooling System Design Process:** Integrated building cooling system design - exploring the hierarchy of priority between thermal load reduction, passive cooling, low carbon cooling technologies and renewable energy integration. Methodology for selecting climate and context appropriate sustainable cooling system: i.e. selecting the optimal (a combination of) cooling technologies with lowest environmental impact and life-cycle cost from direct/indirect evaporative cooling, radiant cooling, structure cooling, solar VAM air conditioning or natural-refrigerant based vapor compression air conditioning through: tools for predicting thermal comfort in buildings, principles and tools for climate analysis, psychrometric processes of conventional and sustainable cooling technologies and representation on psychrometric chart. 5) **Climate Friendly Cooling Systems:** a) Direct and Indirect Evaporative Cooling Systems: Estimating supply air temperature of direct and indirect evaporative cooling systems, calculating water requirements and cooling effect ('equivalent tonnage') of, estimating air handling unit requirements, air flowrate and fan power requirements for evaporative cooling systems, estimating energy and climate impact benefits, understanding hybrid evaporative + vapour compression air conditioning systems, b) Structure and Radiant Cooling Systems: estimating thermal comfort conditions and operative temperature achieved, calculating radiant surface area or structure cooling coil length requirements, calculating cooling effect ('equivalent tonnage'), estimating air handling unit requirements for dedicated outdoor air system (DOAS), understanding spatial design implications and civil-work requirements for various radiant/structure cooling variants, estimating energy and climate impact benefits, understanding hybrid structure/radiant cooling + vapour compression air conditioning systems. (Activity 6) (Activity 7) 6) **Climate Polluting Air Conditioning systems:** Conventional Window, Split, Packaged, Basics of Centralized Air- conditioning system, Water & Air Cooled Chillers, Air Handling Units, Basics of duct sizing and routing, preferred locations of equipment and Architectural Requirements of various equipment. Illustration of duct layout through a small example. (Activity 8) 7) **Specialized Air Conditioning Systems:** Clean Rooms, Server, Hub & UPS Rooms, Operation Theatres etc.

Teaching-Learning Process	1) The subject teacher can use PPTs & Videos to teach basics of the topics 2) The students need to work on the assignments given by the teacher. 3) Quizzes, models, seminars from students can be encouraged.

Module-3	
MECHANICAL TRANSPORTATION SYSTEMS IN BUILDINGS 8) **Elevators:** Types of Elevator systems, design considerations like Peak Handling capacity, Average Waiting Time, Lift speed etc., Architectural Requirements & Details for Elevator shaft - Elevator pit - Elevator Machine Rooms, Automatic Rescue Device for Elevators , Elevator car interiors, Possible Location and arrangements of Elevators in a building. Lift Acts and National Building Code. 9) **Escalators &Travelators:** Applications, Calculation of Traffic capacity, Location and arrangements of escalators and travelators, inclination factor.	
Teaching-Learning Process	1) The subject teacher can use PPTs & Videos to teach basics of the topics 2) The students need to work on the assignments given by the teacher. 3) Quizzes, models, seminars from students can be encouraged.
Module-4	
FIRE SAFETY IN BUILDINGS & PASSIVE FIRE PROTECTION 10) **Introduction:** Classification of fire, causes & hazards**;** Grading of structural elements for its fire resistance as per NBC. Classification of building types as per NBC and brief description of characteristics of combustible and non combustible materials. 11) **Concepts in passive fire protection in buildings**: Escape routes, fire driveways, fire refuge area, fire assembly areas, pressurization, travel distance, fire tower and compartmentation, fire signage's etc.	
Teaching-Learning Process	1) The subject teacher can use PPTs & Videos to teach basics of the topics 2) The students need to work on the assignments given by the teacher. 3) Quizzes, models, seminars from students can be encouraged.
Module-5	
ACTIVE FIRE PROTECTION AND FIRE SAFETY IN HIGH RISE BUILDINGS 12) **Active fire control:** Basic concepts in fixed fire fighting installations, Fire sprinklers, Fire Hydrants, Automatic fire detection and alarm systems. 13) **National Building Code Requirements for Fire Safety**: Rules for Fire Protection and Fire Fighting Requirements for High Rise Buildings in India.	
Teaching-Learning Process	1) The subject teacher can use PPTs & Videos to teach basics of the topics 2) The students need to work on the assignments given by the teacher. 3) Quizzes, models, seminars from students can be encouraged.

Course outcome (Course Skill Set)

1) The students will be able to learn and compare various aspects of air conditioning. Vertical transport systems and fire safety in buildings.
2) The students will be able to incorporate these systems in an architectural design
3) The students will be able to appreciate the importance of the specialists and will be able to coordinate them while designing a building..

Assessment Details (both CIE and SEE)

The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%. The minimum passing mark for the CIE is 50% of the maximum marks (25 marks). A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to each subject/ course if the student secures not less than 40% (20 Marks out of 50)in the semester-end examination(SEE), and a minimum of 50% (50 marks out of 100) in the CIE (Continuous Internal Evaluation) and a minimum of 50% (50 marks out of 100) in the sum total of the CIE (Continuous Internal Evaluation) and SEE (Semester End Examination) taken together. Based on this grading will be awarded.

Continuous Internal Evaluation:

Three Unit Tests each of **20 Marks (duration 01 hour**)

First test at the end of 5th week of the semester
Second test at the end of the 10th week of the semester
Third test at the end of the 15th week of the semester

Two assignments each of **10 Marks**

First assignment at the end of 4th week of the semester
Second assignment at the end of 9th week of the semester

Group discussion/Seminar/quiz any one of three suitably planned to attain the COs and POs for **20 Marks** (**duration 01 hours**)

At the end of the 13th week of the semester

The sum of three tests, two assignments, and quiz/seminar/group discussion will be out of 100 marks and will be **scaled down to 50 marks**

(to have less stressed CIE, the portion of the syllabus should not be common /repeated for any of the methods of the CIE. Each method of CIE should have a different syllabus portion of the course).

CIE methods /question paper is designed to attain the different levels of Bloom's taxonomy as per the outcome defined for the course.

Semester End Examination:

Theory SEE will be conducted by University as per the scheduled timetable, with common question papers for the subject (**duration 03 hours)**

- The question paper will have ten questions. Each question is set for 20 marks.
- There will be 2 questions from each module. Each of the two questions under a module (with a maximum of 3 sub-questions), **should have a mix of topics** under that module.
- The students have to answer 5 full questions, selecting one full question from each module.
- Theory paper will be out of 100 marks and will be **scaled down to 50 marks.**

Suggested Learning Resources:
Books

1) Roy J Dossat , "Principles of Refrigeration" 1961, John Wiley & Sons.
2) ManoharPrasad , "Refrigeration & Air Conditioning Data Hand book" 2013, New Age International, 2nd edition.
3) Don Kundwar , "Refrigeration and Air Conditioning", 2016, DhanpatRai& Co. (P) Limited.
4) "National Building Code of India (NBC)", 2016, Bureau of Indian Standards
5) Walter T. Grondzik, Alison G. Kwok, "Mechanical and Electrical Equipment for Buildings", 2010; 11th edition, Wiley Publication.
6) Shan K. Wang , "Handbook of Air Conditioning and Refrigeration", 2000, McGraw-Hill Edu.
7) "National Building Code of India (NBC) 2016"; Part 8 Section 3 and 5 & Part 3 & 4, BIS.
8) NFPA 101
9) IS Codes -
   - 1391 (Part 1 & 2) : 1992 - Specification for room air conditioners
   - 8148 : 2003 - Specification for packaged air conditioners
   - 4591 : 1968 - Code of practice for installation and maintenance of escalators
   - 14671 : 1999 - Hydraulic lifts
   - 14665 : 2000 - Traction lift
   - 15259 : 2002 - Home Lifts
   - 15330 : 2003 - Lifts for handicapped persons; IS codes for Fire Services

Web links and Video Lectures (e-Resources):

- https://ndl.iitkgp.ac.in
- http://fairconditioning.org/knowledge-resources/#209-active-cooling
- https://www.youtube.com/watch?v=E1VY4s-yiQo
- https://www.youtube.com/watch?v=4z_odywmsyM
- https://www.youtube.com/watch?v=ofT7PLlaxIE
- https://www.youtube.com/watch?v=1pGx6XmGEnE&t=36s
-

Activity Based Learning (Suggested Activities in Class)/ Practical Based learning

Acitivty 1: Air Conditioners' Other 'Side': To experience the heat released by AC's into the atmosphere, Students will realize that our urban 'thermal-excess-comfort' is causing great discomfort to all the invisible, silenced, excluded, marginalized (further details found in Fairconditioning's Pedagogy Manual for Architecture Teachers - Active Cooling Module: http://fairconditioning.org/knowledge-resources/#209-active-cooling

Activity 2: AC vs Fan: Energy Consumption - To compare the energy consumption of a fan vs a room air conditioner, Students will realize that an air conditioner consumes much more energy than a ceiling fan. (further details found in Fairconditioning's Pedagogy Manual for Architecture Teachers - Active Cooling Module: http://fairconditioning.org/knowledge-resources/#209-active-cooling

Activity 3: Psychrometric Pathway Plot for Cooling of Air - To plot the psychrometric pathway for cooling air, Students will develop a deep understanding of psychrometry and variables in the psychrometric chart (further details found in Fairconditioning's Pedagogy Manual for Architecture Teachers - Psychrometry Module: http://fairconditioning.org/knowledge-resources/#206-psychrometry

Activity 4: C ooling Load Estimation of a Space - To estimate the AC Tonnage (TR) required for combatting the typical fresh-air cooling load in a bedroom, Students will understand the procedure to be followed in calculating heat load requirements of a built space (further details found in Fairconditioning's Pedagogy Manual for Architecture Teachers - Psychrometry Module: http://fairconditioning.org/knowledge-resources/#206-psychrometry

Activity 5: Air Volume to be Cooled in Buildings - To critique the idea of cooling the entire volume of building when the volume 'used' by persons is a small fraction, Students will realize that cooling the entire volume is an inefficient way of cooling the building. Instead air vent nozzles can be used to cool certain points in buildings.

Activity 6: Air: Insulator & Coolant? - To critique air as a cooling medium, Students will realize that air conditioning is an inefficient method to cool buildings (further details found in Fairconditioning's Pedagogy Manual for Architecture Teachers - Sustainable Cooling Technology Module: http://fairconditioning.org/knowledge-resources/#232-sust-cooling-technologies

Activiy 7: Radiant Cooling Effect from a Pre-cooled Room - To experience the radiant cooling effect from a pre cooled room, Students will comprehend the cooling effect from radiant cooling systems. (further details found in Fairconditioning's Pedagogy Manual for Architecture Teachers - Sustainable Cooling Technology Module: http://fairconditioning.org/knowledge-resources/#232-sust-cooling-technologies

Activity 8: Carbon offsets from AC's. To estimate the number of trees required to offset GHG emissions of refrigerants from ACs installed in college buildings. Students will realize that offsetting carbon emissions from air conditioners by planting trees is an impractical solution.

V Semester

Building Structure -IV			
Course Code	**21ARC56**	CIE Marks	50
Teaching Hours/Week (L:T:P: S)	3:0:0:0	SEE Marks(VIVA)	50
Total Hours of Pedagogy	40	Total Marks	100
Credits	03	Exam Hours	----

Course objectives:

1. *To Gain understanding of Steel Structural Systems including composite construction and fundamental principles and structural behaviour of steel buildings in withstanding gravity, lateral (seismic and wind), and other environmental forces.*
2. *To understand the process of the design of structural steel systems and the design of simple steel structures.*

Teaching-Learning Process (General Instructions)

These are sample Strategies, which teacher can use to accelerate the attainment of the various course outcomes.

1) The teacher can use PPTs, Videos to discuss Structural Steel and its application in buildings.
2) The students need to sketch various Structural Steel components in a simple on building
3) Quizzes, models, seminars from students can be encouraged

Module-1

1) **Structural Steel:** Different kinds of Steel, their Basic characteristics of Steel & Light Gauge Steel materials.

2) **Concepts of design of Steel Structures:** Introduction to the concept of Working Stress Design and Load and Resistance Factor Design.

3) **Steel Structural Systems:** Introduction to Rigid Portal Frames design of a one story industrial building 18M X 48m with two-bay mezzanine office floor. Project work to include a framing plan for both the industrial building and the mezzanine, an approximate design of structural frame elements, columns and beams. Introduction to available sections in structural steel used in the design of frame elements (Indicative).

Teaching-Learning Process	1) The teacher can use PPTs, Videos to discuss the subject/concepts 2) The students need to visit sites to understand the Concepts of Design. 3) Quizzes, models, seminars from students can be encouraged.

Module-2

4) **Introduction to National Building Code:** IS 800: Criteria & Design to satisfy ECBC and National Building Codes and Standards, Dead and Live load calculations as per IS875 (Part1&2). Determine the general loads to be considered in the design of the structure, based on the type of occupancy for each area specified.

5) **Rigid Frames design-1:** Properties of Indian standard rolled steel section and general framing arrangement of beams and columns for the one story 18M X 48m industrial building.

6) **Rigid Frames design-2:** Design of Rigid frame including selection of frames according to the span, spacing and frame configuration using steel manuals.

Teaching-Learning Process	1) The teacher can use PPTs, Videos to discuss the NB Codes. 2) The students need to visit sites to understand the Concepts of Rigid frames. 3) Quizzes, models, seminars from students can be encouraged.

Module-3

7) **Composite Flooring Systems:** Discussion on steel-concrete composite construction using steel beams, metal decking and concrete, including the role of shear connectors' attachment to the beam for composite action.

8) **Composite flooring systems design for mezzanine:** Loading and Analysis (Moment diagram to be provided) and design of composite steel decking with concrete topping.

Teaching-Learning Process	1) The teacher can use PPTs, Videos to discuss the subject/concepts 2) The students need to visit sites to understand the Concepts composite flooring system. 3) Quizzes, models, seminars from students can be encouraged.

Module-4

9) **Rigid frame elements design-1:** Steel Structural Column design using IS special publication for the design of steel structures [SP-6 (1)].

10) **Rigid frame elements design-2:** Steel Structural Beams and trusses design using IS special publication for the design of steel structures [SP-6 (1)].

Teaching-Learning Process	1) The teacher can use PPTs, Videos to discuss the subject/concepts 2) The students need to visit sites to understand the Concepts of Design.. 3) Quizzes, models, seminars from students can be encouraged.

Module-5

11) Drawings and Specifications for the Rigid frame design: Structural design criteria, including loads used, calculations, drawings and detailing, and steel tonnage calculation.

12)* Field Inspection of Steel Construction Site:** ***The project work to include documentation and a report about the observations, learning and findings at Site

Teaching-Learning Process	Minimum one plate on loading calculation on each Structural steel topic

Course outcome (Course Skill Set)

1) The students will be able to learn the importance of Structural steel in a building.
2) The students will be able to analyse structural steel system in buildings.
3) The students will be able to understand the IS Codes and expect the structural drawings for buildings are complied with the codes.

Assessment Details (both CIE and SEE)

The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%. The student has to obtain a minimum of 50% marks individually both in CIE and 40 % marks in SEE to pass. Semester End Exam (SEE) is conducted for 50 marks (Viva-voce) and a minimum of 50% (50 marks out of 100) in the sum total of the CIE (Continuous Internal Evaluation) and SEE (Semester End Examination) taken together. Based on this grading will be awarded

Continuous Internal Evaluation:

Three Unit Tests each of **20 Marks (duration 01 hour**)

First test at the end of 5th week of the semester
Second test at the end of the 10th week of the semester
Third test at the end of the 15th week of the semester

Two assignments each of **10 Marks**

First assignment at the end of 4th week of the semester
Second assignment at the end of 9th week of the semester

Group discussion/Seminar/quiz any one of three suitably planned to attain the COs and POs for **20 Marks** (**duration 01 hours**)

At the end of the 13th week of the semester

The sum of three tests, two assignments, and quiz/seminar/group discussion will be out of 100 marks and will be **scaled down to 50 marks**

(to have less stressed CIE, the portion of the syllabus should not be common /repeated for any of the methods of the CIE. Each method of CIE should have a different syllabus portion of the course).

CIE methods /question paper is designed to attain the different levels of Bloom's taxonomy as per the outcome defined for the course.

Semester End Examination:

1. The student needs to submit his/her works done throughout the semester, including rough sheets for the Viva examination, at least one day prior to the Viva work examination to the course teacher/coordinator.
   1. The Viva-voce will be evaluated by an external teacher appointed by the University along with Course teacher or an internal examiner.
   2. The SEE marks list generated is to be signed by both internal and external examiners and submitted to VTU in the sealed cover through the Principal of the institution.

Suggested Learning Resources:

Books

1) Martin Bechthold, Daniel L Schodek, STRUCTURES - PHI Learning Private limited
Web links and Video Lectures (e-Resources):
• https://ndl.iitkgp.ac.in • https://www.youtube.com/watch?v=GDs1HiWPZ2U • https://www.youtube.com/watch?v=KWnBNf1INfs • https://www.youtube.com/watch?v= JMtIkNkzbk • https://www.youtube.com/watch?v=l0s9CVmusmY • https://www.youtube.com/watch?v=2Wamzp4TaOE
Activity Based Learning (Suggested Activities in Class)/ Practical Based learning 1) Site visit to evaluate rigid frames in a building. 2) Seminar by students in groups on their learnings.

V Semester

Building Information Modelling			
Course Code	21ARC57	CIE Marks	100
Teaching Hours/Week (L:T:P: S)	0:0:0:4	SEE Marks	--
Total Hours of Pedagogy	50	Total Marks	100
Credits	04	Exam Hours	---

Course objectives:

To develop awareness and familiarity with Advanced Computer applications in Architecture and to equip students with skills required in using digital tools to conceive, develop and present architectural ideas.

Teaching-Learning Process (General Instructions)

These are sample Strategies, which teacher can use to accelerate the attainment of the various course outcomes.

1) The teacher can use PPTs, Videos to discuss commands, tools and other application in making a 3D drawing.
2) The students need to practice the commands and tools in a simple building drawing.
3) Quizzes, virtual models, seminars from students can be encouraged.

Module-1

1) **Introduction to advanced popular 3D modelling software**– e.g. 3DStudio Max, Maya, Rhinoceros and other appropriate software. Introduction to online resources, blogs, tutorials.
2) **Concepts of NURBS modelling** :(curves and surfaces), curve / surface editing, solid modelling, layer management, etc.

Teaching-Learning Process	1) The teacher can use PPTs, Videos to discuss commands, tools and other application used for 3D modelling software. 2) The students need to practice the commands and tools in a simple building drawing.

	3) Practice the use of software to develop skills in NURBS modelling.
Module-2	
3) **Classroom exercise to demonstrate 3D modelling of transformed/ modified/complex 3D objects**: for e.g. twisted tower, deformed cube, sliced cylinder. Introduction to file conversions and interdependencies between 3D modelling software and 2D drafting software, e.g. Rhinoceros to AutoCAD, or any other relevant CAD software. Conversion of 3D model(of transformed/modified objects) to 2D drawings (e.g. plan, section, elevation) **4) Conversion of Architecture/interior design project into NURBS modelling project:** For e.g. measured drawing of classroom, Architecture School, computer room etc.	
Teaching-Learning Process	1) The teacher can use PPTs, Videos to discuss commands, tools and other application used for a 3D Object drawing. 2) The students need to practice the commands and tools in a complex building drawing. 3) Practice the use of software to develop skills in NURBS modelling.
Module-3	
5) **Working on 3D modelling & Visualisation software with rendering:** such as 3DS Max OR Maya or any other appropriate software. **Concepts of solid modelling**: polygonal modelling, modifier, application of materials, simple timeline animations. **Techniques of 3D visualisations** – Introduction to tool settings in 3D rendering engines for photo-realistic rendering. Application of materials and Simple Timeline animations, For e.g. using VRay, Maxwell, Flamingo, Mental Ray or any other appropriate software, Classroom demonstration of objects, of simple Architecture design projects.	
Teaching-Learning Process	1) The teacher can use PPTs, Videos to discuss commands, tools and other application used for a 3D drawing. 2) The students need to practice the commands and tools in a simple building drawing. 3) Practice the use of software to develop skills in rendering.
Module-4	
6) **Working on Graphics/Vector/Image editing software**: To present Architecture design studio projects –Introduction to publishing tools for creating presentations and portfolios.	

Teaching-Learning Process	1) The teacher can use PPTs, Videos to discuss commands, tools and other application used for an image editing exercise. 2) The students need to practice the commands and tools in a simple building drawing. 3) Practice the use of software to develop skills in Graphics presentation. .
Module-5	
7) **Project 1** – Classroom exercise to convert architecture design project 2D drawings (of semester 3 / 4 OR any simple one to three-storied building) into 3D model using relevant software. Project to be rendered using an appropriate 3D visualisation software 8) **Project 2** – Classroom demonstration/exercise of image rendering/collage using Graphics/Image editing software (for e.g., adding context to visualisations), foreground, backgrounds etc. Project to include presentation of final outcomes in the form of drawing panels, booklets, posters. 9) Usage of software/tools to assess the life-cycle carbon footprint of buildings including emissions from cooling systems and refrigerant use, and analyzing trade-offs between increased embodied carbon emissions for high thermal mass, high caliber insulation, glazing and other materials and reduced operational phase carbon emissions through increased energy efficiency.	
Teaching-Learning Process	1) The teacher can use PPTs, Videos to discuss commands, tools and other application used for a class room exercise in 3D visualization modelling. 2) The students need to practice the commands and tools in a simple building drawing. 3) Practice the use of different software to create 3D drawing. 4) Crate awareness on the softwares used in the analysis of Green Buildings.
Course outcome (Course Skill Set) 1) The students will be able to develop the skills in CAD and other software in 3D designing. 2) The students will be able to use the learnings for their academic projects in higher classes.	

Assessment Details (both CIE and SEE) `

(methods of CIE need to be defined topic wise i.e.- Studio/lab discussions, Reviews, Time problems, test, Seminar or micro project)

The weightage of Continuous Internal Evaluation (CIE) is 100% and there is no Semester End Exam (SEE) .The student has to obtain a minimum of 50% marks in CIE and is conducted for 100 marks. Based on the CIE marks grading will be awarded.

Continuous Internal Evaluation:

Methods suggested:

1. Studio discussions, Reviews, Time problems, CIE tests, Seminar or micro project,Quiz, report writing etc.
2. The class teacher has to decide the topic for the Design and Seminars if any, in the beginning only. The teacher has to announce the methods of CIE for the subject in advance in writing.

Semester End Examination:

1. There is no Semester End Exam (SEE) The CIE marks list generated is to be signed by the internal examiners and submitted to VTU as per the procedure through the Principal of the institution.

Suggested Learning Resources:

Books

1. Internet resources, blogs, and learning resources on the web of popular 3D modelling software and NURBS modelling,
2. Vector/Graphics/Image editing software

Web links and Video Lectures (e-Resources):

- https://ndl.iitkgp.ac.in
- https://www.youtube.com/watch?v=92VvxRtZ_Tk
- https://www.youtube.com/watch?v=wY3rezjj9es
-

Activity Based Learning (Suggested Activities in Class)/ Practical Based learning

1) Working on a 3D drawing of a building of the Institute.
2) Group work on a Campus design with rendering.

V Semester

Elective-3			
Course Code	**21ARC58X**	CIE Marks	100
Teaching Hours/Week (L:T:P: S)	2:0:0:0	SEE Marks	--
Total Hours of Pedagogy	25	Total Marks	100
Credits	02	Exam Hours	2

Course objectives:

1) To gain experience in aspects of Architecture not offered in the regular curriculum.
2) To study particular areas of the curriculum in greater depth.
3) To explore career opportunities in the allied fields.

Teaching-Learning Process (General Instructions)

These are sample Strategies, which teacher can use to accelerate the attainment of the various course outcomes.

1) The teacher may use conventional method or an innovative method to deal with the subject.
2) The students need to work with hands on experiences to gain an expertise of the chosen field.
3) The teacher needs to use performance assessments to develop real life skills in the students.

a) ALTERNATE BUILDING TECHNOLOGY AND MATERIAL

OBJECTIVE:

1. Introduce students to overall understanding of Building Technology and Material.
2. Introduce details of Building Material and Alternate Techniques of Building.
3. Introduce students with relevant examples.

OUTLINE:

1. Introduction to building material: Soil, types of soil, characteristics of soil, simple tests conducted at site, Bamboo as building construction material, properties, types, joinery details with examples.
2. Masonry wall- SMB (Stabilised Mud Blocks), Hollow clay blocks, Cement blocks – Making of blocks, Properties, Specifications and Applications with examples.
3. Mud wall, Rammed Earth Wall- Making of wall, Properties, Specification and Application with examples.
4. Alternate method for Foundation, Lintel and Chajja. Roof-Dome, Arch Panel Roof, Vault using SMB, Clay blocks with examples .
5. Concept of Ferro Cement structure, Building Components made out of Ferro cement such as Roof, Wall, Staircase with examples.

NOTE: Field visits to be arranged by teachers. Group work could be encourage.

REFERENCES:

1. K S Jagadish, "Building with Stabilised Mud"; IK International Publishing House PVT Ltd.
2. K S Jagadish, B V Venkatarama Reddy, K S NanjundaRao, "Alternative Building Materials and Technology"; New Age International Publishers.
3. Jules J A Janssen , "Building with Bamboo-A Handbook".
4. Chris Van Uffelen , "Bamboo Architecture and Design(Architecture and materials)".

5. Laurie Bakers work.
6. Documentation "Earth Architecture", Auroville.

Hassan Fathy's work.

b) DIGITAL ARCHITECTURE

OBJECTIVE:

Digital Architecture strategically utilizes digital media in the process of its architectural design. Provide students with a strong foundation in the process of Digital design.

Training tools to comprehend Conceptual Design through the early design stage, design-development, analysis and representation of architectural spaces.

OUTLINE:

This course uses **theoretical and practical study** to examine how digital tools and processes can be developed and applied to design built environments. Vis-à-vis Architects conventional approach of Architects.

a) Introduction to Digital Architecture:

Exploration of new design process in architecture, Exploration and case study of various available Design process involving digital media.

SESSIONAL WORK:

Cases study of available approaches on utilisation of Design tools leading to presentation of case studies and examining pros & cons and suitability of various Design approaches.

b) Parametric Architectural Geometry

Explore parametric software as a first stage of learning software for replicating ideas in to 2D & 3D forms.

SESSIONAL WORK: Students will be given different small exercises which will be based on the primary stage form development in the parametric software.

c) Geometrical explorations`

Explore the relationships and dependencies of progression concepts and architecture. The exploration will be based on geometrical ideologies to develop relationships and new design process for form generation.

The exercise will explore generative design methodologies through the application progression techniques.

SESSIONAL WORK: Students will work on geometric transformations and an approach for form generation

d) Simulation, Visualisation

Explore simulation and visualisation, as a first stage of learning software leading to digital publication

SESSIONAL WORK: Students will be given small exercises which will be based on the primary stage form development for visualisation & Publication of creative process and outputs with Desktop and Web tools.

Software: Any relevant and appropriate 3D-modelling , visualisation software can be used forsessional work

REFERENCES:

1) Contemporary techniques in Architecture – by Ali Rahim
2) Digital Tectonics, Digital Cities AD: Architectural Design – Prof. Neil Leach

Digital to from control to design –by Michael Meredith

c) ARCHITECTURAL LIGHTING DESIGN

CONTACT PERIODS: 3 (Lecture) per week PROGRESSIVE MARKS: 50

OBJECTIVE: *This course surveys the scope and possibilities of integrating light in architecture*.

OUTLINE:

Architectural spaces are designed for a specific purpose, and are sometimes constructed through a specific theme to create such experiences. The aspect of light in architecture is a crucial element in the fabrication of such spatial experiences as illustrated below:

1. Introduction: Quantitative vs Qualitative aspects of lighting design.
2. Experiencing Architecture: Fundamentals and factors that shape spatial experiences ranging from emotion, memory, imagination, aesthetics, culture etc.
3. Seeing Form-Space Relationships in developing lighting strategies.
4. Relationship between man, light and space.
5. A primer to Place-Making through light in architecture.
6. Light in Architecture – Conceptual proposal of lighting design for an architectural space using Perception Based Approach.

METHODS:

Presentations by staff to introduce the concepts; Student presentations to take the discussions further. Practical understanding in principles of light and perception through visualisations/calculations/mock-ups.

Students will work on related assignments. They will develop ideas and concepts for lighting projects.

ASSESSMENT:

The group/individual assignments will be assessed via mock-ups, presentations and reports.

REFERENCE:

1. Boyce, Peter R.,(2014),"Human Factors in Lighting"; CRC Press, 3rd Edition.
2. Cuttle, Christopher(2015),"Lighting Design: A Perception Based Approach"; Routledge, 1st Edition.

3. Michel, Lou. (1995), "Light: The Shape of Space: Designing with Space and Light"; Van Nostrand Reinhold.
4. Steffy, Gary R.(2008), "Architectural Lighting Design" by Wiley.
5. Tanizaki, Junichiro,(1977), "In Praise of Shadows"; Leete'S Island Books, 1st Edition.
Zumthor, Peter(2006), "Atmospheres"; Birkhäuser Architecture, 5th Edition

OPEN ELECTIVE:

The college has the discretion to offer an open elective in the areas/subject/field other than already covered under the syllabus. The college can decide to offer need based electives depending on the availability of the expertise. However, the college will require to submit the title of such electives with the course outline stating learning objectives and mode of delivering the content to the Registrar/ Registrar (evaluation) within the 15 days of the commencement of the semester.

Teaching-Learning Process	1) The teacher may use conventional method or an innovative method to deal with the subject. 2) The students need to work with hands on experiences to gain an expertise of the chosen field. 3) The teacher needs to use performance assessments to develop real life skills in the students.

Course outcome (Course Skill Set)

1) To develop desired knowledge and skill in a particular domain of Architecture
2) To develop an understanding of the processes required for the particular subject.
3) To develop an expertise in the chosen field for career enhancement.

Assessment Details (CIE)

(methods of CIE need to be defined topic wise i.e.- Studio/ Class room/Tutorial discussions, Reviews, Time problems, test, Seminar or micro project)

The weightage of Continuous Internal Evaluation (CIE) is 100% and there is no Semester End Exam (SEE) .The student has to obtain a minimum of 50% marks in CIE and is conducted for 100 marks. Based on the CIE marks grading will be awarded.

Continuous Internal Evaluation:

Methods suggested:

1. Studio discussions, Reviews, Time problems, CIE tests, Seminar or micro project, Quiz, report writing etc.
2. The class teacher has to decide the course of learning for the Elective subject, in the beginning only. The teacher has to announce the methods of CIE for the subject in advance in writing.

Semester End Examination:

1. There is no Semester End Exam (SEE) The CIE marks list generated is to be signed by the internal examiners and submitted to VTU as per the procedure through the Principal of the institution.

Suggested Learning Resources: **Books**
Web links and Video Lectures (e-Resources):
• https://ndl.iitkgp.ac.in • https://www.youtube.com/watch?v=bsQBSVJoV04 • https://www.youtube.com/watch?v=HaGFrVGMzb4 • https://www.youtube.com/watch?v=tKcyrlysQwA • https://www.youtube.com/watch?v=N3HX2yEnCas • https://www.youtube.com/watch?v=yTOD2emZUSM • https://www.youtube.com/watch?v=4ORbpY6d9Zk • https://www.youtube.com/watch?v=slEvHTzAXhE
Activity Based Learning (Suggested Activities in Class)/ Practical Based learning 1) Students need to explore and meet an expert to understand the subject in a greater depth. 2) Students need to work with hands on experiences to develop desired skills in the field.

VI Semester

ARCHITECTURAL DESIGN - VI			
Course Code	**21ARC61**	CIE Marks	100
Teaching Hours/Week (L:T:P: S)	0:0:8:0	SEE Marks(VIVA)	100
Total Hours of Pedagogy	95	Total Marks	200
Credits	8	Exam Hours	----

Course objectives:

To enable the students to integrate design with history, theory, building construction and material science in a more informed way.

Teaching-Learning Process (General Instructions)

These are sample Strategies, which teacher can use to accelerate the attainment of the various course outcomes.

4) The contents of the courses shall be taught in an application-oriented manner on a scientific and design basis. The course contents shall be taught and learned in lectures, seminars, labs or workshops, studio exercises and design projects, etc.
5) In-studio exercises the teachers shall take the lead to provide tasks and offer guidance for solutions finding. The students shall work either individually or in groups.

6) In design studios, the students contribute to the processing, analysis and solving of problems of direct professional practice, attended by faculty(s) entitled to conduct the studio and examine. The results shall be defended through drawings; models and reports and evaluated through periodic assessment and finally by a jury or panel, and finally, evaluated through periodic assessment and an end semester examination or viva voce.

OUTLINE:

To understand the role of built environments of increasing complexity by:

a) Intrinsic factors: Size, volume, levels, functional spaces or zones, structural possibilities
b) External factors: site, approach, traffic, climate change, ecology, services
c) Constraints: bye-laws, resource and planetary limits, budget, ideology, attitudes
d) Create an 'Identity' to the Campus through integration of the above.

MODES OF STUDY:

The aim of the studio is to explore STRUCTURING: structuring of a research or a case study, structuring of the program, spatial structuring and informal structuring.

Structuring of research: Case studies, reading material and site studies have to be a directed exercise with the involvement of tutors where visiting the project of concern would be of utmost importance. This studio is also about how one organizes research. It should be mandatory to use analytical models, diagrams to understand the chosen case study in terms of Design Intent, site and spatial structuring. There needs to be emphasis on Graphical consistency and legibility of the study. It is recommended to add a reading list as part of the studio to further enrich this discussion about institutions. Once a week, students could be asked to present the case studies and selected readings to the class.

Structuring program: Studying requirements from various point of views which include relationship between requirements and values, requirements and phenomenology, area of the site and functional area requirements, issues of public and private domains, open and closed spaces, interrelationship between the various components, formal and informal, service requirements, relationship between whole and the part, requirement and climate etc. information resulting from this exercise becomes the individual's program for the project which can then lead to structuring of space.

PROJECTS

a). One major project and one minor/time project to be tackled in the semester. Institutional projects like facilities of higher learning, such as, Engineering college campus, medical college campus, management institute campus, hotel management institute, Law college campus, Dental college campus, Nursing college campus, Juvenile Correction Centre, etc.

b). The minor project could include a case study documentation of the project proposed for the design intervention. This work could be done in a group and as part of its findings shall be an outline program to be a major project.

In view of the current urban contexts where land is precious and resources are scarce, the project could also be institutional buildings on a small urban plot, on multiple levels and still engage with its context and establish an environment within that captures the essential nature of an institution. However, Project selection is left to the discretion of the tutors.

Project work could be done in 5 stages of activity jointly with research and analysis.

1. Introduction to the initial design parameters which include choice of:

    a. Geography/situation (context)
    b. Constraints (bye-laws, budget, ideology, attitudes, etc.)

2. Spatial structuring: To understand spatial structuring as a set of logical operations after an analytical understanding of the site, surroundings, program and intent expressing diversity of program and its resulting spatial variety and the relationship between the built and the unbuilt established through movement systems ,linkages and nodes etc.

3. Informal structuring: Architecture is an integrative discipline. Establishment of a structure enables reverse integration with other subjects where the students look beyond their studio offering a mechanism to observe the surroundings and document it, understand history and theory analytically, integrate design with building construction, climatic, environmental and material science in a more informed way.

4. The design exercise shall focus on ideas of scale, engagement (social, economic, political, and environmental), hierarchy, public/private space, and challenge the students to reflect on these as part of the design development. The emphasis should be to establish these larger goals as part of the discussion on the nature of an institution. The project and design development should focus on integrating sustainable design in every aspect and process possible, with an emphasis on reducing thermal locals and integrating ventilation, insulation, thermal mass, shading, cool roofs, passive/natural cooling and low energy, low-carbon active cooling technologies; local materials as much as possible; sustainable systems such as storm water harvesting, water recycling and reusing, waste management systems and renewable energy systems and above all response to site context and existing informal systems.

5. Goal of the studio shall be to see the architect as *instigator* - defining the nature of engagement with the city, through the articulation of the program and its relationship with the context. Studio must provoke students to define clearly their

agenda and to think of architecture as an active, live engagement rather than a passive and inert one. By having students spell out a hypothesis it then doesn't matter what the type is. This prepares the students to frame a series of questions to address the problem at hand.

Assessment Details (both CIE and SEE)

(methods of CIE need to be defined topic wise i.e.- Studio discussions, Reviews, Time problems, test, Seminar or micro project)

The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%. The student has to obtain a minimum of 50% marks individually both in CIE and 40 % marks in SEE to pass. Semester End Exam (SEE) is conducted for 100 marks (Viva-voce) and a minimum of 50% (50 marks out of 100) in the sum total of the CIE (Continuous Internal Evaluation) and SEE (Semester End Examination) taken together. Based on this grading will be awarded

Continuous Internal Evaluation:

Methods suggested:

1. Studio discussions, Reviews, Time problems, CIE tests, Seminar or micro project, Quiz, report writing etc.
2. The class teacher has to decide the topic for the Design and Seminars if any, in the beginning only. The teacher has to announce the methods of CIE for the subject in advance in writing.

Semester End Examination:

1. The student needs to submit his/her works done throughout the semester, including rough sheets for the Viva examination, at least one day prior to the Viva work examination to the course teacher/coordinator.

2. The Viva-voce will be evaluated by an external teacher appointed by the University along with Course teacher or an internal examiner.

3. The SEE marks list generated is to be signed by both internal and external examiners and submitted to VTU in the sealed cover through the Principal of the institution.

Suggested Learning Resources:

Books

1) Roger H. Clark and Michael Pause, " Precedents in architecture", 1984, John Wiley &Sons.
2) Geoffrey H Baker , "Le Corbusier an analysis of form", 1996, Van Nostrand Reinhold.
3) Herman Hertzberger, "Lessons for students in architecture", 1991, Delft University.
4) Charles Correa , "A Place in shade", 2010, Penguin India
5) Rem Koolhaas, "Conversation with students", 1996, Princeton Architectural Press.

Web links and Video Lectures (e-Resources):

- https://ndl.iitkgp.ac.in
- https://www.youtube.com/watch?v=FfJ6j0NjfDo
- https://www.youtube.com/watch?v=TY_aB4TLsUA
- https://www.youtube.com/watch?v=dRKVZZ9Srcc
- https://www.youtube.com/watch?v=_AOzpFXocKI

Activity Based Learning (Suggested Activities in Class)/ Practical Based learning
Activity 1: Case study and document a campus in a nearby place. Activity 2: Research and document a building or a campus or a gated community which has implemented several sustainable passive design techniques and approaches (such as waste water, storm water, passive design, energy generation, materials, etc).

VI Semester

Materials and Methods in Building Construction -VI			
Course Code	**21ARC62**	CIE Marks	50
Teaching Hours/Week (L:T:P: S)	1:0:3:0	SEE Marks(VIVA)	50
Total Hours of Pedagogy	50	Total Marks	100
Credits	04	Exam Hours	----

Course objectives:

To acquaint the students with construction practices pertaining to structural glazing, Metal Cladding and roofing systems and to study constructional systems and detailing of alternative material doors, windows and partition. This course will also examine their thermal properties, passive cooling possibilities, capabilities for mitigating climate change related impacts (heat, humidity and precipitation) and circularity (recyclability) of each material studied.

Teaching-Learning Process (General Instructions)

These are sample Strategies, which teacher can use to accelerate the attainment of the various course outcomes.

1. The subject teacher to link the studio work with on site work by arranging site visits in the nearby areas.
2. The Subject teacher to highlight the uses of various types of Glass in a building.

Module-1

1) **Glass as a building material:** Glass manufacturing in various types like plate, tinted, decorative, reinforced, laminated glass block, fibreglass, glass murals, partially coloured glass, etching of glass and its applications in building industry for both exteriors and interiors. Glass fabrication techniques, fibre reinforced composite materials and products. Qualitative and quantitative study of the material's contributions to increased building solar heat gain in the tropics, increased air conditioning load and hence artificial cooling energy needs, and inability to promote natural unassisted night-time cooling through spontaneous release of accumulated heat. Study the life cycle environmental impacts, carbon emissions and recyclability of Glass as a material used in building construction.

2) **Frameless glass doors and windows and partitions:** Fixing and fabrication details.

Teaching-Learning Process	Minimum one plate on each construction topic. Site visits to be arranged by studio teachers. Study of material applications in the form of a portfolio.

Module-2

3) **Structural Glazing and cladding:** Fixing and fabrication details.

4) **Point supported glazing:** Fixing and fabrication details.

5) **Introduction to metal cladding:** ACP, Aluminium louvers; Fixing and fabrication details.

Teaching-Learning Process	Minimum one plate on each construction topic. Site visits to be arranged by studio teachers. Study of material applications in the form of a portfolio.

Module-3

6) **Glass and Metal cladding of facades and building envelopes:** Fixing and fabrication details. Qualitatively and quantitatively study the material's contributions to increased building solar heat gain in the tropics, increased air conditioning load and hence artificial cooling energy needs, and inability to promote natural unassisted night-time cooling through spontaneous release of accumulated heat Study the life cycle environmental impact and recyclability of metal facades.

7) **UPVC, PVC & FRP:** Doors and windows and partitions (Detailing and study of joinery).

8) **Wooden sliding and folding doors and partitions:** Principles and methods of construction and detailing.

Teaching-Learning Process	Minimum one plate on each construction topic. Site visits to be arranged by studio teachers. Study of material applications in the form of a portfolio.

Module-4

9) **Steel sliding and folding doors and partitions:** Principles and methods of construction and detailing.

10) **Aluminium sliding and folding doors and partitions:** Principles and methods of construction and detailing.

Teaching-Learning Process	Minimum one plate on each construction topic. Site visits to be arranged by studio teachers. Study of material applications in the form of a portfolio.

Module-5

11) **Skylight in steel and glass:** Principles and methods of construction and detailing.

12) **Alternative wall technologies:** Sandwich panel walls, PUF panels etc. Critical analysis and study of materials such as glass, aluminium and steel used in medium-high rises in terms of its environmental impact. Building a narrative of Climate stress and how Architecture can contribute to reducing it. Alternative sustainable and less energy intensive materials to be explored.

Teaching-Learning Process	Minimum one plate on each construction topic. Site visits to be arranged by studio teachers. Study of material applications in the form of a portfolio.

Course outcome (Course Skill Set)

1. The students will be able to understand the various application of glass as a building material.
2. The students will be able to adopt and use of Glass and other materials in building construction.

Assessment Details (both CIE and SEE)

(methods of CIE need to be define topic wise i.e.- Submission of construction drawing sheets, Journal of materials, Multiple Choice Question, Quizzes, Open book test, Seminar or micro project)

The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%. The student has to obtain a minimum of 50% marks individually both in CIE and 40 % marks in SEE to pass. Semester End Exam (SEE) is conducted for 100 marks (Viva-voce) and a minimum of 50% (50 marks out of 100) in the sum total of the CIE (Continuous Internal Evaluation) and SEE (Semester End Examination) taken together. Based on this grading will be awarded.

.

Continuous Internal Evaluation:

1. Methods suggested: Submission of Construction sheets, Journal of Materials, Test, Written Quiz, Seminar, report writing etc.
2. The class teacher has to decide the topics for the test, Written Quiz, and Seminar. In the beginning, only the teacher has to announce the methods of CIE for the subject.

Semester End Examination:

1. The student need to submit his/her works done throughout the semester, including rough sheets for Vivavoce examination, atleast one day prior to Viva voce examination to the course teacher/coordinator.

2. The work will be evaluated by an external teacher appointed by the University along with Course teacher or an internal examiner.

3. The SEE mark list generated is to be signed by both internal and external examiners and submitted to VTU in sealed cover through the Principal of the institution.

Suggested Learning Resources:

Books

1. Francis, D.K. (2008), "Building Construction Illustrated", Fourth Edition, Wiley India Pvt. Ltd.
2. Mackay, J.K. (2015) – Volume 1, "Building Construction", Fourth Edition, Pearson India
3. Roy Chudley (2015) – Volume 1, "Construction Technology" Second Edition, Pearson India
4. Barry R. (1999) – Volume 3 & 4, "The Construction of Buildings", Fourth Edition, East-West Press Pvt. Ltd., New Delhi.
5. Lyons Arthur (2014), "Materials for Architects and Builders", Fifth Edition, Routledge.
6. Varghese P.C. (2015), "Building Materials", Second Edition, PHI Learning Pvt. Ltd.

Web links and Video Lectures (e-Resources):

- https://ndl.iitkgp.ac.in
- https://www.youtube.com/watch?v=loCKY6kZM-U
- https://www.youtube.com/watch?v=BGPaywY1wvs
- https://www.youtube.com/watch?v=i_5XuGZPiog
- https://www.youtube.com/watch?v=2fMISF6lreM

Activity Based Learning (Suggested Activities in Class)/ Practical Based learning

Activity 1- Site visit and study Glass facades in large Buildings through sketches, photos, make a report of the study.

Activity 2- Observe and understand technical construction methods and materials for Glass curtain walls, and document the same in a report.

Activity 3 – Site visit to a PUF insulated cold storage. Discuss with an expert and document the observations in a report.

VI Semester

Landscape Architecture			
Course Code	**21ARC63**	CIE Marks	50
Teaching Hours/Week (L:T:P: S)	3:0:0:0	SEE Marks	50
Total Hours of Pedagogy	40	Total Marks	100
Credits	03	Exam Hours	3

Course objectives:

1. *To introduce the students to the discipline of Landscape Architecture.*
2. *To advance analytical and planning skills for Architectural project sites.*
3. *To develop design skills for small landscape projects.*

Course Outline:

Introduction, design philosophies and contemporary approaches to landscape architecture and design are reviewed through various landscape design projects over time while modules on site analysis, site planning, elements of landscape architecture and landscape design process are supported with theoretical inputs.

Teaching-Learning Process (General Instructions)
These are sample Strategies, which teacher can use to accelerate the attainment of the various course outcomes.

i. **Lecture component:** Various landscape design projects to explain the design philosophies, theoretical aspects of site analysis and site planning, element of landscape architecture and design process will be delivered as lecture component.
ii. **Literature study:** Exercise on 'relating architecture and landscape' may be undertaken as a literature study exercise.
iii. **Studio component:** Studio exercises in site analysis, site planning and a small landscape design project.

Module-1

Introduction to the discipline of landscape architecture

a. Landscape as a broad terminology, Natural and Man-modified landscapes.
b. Brief history and the growth of landscape architecture as a design and planning profession from gardens to regional landscapes.
c. Scope and nature of professional work in contemporary landscape architecture, changing priorities of disciplinary approach: ecology, biodiversity and sustainability.

Teaching-Learning Process	1) The teacher can use PPTs, Videos to discuss the style of Landscape design. 2) The students need to sketch and document elements of landscape architecture. 3) Quizzes, models, seminars from students can be encouraged.

Module-2

Relating Architecture and Landscape, Site analysis and Site planning

a. Study of architectural response to landscapes and understanding the relation between architecture and landscape through case examples.
b. The idea of site as part of whole/larger landscape, Site inventory and analysis: physical, biological, social contextual studies and layers of site analysis, site suitability analysis, inferences and response for architectural interventions.
c. Design considerations and approaches to site planning, site program, siting of buildings and open spaces, introduction to grading and land modifications, working with sloping sites.

Demonstration of understanding of site analysis and site planning through studio exercise.

Teaching-Learning Process	1) The teacher can use PPTs, Videos to discuss the relation between Landscape and Architecture. 2) The students need to sketch and document Architectural interventions in landscape architecture. 3) Quizzes, models, seminars from students can be encouraged.

Module-3

Elements of landscape architecture and their application in landscape design

a. Primary landscape elements: Landform, water and vegetation, Design considerations and their role in articulating outdoor spatial design.
b. Secondary landscape elements: Street furniture, landscape walls, paving, inert ground covers, trellis, outdoor shading structures, embellishments, etc. Design considerations and their role in spatial design. Hard and soft landscapes (Activity 1)

Teaching-Learning Process	1) The teacher can use PPTs, Videos to discuss Landscape elements. 2) The students need to sketch and document landscape elements. 3) Quizzes, models, seminars from students can be encouraged.

Module-4

Works of noted landscape architects and landscape projects

a. Eastern landscape philosophies: Chinese and Japanese gardens, Asian landscapes: Mughal and Persian gardens, Western landscape designs: Italian and French gardens, English romantic gardens and American parks, Examples in modern landscape: works of Garret Eckbo, Lawrence Halprin and Peter Latz.
b. Examples of contemporary landscape projects: works of Martha Schwartz , Maya lin, Peter Walker & Partners, Hargreaves Associates, Sasaaki, SWA, Michael Van Valkenburgh, Andropogon Associates, Field Operations, Turenscape etc. Landscape projects in India: works of Ravindra Bhan, Shaheer Associates etc.

Examples should cover various categories of landscape design such as residential, commercial, institutional, public plaza, water/riverfront and other categories. The content of this module should emphasis on design philosophies, the changing styles and changing priorities of the profession over time.

Teaching-Learning Process	1) The teacher can use PPTs, Videos to discuss the Landscape Projects and works of famous Landscape Architects. 2) The students need to sketch and document Landscape Projects and works of famous Landscape Architects. 3) Quizzes, models, seminars from students can be encouraged.

Module-5

Landscape Design project

Demonstration of an understanding of landscape design through simple and small design exercise as studio project. Clarity in design process, detail development and representation of the landscape design scheme is to be emphasized.

One more minor analysis activity can be included as a project: Study the design of a current or recently proposed landscape project such as riverfront development, lake projects, religious corridors, tourism projects and analyze and assess the design, identify the loopholes and its impact on the environment and inhabiting population

NOTE: Studio exercises should be introduced after relevant theoretical inputs are

delivered utilizing the contact periods.

Teaching-Learning Process	1) The teacher to give an assignment of an open space in the city/locality or an academic project of an earlier semester to design with all details. 2) The students need complete the assignment with details and proper presentation.

Course outcome (Course Skill Set)

1) The students will be able to learn and compare various styles of Landscape Architecture.
2) The students will be able to design small landscape architecture.
3) The students will be able to appreciate the importance of Landscape in Architecture.

Assessment Details (both CIE and SEE)

The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%. The minimum passing mark for the CIE is 50% of the maximum marks (25 marks). A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to each subject/ course if the student secures not less than 40% (20 Marks out of 50)in the semester-end examination(SEE), and a minimum of 50% (50 marks out of 100) in the CIE (Continuous Internal Evaluation) and a minimum of 50% (50 marks out of 100) in the sum total of the CIE (Continuous Internal Evaluation) and SEE (Semester End Examination) taken together. Based on this grading will be awarded.

Continuous Internal Evaluation:

Three Unit Tests each of **20 Marks (duration 01 hour**)

- First test at the end of 5th week of the semester
- Second test at the end of the 10th week of the semester
- Third test at the end of the 15th week of the semester

Two assignments each of **10 Marks**

- First assignment at the end of 4th week of the semester
- Second assignment at the end of 9th week of the semester

Group discussion/Seminar/quiz any one of three suitably planned to attain the COs and POs for **20 Marks** (**duration 01 hours**)

- At the end of the 13th week of the semester

The sum of three tests, two assignments, and quiz/seminar/group discussion will be out of 100 marks and will be **scaled down to 50 marks**

(to have less stressed CIE, the portion of the syllabus should not be common /repeated for any of the methods of the CIE. Each method of CIE should have a different syllabus portion of the course).

CIE methods /question paper is designed to attain the different levels of Bloom's taxonomy as per the outcome defined for the course.

Semester End Examination:

Theory SEE will be conducted by University as per the scheduled timetable, with common question papers for the subject (**duration 03 hours)**

- The question paper will have ten questions. Each question is set for 20 marks.
- There will be 2 questions from each module. Each of the two questions under a module (with a maximum of 3 sub-questions), **should have a mix of topics** under that module.
- The students have to answer 5 full questions, selecting one full question from each module.
- Theory paper will be out of 100 marks and will be **scaled down to 50 marks.**

Suggested Learning Resources:

Books

1. **Laurie, M**. *An introduction to landscape architecture*, Elsevier. 1975.
2. **Motloch, J**. *Introduction to landscape design*, John Wiley & Sons, 2001.

3. **Holden, R &Liversedge, J**. *Landscape Architecture: An Introduction*, Laurence King publishing ltd. 2014.
4. **Girot, C**. *The course of landscape architecture: A history of our designs on our natural world*, Thames & Hudson. 2016.
5. **Simonds, J O**. *Landscape Architecture: A manual of site planning and design*, McGraw- Hill, 1997.
6. **LaGro, J**. *Site Analysis: Sustainable site planning and design*, John Wiley & Sons. 2013.
7. **Birksted, J**. *Relating architecture to landscape*, E&FN Spon. 2004.
8. **Shaheer, M &Dua, G.** Landscape Architecture in India: A reader, LA, Journal of landscape architecture. 2010.

Web links and Video Lectures (e-Resources):

- https://ndl.iitkgp.ac.in
- https://www.youtube.com/watch?v=7TXJV-v_Wa4&list=PLxHgc0UFNU4vfMkxqBl9ABrZCgwr_Bjby
- https://www.youtube.com/watch?v=ettKgxoK3Tg
- https://www.youtube.com/watch?v=JBa4NUBgDNY

Activity Based Learning (Suggested Activities in Class)/ Practical Based learning

Activity 1 - Critical Study of a public project: Study of an already developed landscape project, primarily a public realm such as riverfront, lake redevelopment in terms of the existing and shifted contours and levels, impact on the watershed inclusive of the site, existing and proposed biodiversity, soft and hard landscape and its impact on ground water and soil and affected communities while development of this public project

VI Semester

Contemporary Architecture			
Course Code	**21ARC64**	CIE Marks	50
Teaching Hours/Week (L:T:P: S)	3:0:0:0	SEE Marks	50
Total Hours of Pedagogy	40	Total Marks	100
Credits	03	Exam Hours	3

Course objectives:

To do a critical survey of contemporary architecture from the 1960s to the present, and to provide an understanding and appreciation of contemporary issues and trends in Indian and western architecture in terms of ideas and directions.

Teaching-Learning Process (General Instructions)

These are sample Strategies, which teacher can use to accelerate the attainment of the various course outcomes.

1. Use of theory, activities, sketches, drawings, assignment and tutorial for teaching.
2. Evaluation by quiz, tests, classroom activities.

Module-1

1. **Architecture in India (Pre independence):** The Architecture of the Princely States of Jaipur, Bikaner and Mysore: Their city examples – clock towers, railway stations, public offices, assembly halls, water systems, public hospitals, etc. Developing an environmental and vernacular expression connection in Pre-independence architecture.

2. **Modern Architecture in India-1**: Architecture in India(Post-Independence): Works of public nature in Chandigarh and Ahmadabad (Legislative Assembly Complex including High Court, Legislative assembly and Secretariat, Chandigarh and Mill Owners "Building, Ahmadabad), IIM, Ahmadabad and its significance.
3. **Modern Architecture in India-2:**Ideas and works of BV Doshi (Institute of Indology Ahmadabad, IIM-Bangalore and Hussain-Doshi Gufa, Ahmadabad) and Charles Correa: (Vidhan Bhavan Bhopal, Jawahar Kala Kendra Jaipur, Kanchen - Junga Apartments, Mumbai and Kala Academy Panaji, Goa).

Teaching-Learning Process	1) The teacher can use PPTs, Videos to discuss the buildings, style of architecture. 2) The students need to sketch the buildings for its unique qualities. 3) Quizzes, models, seminars from students can be encouraged.

Module-2

4. **Modern Architecture in India-3:**Ideas and works of Raj Rewal and Uttam Jain (Pragati Maidan, New Delhi and Asian Games Village, New Delhi), Achyut Kanvinde(IIT, Kanpur and Nehru Science Centre, Mumbai), Uttam Jain(Lecture Theatres, Jodhpur and Engineering College, Kota).

5. **Modern Architecture in India-4:** Enrichment of Indian experience- Cost effectiveness and local influences. Lauire Baker and Anant Raje (Centre for Development Studies, Thiruvananthapuram and St. John Cathedral at Tiruvalla) and Anant Raje(IIFM, Bhopal and Management Development Centre, IIM-A). Bimal Patel (Sabarmati River front development at Ahmadabad Kashi Vishwanath Corridor Varanasi) Sanjay Mohe (Karunashraya, NIFT Chennai, Anji Reddi Memorial Hyderabad)

6. **Parallel trends in Indian architecture:** a) Revivalist- monumental, Religious b) Experimental-Pondicherry, Belgium embassy, IITB, Sriram Centre New Delhi c) Vernacular influence-Cost effective concepts

Teaching-Learning Process	1) The teacher can use PPTs, Videos to discuss the buildings, style of architecture. 2) The students need to sketch the buildings for its unique qualities. 3) Quizzes, models, seminars from students can be encouraged.

Module-3

7. **Last phase of Modern Architecture: Ideas and works of Richard Meier** (Smith House, Connecticut and Getty Centre, Brent Wood, Los Angeles) and Charles Moore (Architect's Own House at Orinda and Piazza d'Italia, New Orleans), Bernard

Tschumi (Kyoto Railway Station Project and Parc de la Villete, Paris).

8. **Ideas and works of Frank Gehry**(AeroSpace Museum, Santa Monica and Guggenheim Museum, Bilbao).

9. **High-tech architecture or Structural Expressionism-1:** An architectural style that emerged in the 1970s: The High-tech architecture practitioners include British architects Sir Norman Foster(Hong Kong Shanghai Bank and Renault Distribution Centre, Swindon, England), Sir Richard Rogers, Sir Michael Hopkins.

Teaching-Learning Process	1) The teacher can use PPTs, Videos to discuss the buildings, style of architecture. 2) The students need to sketch the buildings for its unique qualities. 3) Quizzes, models, seminars from students can be encouraged.

Module-4

10. **High-tech architecture or Structural Expressionism-2:** The High-tech architecture practitioners include Italian architect Renzo Piano (Pompidou Centre, Paris and Menil Museum, Houston) and Spanish architect Santiago Calatrava (Lyon-Satolas Railway Station and Olympic Stadium at Athens).
11. **Postmodern Architecture**: Development of Postmodernism with its origins in the alleged failure of Modern architecture from 1950s, and spreading in the 1970s and its continuous influence on present-day architecture. Ideas and works of Michael Graves, James Stirling, Robert Venturi etc.

Teaching-Learning Process	1) The teacher can use PPTs, Videos to discuss the buildings, style of architecture. 2) The students need to sketch the buildings for its unique qualities. 3) Quizzes, models, seminars from students can be encouraged.

Module-5

12. **Hyper theories of Architecture-1:** Development of postmodern architecture in 1980s is the ideas of Deconstructivism including, Frank Gehry (AeroSpace Museum, Santa Monica and Guggenheim Museum, Bilbao), Daniel Leibskind (Jewish Museum, Berlin and World Trade Centre, New York), Rem Koolhas(Dance Theatre, The Hague and Netherlands Sports Museum).

13. **Hyper theories of Architecture-2:** Ideas of Deconstructivism including, Peter Eisenman, ZahaHadid (The Peak Club, Hong Kong and IBA Housing Block 2, West Berlin), Coop Himmelb(l)au, and Bernard Tschumi.

Teaching-Learning Process	1) The teacher can use PPTs, Videos to discuss the buildings, style of architecture. 2) The students need to sketch the buildings for its unique qualities. 3) Quizzes, models, seminars from students can be encouraged.

Course outcome (Course Skill Set)

1) The students will be able to learn and compare various styles of Modern Architecture.
2) The students will be able to appreciate and learn from various phases of Contemporary Architecture and pioneers.
3) The students will be able to link the modern movement in different times.

Assessment Details (both CIE and SEE)

The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%. The minimum passing mark for the CIE is 50% of the maximum marks (25 marks). A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to each subject/ course if the student secures not less than 40% (20 Marks out of 50)in the semester-end examination(SEE), and a minimum of 50% (50 marks out of 100) in the CIE (Continuous Internal Evaluation) and a minimum of 50% (50 marks out of 100) in the sum total of the CIE (Continuous Internal Evaluation) and SEE (Semester End Examination) taken together. Based on this grading will be awarded.

Continuous Internal Evaluation:

Three Unit Tests each of **20 Marks (duration 01 hour**)

First test at the end of 5th week of the semester

Second test at the end of the 10th week of the semester

Third test at the end of the 15th week of the semester

Two assignments each of **10 Marks**

First assignment at the end of 4th week of the semester

Second assignment at the end of 9th week of the semester

Group discussion/Seminar/quiz any one of three suitably planned to attain the COs and POs for **20 Marks** (**duration 01 hours**)

At the end of the 13th week of the semester

The sum of three tests, two assignments, and quiz/seminar/group discussion will be out of 100 marks and will be **scaled down to 50 marks**

(to have less stressed CIE, the portion of the syllabus should not be common /repeated for any of the methods of the CIE. Each method of CIE should have a different syllabus portion of the course).

CIE methods /question paper is designed to attain the different levels of Bloom's taxonomy as per the outcome defined for the course.

Semester End Examination:

Theory SEE will be conducted by University as per the scheduled timetable, with common question papers for the subject (**duration 03 hours)**

The question paper will have ten questions. Each question is set for 20 marks.

There will be 2 questions from each module. Each of the two questions under a module (with a maximum of 3 sub-questions), **should have a mix of topics** under that module.

The students have to answer 5 full questions, selecting one full question from each module.

Theory paper will be out of 100 marks and will be **scaled down to 50 marks.**

Suggested Learning Resources:

Books

1) Morgan, Ann Lee & Taylor Colin , "Contemporary Architecture".
2) Bahga, Bahga and Bahga , "Modern Architecture in India", 1993, Galgotia Pub. Co.

Web links and Video Lectures (e-Resources):

- https://ndl.iitkgp.ac.in
- https://www.youtube.com/watch?v=Ym2CGp69oBQ
- https://www.youtube.com/watch?v=QkVcUJauY0Y
- https://www.youtube.com/watch?v=BfhHYPaIVwo
- https://www.youtube.com/watch?v=KQEhDJljun8
-

Activity Based Learning (Suggested Activities in Class)/ Practical Based learning
1) Sketching of the contemporary buildings from a Book/ Internet. 2) Group or Individual seminar on a building. 3) Quizzes, debates on a selected topic.

VI Semester

Building Services -IV (Acoustics & Noise Control)			
Course Code	**21ARC65**	CIE Marks	50
Teaching Hours/Week (L:T:P: S)	3:0:0:0	SEE Marks	50
Total Hours of Pedagogy	40	Total Marks	100
Credits	03	Exam Hours	3

Course objectives:

To explore the role and capacity of sound in all its variations and to enhance aural experience in built environment- within and without.

Teaching-Learning Process (General Instructions)

These are sample Strategies, which teacher can use to accelerate the attainment of the various course outcomes.

1. Use of theory, activities, sketches, drawings, assignment and tutorial for teaching.
2. Evaluation by quiz, tests, classroom activities.

Module-1

Introduction to Sound and Room Acoustics

1) **Introduction to Sound:** Origin and nature of sound, its characteristics and measurement– Amplitude, frequency, period, wavelength, velocity of sound, sound pressure, sound intensity, decibel scale, sound and distance – inverse square law. human hearing, auditory range for humans (Frequency and Intensity – threshold of audibility and pain), pitch (association with frequency), tone, loudness (association with amplitude and intensity), Phon.

2) **Room Acoustics**: Reflection - Nature of reflection from plane, convex and concave surfaces, diffraction, Absorption, Echoes, focusing of sound, dead spots, flutter echo. Room resonances, Reverberation - reverberation time (RT) calculation using Sabine's and Eyring's formulae. Effect of RT on speech and music.

Teaching-Learning Process	1) The subject teacher can use PPTs & Videos to teach basics of sound and Acoustics. 2) The students need to work on the assignments given by the teacher. 3) Quizzes, models, seminars from students can be encouraged.

Module-2

Acoustical Tools, Measurements and Materials

3) **Acoustical Tools and Measurements:** Use of SLM (Sound Level Meter), AI (Articulation Index), STI (Speech-Transmission Index), Speech Intelligibility. Sound Attenuation. Absorption coefficients of acoustical materials, NRC value, NC Curves for various spaces.

4) **Acoustical Materials:** Vernacular methods of sound insulation, Porous materials, panel absorbers, membrane absorbers, acoustical plasters, diffusers, cavity or Helmholtz resonators. Role of functional absorbers, Adjustable acoustics and variable sound absorbers. Acoustical correction and retrofits to existing spaces.

Teaching-Learning Process	1) The subject teacher can use PPTs & Videos to teach Acoustics tools & Materials. 2) The students need to work on the assignments given by the teacher. 3) Site visit for the material study and applications.

Module-3

Acoustical Design

5) **Acoustical Design of Auditoriums - Multipurpose Halls:** History of Greek, Roman theatres. Use of IS code 2526 - 1963 for design and detailing of Auditoriums - Cinema Halls - Multi- purpose Halls - Halls for speech and music.

6) **Acoustical Design and Detailing of Other Spaces** – Open air theatres, Halls for Indoor Sports, home theatres, recording studios, open plan offices, etc. Need and use of sound reinforcement systems, sound masking systems and speech privacy.

Teaching-Learning Process	1) The subject teacher can use PPTs & Videos to teach Historical developments, IS Codes, designing and detailing of auditorium. 2) The students need to work on the assignments given by the teacher. 3) Site visit to understand acoustical designing and detailing of various types of spaces.

Module-4

Noise reduction and Control	
7) **Introduction to environmental noise control:** Noise, its sources and its classification - outdoor and indoor, airborne and structure borne, impact noise, noise from ventilation system, community and industrial noise. Noise transmission, Mass law and transmission loss. Maximum acceptable noise levels. Design Principles – reduction at source, reduction near source, etc. 8) **Constructional measures of noise control and sound insulation -**Enclosures, Barriers, Sound insulation (AC Ducts and plants), Vibration isolation – control of mechanical noise, floor, wall, ceiling treatment. Sound Isolation. Construction details of composite walls, double walls, floating floors, wood-joist floors, plenum barriers, sound locks, etc. STC (Sound Transmission Class) ratings.	
Teaching-Learning Process	1) The subject teacher can use PPTs & Videos to teach problems associated with noise and measures for the same. 2) The students need to work on the assignments given by the teacher. 3) Students interaction with acoustical experts for practical solutions.
Module-5	
Noise reduction and Control-II	
9) **Industrial noise: Sources of industrial noise -** impact, friction, reciprocation, air turbulence and other noise. Methods of reduction by enclosures and barriers. 10) **Introduction to Urban Soundscape –** Introduction to Urban noise, Noise sources - Air traffic, Rail traffic, Road traffic, Seashore and inland. Traffic planning against outdoor noise. Noise reduction and control by Site planning, Town planning and Regional Planning consideration. Role of Architects / Urban Planners in shaping the urban soundscape. Sustainable design strategies in building acoustics.	
Teaching-Learning Process	1) The subject teacher could arrange for visits to acoustically designed and treated multipurpose halls - general purpose halls used for both speech and music, cinema theatres, Industrial Buildings, etc. 2) Case study reports could be submitted as group assignments. 3) Design of a multipurpose hall - rooms for speech and music for optimum acoustics - drawings and construction details of acoustical treatment.
Course outcome (Course Skill Set)	
1) The students will be able to learn and appreciate acoustics as a discipline of study. 2) The students will be able to analyse acoustical problems in an enclosed space. 3) The students will be able to coordinate with acoustical experts while designing auditorium and allied spaces.	

Assessment Details (both CIE and SEE)

The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%. The minimum passing mark for the CIE is 50% of the maximum marks (25 marks). A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to each subject/ course if the student secures not less than 40% (20 Marks out of 50)in the semester-end examination(SEE), and a minimum of 50% (50 marks out of 100) in the CIE (Continuous Internal Evaluation) and a minimum of 50% (50 marks out of 100) in the sum total of the CIE (Continuous Internal Evaluation) and SEE (Semester End Examination) taken together. Based on this grading will be awarded.

Continuous Internal Evaluation:

Three Unit Tests each of **20 Marks (duration 01 hour**)`

First test at the end of 5th week of the semester

Second test at the end of the 10th week of the semester

Third test at the end of the 15th week of the semester

Two assignments each of **10 Marks**

First assignment at the end of 4th week of the semester

Second assignment at the end of 9th week of the semester

Group discussion/Seminar/quiz any one of three suitably planned to attain the COs and POs for **20 Marks** (**duration 01 hours**)

At the end of the 13th week of the semester

The sum of three tests, two assignments, and quiz/seminar/group discussion will be out of 100 marks and will be **scaled down to 50 marks**

(to have less stressed CIE, the portion of the syllabus should not be common /repeated for any of the methods of the CIE. Each method of CIE should have a different syllabus portion of the course).

CIE methods /question paper is designed to attain the different levels of Bloom's taxonomy as per the outcome defined for the course.

Semester End Examination:

Theory SEE will be conducted by University as per the scheduled timetable, with common question papers for the subject (**duration 03 hours)**

The question paper will have ten questions. Each question is set for 20 marks.

There will be 2 questions from each module. Each of the two questions under a module (with a maximum of 3 sub-questions), **should have a mix of topics** under that module.

The students have to answer 5 full questions, selecting one full question from each module..

Theory paper will be out of 100 marks and will be **scaled down to 50 marks.**

Suggested Learning Resources:

Books

1) M.DavidEgan , "Architectural Acoustics".
2) Leslie L. Doelle , "Environmental Acoustics".
3) Vern O.Knudsen and Cyril M.Harris , "Acoustical Designing in Architecture".
4) Peter H. Parkins and H. R. Humphreys , "Acoustics, noise and buildings".
5) F.Alton Everest and Ken C. Pohlmann , "Master Handbook of Acoustics".
6) A.B. Wood, "A Text book of Sound".
7) T.M. Yarwood, "Acoustics".
8) Duncan Templeton, "Acoustics in the Built Environment".
9) J E Moore, "Design for good Acoustics and noise control".
10) T. E. Vigran , "Building Acoustics".
11) W.J. Cavanaugh, C.T. Gregory and J.A. Wikes, "Architectural Acoustics: Principles and Practices" 2nd Edition, Codes and standards–
    - National Building Code of India (NBC) 2016; Part 8 Section 4

- IS 1950: 1962 Code of practice for sound insulation of non-industrial buildings
- IS 3483: 1965 Code of practice for noise reduction in industrial buildings
- IS 4954: 1968 Recommendations for noise abatement in town planning
- IS 11050 (Part 1) 1984: Rating of sound insulation in buildings and of building elements: Part 1 Airborne sound insulation in buildings and of interior building elements
- IS 11050 (Part 2)1984: Rating of sound insulation in buildings and of building elements: Part 2 Impact sound insulation

- IS code 2526: 1963Code of practice for acoustical design of auditoriums and conference halls
-

Web links and Video Lectures (e-Resources):

- https://ndl.iitkgp.ac.in
- https://www.youtube.com/watch?v=IftFGdH52Lc
- https://www.youtube.com/watch?v=JPYt10zrclQ
- https://www.youtube.com/watch?v=akiWq97dSBA
- https://www.youtube.com/watch?v=B9u7k2V4YPw
- https://www.youtube.com/watch?v=lrNBrl9qMLw

Activity Based Learning (Suggested Activities in Class)/ Practical Based learning

1) Sketching and drawings of acoustical treatment in an auditorium building from site visit.
2) Group or Individual seminar on acoustical treatment in an auditorium building.
3) Quizzes, debates on a selected topic.

VI Semester

Building Structure -V			
Course Code	**21ARC66/21ENG66**	CIE Marks	50
Teaching Hours/Week (L:T:P: S)	3:0:0:0	SEE Marks(VIVA)	50
Total Hours of Pedagogy	40	Total Marks	100
Credits	03	Exam Hours	--

Course objectives:

Integration of structures with architectural objectives by developing an understanding of building structures and selection criteria for appropriate horizontal systems; conceptual design of long span structures for gravity and lateral wind and seismic loads.

Teaching-Learning Process (General Instructions)

These are sample Strategies, which teacher can use to accelerate the attainment of the various course outcomes.

1) The teacher can use PPTs, Videos to discuss Structural design in buildings.
2) The students need to practice Structural Design in a simple building.
3) Quizzes, models, seminars from students can be encouraged.

Module-1

1) **Introduction:** Horizontal or Long Span Structures

2) **Introduction to the Structural design Project:** Design for an Airport terminal building of dimension 75M X 300M using horizontal system. Selection of Horizontal structural systems including load calculation based on Building Codes and

Standards (indicative). 3) **Structural Analysis and Design to satisfy Building Codes and Standards:** Determine the general loads to be considered in the design of the structure, based on the type of occupancy specified for each area. a) Gravity loading: Dead and Live load calculation based on IS 875 (Part 1&2) b) Seismic loading: Seismic loading calculation based on IS 1893 Code Static Analysis Procedure c) Wind loading: Wind loading calculation based on Indian Standard I.S. 875 (Part3).	
Teaching-Learning Process	1) The teacher can use PPTs, Videos to discuss Structural design in buildings. 2) The students need to practice Structural Design with seismic loading in a simple building. 3) Quizzes, models, seminars from students can be encouraged.
Module-2	
4) **Design of Portal frame Structure System:** Design of two-dimensional rigid frames that have a rigid joint between column and beam. General framing arrangement of Portal frame for 75M X 300M building, basic load path and total structural weight calculation. 5) **Design of Arch and Vault Structures:** Design of curved structural member spanning two points, of masonry, concrete or steel and used as the roofing systems of large span buildings. Design of Arch and Vault arrangement for spanning 75M X 300M building, and basic load path and total structural weight calculation. 6) **Design of Dome Structures:** Domes as polar arrays of curved structural systems in masonry, concrete, steel with glass cladding, their structural strength and properties as roofing systems of large column-free spans. Design of dome(s) for spanning 75M X 300M building, basic load path and total structural weight calculation. 1)	
Teaching-Learning Process	1) The teacher can use PPTs, Videos to discuss Portal frame, Arch and Dome structures. 2) Site visit to large span structure building to understand the system of construction. 3) Quizzes, models, seminars from students can be encouraged
Module-3	
7) **Long Span Planar Truss Design:** Triangular structural system; assembly of simple triangular planar trusses. Planar trusses in roofs and bridges. General framing arrangement of Long Span Truss for 75M X 300M building, and basic load path and total structural weight calculation. 8) **Vierendeel truss design:** Truss design with rectangular or square assembly of members with rigid joints capable of resisting bending moments. General framing arrangement of Vierendeel truss for 75M X 300M building, and basic load path and total structural weight calculation.	

Teaching-Learning Process	1) The teacher can use PPTs, Videos to discuss Long span planar and vierendeel truss design. 2) Site visit to Long span planar and vierendeel Truss building to understand the system of construction. 3) Quizzes, models, seminars from students can be encouraged

Module-4

9) **Cable and Suspension Structures:** Design for long-span systems using Cable and suspension systems. Design cable suspended roof to span 75M X 300M building, and basic load path and total structural weight calculation.

10) **Space Truss:** Design of three dimensional trusses, their structural properties and strength due to three dimensional triangulation. Design of Space Truss roof for spanning 75M X 300M building, and basic load path and total structural weight calculation.

Teaching-Learning Process	1) The teacher can use PPTs, Videos to discuss cable and space truss design. 2) Site visit to cable and space truss structures to understand the system of construction. 3) Quizzes, models, seminars from students can be encouraged

Module-5

11) **Concrete Shell structure design:** Design of double curved surfaces formed from warped surface (e.g. hyperbolic parabolic); their properties and strength as light-weight construction for column free large spans. Design of Concrete shell roof to spanning 75M X 300M building, and basic load path and total structural weight calculation.

12) **Fabric Structure:** Design of membrane structures of thin flexible fabric covers that provide light-weight free-form roofing system. Design of Fabric roof to span 75M X 300M building, and basic load path and total structural weight calculation.

Note: a) Minimum one plate on each loading calculation and vertical structural system.
b) This course to be conducted jointly by Structures and Architecture Design Studio faculty.

Teaching-Learning Process	1) The teacher can use PPTs, Videos to discuss concrete shell and fabric structures. 2) Site visit to concrete shell and fabric structures to understand the system of construction. 3) Quizzes, models, seminars from students can be encouraged

Course outcome (Course Skill Set)

1) The students will be able to learn the structural designing of a small building.
2) The students will be able to analyse components in structural designing of a buildings.
3) The students will be able to appreciate the use of large span structure in buildings.

Assessment Details (both CIE and SEE)

The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%. The student has to obtain a minimum of 50% marks individually both in CIE and 40 % marks in SEE to pass. Semester End Exam (SEE) is conducted for 50 marks (Viva-voce) and a minimum of 50% (50 marks out of 100) in the sum total of the CIE (Continuous Internal Evaluation) and SEE (Semester End Examination) taken together. Based on this grading will be awarded

Continuous Internal Evaluation:

Three Unit Tests each of **20 Marks (duration 01 hour**)

First test at the end of 5th week of the semester

Second test at the end of the 10th week of the semester

Third test at the end of the 15th week of the semester

Two assignments each of **10 Marks**

First assignment at the end of 4th week of the semester

Second assignment at the end of 9th week of the semester

Group discussion/Seminar/quiz any one of three suitably planned to attain the COs and POs for **20 Marks** (**duration 01 hours**)

At the end of the 13th week of the semester

The sum of three tests, two assignments, and quiz/seminar/group discussion will be out of 100 marks and will be **scaled down to 50 marks**

(to have less stressed CIE, the portion of the syllabus should not be common /repeated for any of the methods of the CIE. Each method of CIE should have a different syllabus portion of the course).

CIE methods /question paper is designed to attain the different levels of Bloom's taxonomy as per the outcome defined for the course.

Semester End Examination:

1. The student needs to submit his/her works done throughout the semester, including rough sheets for the Viva examination, at least one day prior to the Viva work examination to the course teacher/coordinator.
2. The Viva-voce will be evaluated by an external teacher appointed by the University along with Course teacher or an internal examiner.

The SEE marks list generated is to be signed by both internal and external examiners and submitted to VTU in the sealed cover through the Principal of the institution

Suggested Learning Resources:

Books

1) Martin Bechthold, Daniel L Schodek , "STRUCTURES"; PHI Learning Private limited
2) Works of Felix Candela
3) Works of Frei Otto
4) Works of Hassan Fathy
5) Works of P.L. Nervi
6) Works of Sir Buck minister Fuller

Web links and Video Lectures (e-Resources):

- https://ndl.iitkgp.ac.in
- https://www.youtube.com/watch?v=AJG1Jix8NDk
- https://www.youtube.com/watch?v=PaAHW8uFNmo
- https://www.youtube.com/watch?v=SUf5h2ulf2U
- https://www.youtube.com/watch?v=uDieRHcG3x8
- https://www.youtube.com/watch?v=8iIPEojHB1g
- https://www.youtube.com/watch?v=APc0EXTw2KQ
-

Activity Based Learning (Suggested Activities in Class)/ Practical Based learning

1) Visit to a construction site to evaluate Various types of large span structures.
2) Seminar by students in groups on their learnings.

VI Semester

Working Drawing-I			
Course Code	21ARC67	CIE Marks	100
Teaching Hours/Week (L:T:P: S)	0:0:0:4	SEE Marks	-
Total Hours of Pedagogy	50	Total Marks	100
Credits	04	Exam Hours	-

Course objectives:

Introduction of Working Drawings and Details; Coordination between Architectural, Structural, Services and other disciplines; Preparation of Architectural Working Drawings for a design project.

Teaching-Learning Process (General Instructions)

These are sample Strategies, which teacher can use to accelerate the attainment of the various course outcomes.

1) The teacher can use PPTs, Videos, and a working drawing portfolio to demonstrate the preparation of working drawing for a building.
2) The students need to observe and practice the preparation of working drawing for a simple building.

Module-1

1. Introduction: Overview of Working Drawings; historical perspective; consultants involved in preparation of working drawings, their role and scope; reading, error checking, problems in working drawings.

Teaching-Learning Process	1) Students to practice working drawing in the studio. 2) Teachers need to critically exam the practice.

Module-2

2. Drafting Conventions: Representation of materials, graphic symbols, line type conventions, grid lines, lettering, colour codes, paper sizes, title blocks, office practices, standardization of details.	
Teaching-Learning Process	1) Students to practice working drawing in the studio. 2) Teachers need to critically exam the practice.
Module-3	
3. CAD Drawings: Working with layers, blocks, templates, assemblies, libraries, layouts, plot styles, error checking, editing.	
Teaching-Learning Process	1) Students to practice working drawing in the studio. 2) Teachers need to critically exam the practice.
Module-4	
4. Project work: Preparation of Architectural Working drawings and details for one of the design projects of medium rise-framed structure, from earlier semester, like Residence, Primary Health Center or School etc. Alternatively, the design of this project may be taken up at the beginning of the semester in a site measuring 30 m x 40 m or less and within B+G+3 floors.	
Teaching-Learning Process	1) Students to practice working drawing in the studio. 2) Teachers need to critically exam the practice.
Module-5	
5. Preparation of Submission Plan of the project assignment. Refer local guidelines and requirements for such building to get permission as per the byelaws. Sustainable systems like rainwater harvesting systems, solar power generation, waste management infrastructure, percolation tanks, soft landscape, trees, etc to be the fundamentals of building design, to be incorporated in the project.	
PORTFOLIO: Drawings to include Site Plan, Marking Plan, Plans at all levels, Terrace Plan; all Elevations; two Cross Sections passing through staircase & lift shaft; Profile Sections; Details to include Toilet, Kitchen, Staircase, Door, Window, Railing, Gate, Sky-light.	
NOTE: **Same project may be continued for preparation of working drawings w.r.t. structures and services for Working Drawing-II.**	
Teaching-Learning Process	1) Students to practice working drawing in the studio. 2) Teachers need to critically exam the practice.

Course outcome (Course Skill Set)

1) The students will be able to produce working drawings along with details for a small project.
2) The students will be able to work in groups and coordinate other consultants like Structural consultants, MEP consultants, Electrical consultants, Networking, fire and other consultants.

Assessment Details (CIE)

(methods of CIE need to be defined topic wise i.e.- Studio/ Class room/Tutorial discussions, Reviews, Time problems, test, Seminar or micro project)

The weightage of Continuous Internal Evaluation (CIE) is 100% and there is no Semester End Exam (SEE) .The student has to obtain a minimum of 50% marks in CIE and is conducted for 100 marks. Based on the CIE marks grading will be awarded.

Continuous Internal Evaluation:

Methods suggested:

1. Studio discussions, Reviews, Time problems, CIE tests, Seminar or micro project, Quiz, Portfolio preparation etc.
2. The class teacher has to decide the course of learning for the working drawing subject, in the beginning only. The teacher has to announce the methods of CIE for the subject in advance in writing.

Semester End Examination:

1. There is no Semester End Exam (SEE) The CIE marks list generated is to be signed by the internal examiners and submitted to VTU as per the procedure through the Principal of the institution.

Suggested Learning Resources:

Books

Time saver standards by Callender.
Time saver standards by E & OE
Time saver standards by Nuferts.

Web links and Video Lectures (e-Resources):

- https://ndl.iitkgp.ac.in
- https://www.youtube.com/watch?v=YDQqMFqjChY
- https://www.youtube.com/watch?v=FZiFAAvsJqc
- https://www.youtube.com/watch?v=Pyaw8ivOz6Q

Activity Based Learning (Suggested Activities in Class)/ Practical Based learning

1) Individual/ Group work on Template preparation for working Drawing.
2) Individual/ Group work on typical details such as staircases, Lift well, Toilets, etc for working Drawing.

VI Semester

Elective-4			
Course Code	**21ARC68X**	CIE Marks	100
Teaching Hours/Week (L:T:P: S)	2:0:0:0	SEE Marks	--
Total Hours of Pedagogy	25	Total Marks	100
Credits	02	Exam Hours	2

Course objectives:

1) To gain experience in aspects of Architecture not offered in the regular curriculum.
2) To study particular areas of the curriculum in greater depth.
3) To explore career opportunities in the allied fields.

Teaching-Learning Process (General Instructions)

These are sample Strategies, which teacher can use to accelerate the attainment of the various course outcomes.

1) The teacher may use conventional method or an innovative method to deal with the subject.
2) The students need to work with hands on experiences to gain an expertise of the chosen field.
3) The teacher needs to use performance assessments to develop real life skills in the students.

a) CULTURE AND BUILT ENVIRONMENT

Objective:

To sensitise students to culture and behavioural sciences and their influence on design and built environment

Culture is a major attribute of humans with deep evolutionary roots. It has an important role in fostering economic, social and environmental dimensions of development. This elective course explores to gather insight into cultural identity, the nature of culture as it relates to the physical environments and how people shape environments, use them and interact with them.

The course needs to address two primary enquiries:

A. Understand the interrelationship between design and behavioural sciences
B. Understand the contributions to the design field that behavioural sciences have made and can make.

Architect Amos Rapport, well-renowned for his seminal contributions to the field of environmental behavioural studies, raises three questions regarding the relationship between culture and the built environment:

1) What biosocial, psychological, and cultural characteristics of human beings, as members of a species, as individuals, an as members of various groupings, influence (and, in design, should influence) what characteristics of the built environment?
2) What effects do what aspects of what environments have on groups of people, under what circumstances and why?
3) Given these two-way interactions between people and environments, what are the

mechanisms that link them?

Guided by Rapport's questions, this course examines the role of culture in shaping built environment that varies with the type of environment, over time, for different groups, in different situations and contexts with the help of comparative studies of built environments across Indian subcontinent, South Asia and Latin America to understand the intersections of cultural practices and the built environment and their influence over one another.

References:

1. Rapoport, "A. *Culture, Architecture and Design"*, Locke Science publication, 2005.

Zube, E & Moore, G(Ed.), *"Advances in environment, behaviour and design*", Springer, 1991

b) GEOGRAPHICAL INFORMATION SYSTEM

Objective:

Geographic information system (GIS) integrates hardware, software, and data for capturing, managing, analyzing, and displaying all forms of geographically referenced information.

The course is intended to provide students with a foundation for basic GIS techniques which are relevant to architectural analysis and Presentation. The elective is intended to establish a bridge between the conceptual realms - Architecture /Site -Terrain Analysis/ Landscape architecture/Urban planning. Output being digital, online and printed maps.

Outline:

1. **<u>Introduction to GIS:</u>**

GIS as a Hardware/software/application? GIS data, Vector date, Raster data, attribute data, Data capture & methods, Coordinate reference systems

2. **<u>Introduction to Google Earth</u>**

An overview of Google Earth & KML, Google Objects, Descriptive HTML in Place marks, Ground overlays, Screen overlays, Paths, manipulating a path Polygon, taking profiles of site, creating KML files and exporting to GIS format.

3. **<u>Creating & analysing GIS data:</u>**

Capturing survey data through hand held GPS or mobile application. Traversing boundary of site , bringing routes and way point data into GIS.
Spatial data, loading raster files, Mosaic raster, Geo referencing raster and vector files, Loading data from OGC web services, databases.
Creating vector data layers, joining tabular data, Topology errors & tools, Analyzing raster data, Combining raster and vector data, Raster surface through interpolation, leveraging the power of Spatial database, Vector and raster analysis, Vector Spatial analysis (Buffers), Spatial analysis (interpolation).

4. **<u>Terrain Analysis& scientific computing of Raster dataset:</u>**

Creating Digital elevation model (DEM) from point data, Hill shade, Slope, Aspect

Creating great Maps: Composing maps: Vector styling, Labelling, Using adobe illustrator for composing multiple vector layers of maps, Designing print maps, Publishing GIS 2D maps on the web

5. **Create 3D maps:**
   3D maps in html format and navigate in the internet browser

References:

1) https://sites.duke.edu/envgis/tutorials/introduction-to-google-earth/
2) Anita Graser , "Learning QGIS" PAKT open source, 2016.
3) GISP Dr. John Van Hoesen, Dr. Luigi Pirelli, GISP Dr. Richard Smith Jr., GISP Kurt Menke, " A refreshing look at QGIS: Mastering QGIS", PACKT Pub., 2016.
4) Displaying and analysing 3D data in Surfer software.

Carson, Tom, **Baker**, Donna L., "Adobe® Acrobat® and PDF for Architecture, Engineering, and Construction", Springer publication, 2006, available as Google EBook.

c) DESIGN OF HIGH - RISE BUILDINGS

Objective:

The design and construction of skyscrapers involves creating safe, habitable spaces in very tall buildings. The buildings must support their weight, resist wind and earthquakes, and protect occupants from fire. Yet they must also be conveniently accessible, even on the upper floors, and provide utilities and a comfortable climate for the occupants. The problems posed in skyscraper design are considered among the most complex encountered given the balances required between economics, engineering, and construction management. The students may be given a snapshot of this very important typology that gives them an insight into complex world of various services that form the backbone of any skyscrapers. The students will also critically analyse the impact of tall buildings on environment and climate.

Outline:

1. Evolution of Skyscrapers
2. Basic design considerations
3. Loading and Vibrations
4. Structural systems for high rise buildings; Trussed tube & X bracing, Bundled tube, etc.
5. Economic rationale
6. Environmental Impact
7. Services in Skyscrapers
8. Fire safety in Skyscrapers
9. Skyscrapers in India

The faculty in-charge should organise inputs by inviting various consultants and visits to few high rise buildings in the area. Students may be given assignments on relevant

topics. (Activity 1)

References:

1. Basem M.M., "Construction Technology for High Rise Buildings: Handbook", 2014, CreateSpace.
2. Basem M.M., " Mechanical and Electrical Services for High Rise Buildings: Handbook", 2014, CreateSpace.
3. Mark Sarkisian, " Designing Tall Buildings: Structure as Architecture" Routledge, New york, 2012.
4. Johann Eisele&Ellen Kloft, " High-rise Manual : Typology and Design, Construction, and Technology" Birkhäuser, 2003.

Nigel Clark and Bill Price, ″ Tall Buildings: A Strategic Design Guide", RIBA & BCO, 2016.

OPEN ELECTIVE:

The college has the discretion to offer an open elective in the areas/subject/fie other than already covered under the syllabus. The college can decide to offer need based electives depending on the availability of the expertise. However, the college will require to submit the title of such electives with the course outline stating learning objectives and mode of delivering the content to the Registrar/ Registrar (evaluation) within the 15 days of the commencement of the semester.

Teaching-Learning Process	1) The teacher may use conventional method or an innovative method to deal with the subject. 2) The students need to work with hands on experiences to gain an expertise of the chosen field. 3) The teacher needs to use performance assessments to develop real life skills in the students.

Course outcome (Course Skill Set)

1) To develop desired knowledge and skill in a particular domain of Architecture
2) To develop an understanding of the processes required for the particular subject.
3) To develop an expertise in the chosen field for career enhancement.

Assessment Details (CIE)

(methods of CIE need to be defined topic wise i.e.- Studio/ Class room/Tutorial discussions, Reviews, Time problems, test, Seminar or micro project)

The weightage of Continuous Internal Evaluation (CIE) is 100% and there is no Semester End Exam (SEE) .The student has to obtain a minimum of 50% marks in CIE and is conducted for 100 marks. Based on the CIE marks grading will be awarded.

Continuous Internal Evaluation:

Methods suggested:

1. Studio discussions, Reviews, Time problems, CIE tests, Seminar or micro project, Quiz, report writing etc.
2. The class teacher has to decide the course of learning for the Elective subject, in the beginning only. The teacher has to announce the methods of CIE for the subject in advance in writing.

Semester End Examination:

1. There is no Semester End Exam (SEE) The CIE marks list generated is to be signed by the internal examiners and submitted to VTU as per the procedure through the Principal of the institution.

Web links and Video Lectures (e-Resources):

- https://ndl.iitkgp.ac.in
- https://www.youtube.com/watch?v=OFRhyaIZ_ro
- https://www.youtube.com/watch?v=y_px2caS6JU
- https://www.youtube.com/watch?v=Z1eiKW8TwVw
- https://www.youtube.com/watch?v=vJAQHA5XQWI
- https://www.youtube.com/watch?v=-syqppgcoVE
- https://www.youtube.com/watch?v=2-t2c9eiFyQ
- https://www.youtube.com/watch?v=_ZS0Mz1UA40

Activity Based Learning (Suggested Activities in Class)/ Practical Based learning

1) Students need to explore and meet an expert to understand the subject in a greater depth.
2) Students need to work with hands on experiences to develop desired skills in the field.

VI Semester

VI Semester

Study Tour			
Course Code	**21ARC69A**	CIE Marks	50
Teaching Hours/Week (L:T:P: S)	--	SEE Marks	--
Total Hours of Pedagogy	--	Total Marks	50
Credits	--	Exam Hours	--

Course objectives:

1) To expose students to historical, vernacular and contemporary architecture.

2) To document the learnings from study tour.

Teaching-Learning Process (General Instructions)

These are sample Strategies, which teacher can use to accelerate the attainment of the various course outcomes.

1) A faculty member for strength of 20 to 25 students to accompany them.
2) Teacher need to programme the tour details much in advance with the help of student leaders.
3) Details of the site visit, sketches/ drawings/photographs to be done to be informed to the group in advance.
4) A report of the study tour in a group of 4-5 students to be submitted within 3 days after returning from the tour to the Principal.

OUTLINE:

A minimum of two Study tours are to be undertaken before the commencement of 6th semester B. Architecture classes. The study tour may include places of architectural interest in India or Abroad. The choice of places and buildings to be visited is left to the concerned department / college. The students have to submit a study tour report as group work (4 to 6 students per group) within 15 days after the end of the study tour. The two reports are to be assessed by the department / colleges for progressive marks. The department/ college may use its discretion about the choice of places for study tour and suitable time schedule.

Course outcome (Course Skill Set)

1) The students will be able to work and coordinate with the teams/groups
2) The students will be able to explore new places of architectural interest.

Assessment Details (CIE)

(methods of CIE need to be defined topic wise i.e.- Studio/ Class room/Tutorial discussions, Reviews, Time problems, test, Seminar or micro project)

The weightage of Continuous Internal Evaluation (CIE) is 100% and there is no Semester End Exam (SEE) .The student has to obtain a minimum of 50% marks in CIE and is conducted for 100 marks. Based on the CIE marks grading will be awarded.

Continuous Internal Evaluation:

Methods suggested:

1. Studio discussions, Reviews, Time problems, CIE tests, Seminar or micro project, Quiz, report writing etc.
2. The class teacher has to decide the course of learning for the subject, in the beginning only. The teacher has to announce the methods of CIE for the subject in advance in writing.

Semester End Examination:

1. There is no Semester End Exam (SEE) The CIE marks list generated is to be signed by the internal examiners and submitted to VTU as per the procedure through the Principal of the institution.

Suggested Learning Resources:

Books:

1) Around India in 80 trains by Monisha Rajesh

2) A passage to India by E M Forster

3) India published by Lonely Planet

Web links and Video Lectures (e-Resources):

- https://ndl.iitkgp.ac.in
- https://www.youtube.com/watch?v=I8z0emBInNw
- https://www.youtube.com/watch?v=uL8PCKK_1yo
- https://www.youtube.com/watch?v=cbr6czX_WqY
- https://www.youtube.com/watch?v=dZnEus8uz54

Activity Based Learning (Suggested Activities in Class)/ Practical Based learning

Activity 1 - The downside of the skyscrapers in its environmental impact and the skewed aspiration of skyscraper cities.

VII Semester

Architectural Design-VII			
Course Code	**21ARC71**	CIE Marks	100
Teaching Hours/Week (L:T:P: S)	0:0:8:0	SEE Marks(VIVA)	100
Total Hours of Pedagogy	95	Total Marks	200
Credits	8	Exam Hours	----

Course objectives:

1. *To understand the subject of Architecture as an integrated field which works in tandem with Technology, Design, Economy, Ecology, Geography and Sociology etc*
2. *To rethink architecture as a man-made ecosystem, which is self-contained and sustainable*
3. *To be able to identify and Augment the right set of knowledge kit (from the learnt courses and electives) that will steer the approach to the brief in a strong direction.*

INTRODUCTION/OVERVIEW:

Post six semesters of architectural training, from introduction to architecture: Design of public buildings, in concurrence with allied subjects, the student is expected to have developed a worldview with which he/she is able to analyze a given design brief. The objective of this semester is to activate that critical mind, with an underlying emphasis on performative/responsive (including low-energy and low-carbon performance attributes) architecture. The studio has two main themes, of which any one can be proposed for a studio.

OUTLINE:

Each of the two themes approach sustenance in different ways, one which looks at traditional wisdoms of sustainability and the other which address the same through technology, digital media and evaluating efficacy in design.

Teaching-Learning Process (General Instructions)

These are sample Strategies, which teacher can use to accelerate the attainment of the various course outcomes.

Case study practices: David Adjaye architects, ke're' Architecture, Morphogenesis, CnT Architects, Small projects, Matharoo associates, Roger Anger houses, Popo Pingel architecture, Aga khan architecture

Case study concepts: Aqua ducts; Step wells; passive design elements like day lighting, natural ventilation, thermal mass, evaporation, nocturnal radiation, insulation; contemporary interpretation of vernacular elements like jaalis, jharokhas, shading, verandas; Wind towers, Solar chimneys, Water coolant systems, HVAC systems etc

1. **Meta Architecture**: The work in question will strongly root for itself. It will search meaning, solutions, and best practices from principles of regional/vernacular architecture and reincarnate itself as embodiment of contemporary expression instilled with traditional wisdom. The identity of the building will be an outcome of the interplay between the older principles and newer materials. Articulation of the building character through details will remain a primary motive of the studio. Although drawn from the traditional principles, the nature of the buildings remains current. An architectural vocabulary could be built by extending the exercise to service design, furniture design and facade development. The Program will utilize both active and passive energy efficient methods in its climatic design.

Program: Office/commercial complexes, Community centre, Institutions, Public Library etc

Teaching-Learning Process (General Instructions)

These are sample Strategies, which teacher can use to accelerate the attainment of the various course outcomes

Case study practices: Arup associates, Atelier Jean Nouvel, Heather wick Studio, SOM, Calatrava Architects, Toyo ito architects, Grimshaw architects, Thornton Tomasetti, Renzo Piano architects

Case study concepts: Responsive facades, dynamic facades, vernacular materials and passive design strategies technological innovation, exo skeletal structures, Kinetic structures, etc

2. Performative Architecture: It is the architecture, in which a building becomes a living, breathing, consuming, excreting organism. Its Facade i.e, skin of the building will simultaneously resolve the structural, aesthetic, climatic requirements of the building. Its architectural expression shall not be a static response to its context, but a dynamic one.

The engineering aspect of the building typically continues into its internal function. From foundation to form, performative architecture, rethinks the formulaic approach to building design. The program will ask the students to delve deeper into exploring diurnal patterns of solar geometry and thermal comfort conditions (daytime and night-time temperatures/humidity and wind flow patterns), and engineering vernacular materials into dynamic climate responsive skin of the building. The program will thus consider the forces of nature such as Sun, Wind, Water, and its absence as controlling parameters of its function. In order to extract maximum design mileage, the program shall be situated in regions with extreme weather conditions.

Program: Office/commercial complexes, Community centre, Institutions, Public Library etc

Course outcome (Course Skill Set)

I. In depth understanding of Green concepts, be it Vernacular, active energy efficient methods or projective models. Case study work should be presented as a knowledge sharing exercise, through models, 3d models and explanatory diagrams.

II. Building simulation models should be a mandatory output of the studio, to utilize software technology as an effective analytical and design management tool.

III. Exploring the technology powered - engineering of vernacular materials and designing elements into contemporary expression

IV. The complexity of the project can be broken down into components and treated as one/two minor projects and one major component.

Note: The suggested directions can be altered and evolved to suit the expertise of the studio faculty, keeping in mind that the studio shifts to an explorative (concept driven) path from a program driven model.

Assessment Details (both CIE and SEE)

(methods of CIE need to be defined topic wise i.e.- Studio discussions, Reviews, Time problems, test, Seminar or micro project)

The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%. The student has to obtain a minimum of 50% marks individually both in CIE and 40 % marks in SEE to pass. Semester End Exam (SEE) is conducted for 100 marks (Viva-voce) and a minimum of 50% (50 marks out of 100) in the sum total of the CIE (Continuous Internal Evaluation) and SEE (Semester End Examination) taken together. Based on this grading will be awarded

Continuous Internal Evaluation:

Methods suggested:

1. Studio discussions, Reviews, Time problems, CIE tests, Seminar or micro project, Quiz, report writing etc.
2. The class teacher has to decide the topic for the Design and Seminars if any, in the beginning only. The teacher has to announce the methods of CIE for the subject in advance in writing.

Semester End Examination:

3. The student needs to submit his/her works done throughout the semester, including rough sheets for the Viva examination, at least one day prior to the Viva work examination to the course teacher/coordinator.
4. The Viva-voce will be evaluated by an external teacher appointed by the University along with Course teacher or an internal examiner.
5. The SEE marks list generated is to be signed by both internal and external examiners and

Suggested Learning Resources:

Books

1. Elizabeth M. Golden, "Building from Tradition: Local Materials and Methods in Contemporary Architecture", 2018, Routledge.
2. Paola Sassi, "Strategies for sustainable Architecture", 2006, Taylor and Francis Group.
3. Lisa Iwamoto, "Digital Fabrications: Architectural and Material Techniques", 2009, Princeton Architectural Press.
4. Jesse Reiser, " Atlas of Novel Tectonics", 2006, Princeton Architectural Press.
5. Russell Fortmeyer, Charles F. Linn, " Kinetic Architecture: Designs for Active Envelopes", 2014, The Images Publishing Group.
6. Michael Fox, " Interactive Architecture: Adaptive World", 2016, Princeton Architectural Press.

Web links and Video Lectures (e-Resources):

- https://ndl.iitkgp.ac.in
- https://www.youtube.com/watch?v=koMAXj9OpPM
- https://www.youtube.com/watch?v=0fuE2_Qg8_w
- https://www.youtube.com/watch?v=Lzn-7tcmiY4
- https://www.youtube.com/watch?v=kdxPj3bV2XU
- http://architectureinthemaking.se/projects/meta-urbanism
- https://www.youtube.com/watch?v=LWiU06imMks

Activity Based Learning (Suggested Activities in Class)/ Practical Based learning

Activity 1: Case study of Green Buildings in nearby place.

Activity 2: write a Research Paper on Meta and Performative Architecture in a regional context.

Activity 3: Study of Responsive facades, dynamic facades, vernacular materials and passive design strategies technological innovation, etc based on performative architecture.

VII Semester

Materials and Methods in Building Construction -VII			
Course Code	**21ARC72**	CIE Marks	50
Teaching Hours/Week (L:T:P: S)	1:0:3:0	SEE Marks(VIVA)	50
Total Hours of Pedagogy	50	Total Marks	100
Credits	04	Exam Hours	-

Course objectives:

To familiarize students with construction techniques in interior spaces and to provide an introduction to prefabrication design, analysis and manufacture processes. This course will also bring in the aspect of environmental impact, energy intensiveness, carbon emissions and circularity (recyclability) of each material studied.

Teaching-Learning Process (General Instructions)

These are sample Strategies, which teacher can use to accelerate the attainment of the various course outcomes.

1. The subject teacher to link the studio work with on site work by arranging site visits in the nearby areas.
2. The subject teacher to highlight the uses of various types of Manufactured Wood used in buildings.

Module-1

1. **Introduction to wood products as building material:** Plywood, block board, particle board, hard board, laminates, MDF, HDF, HDPE wood wool, etc
2. **Interior residential construction:** Detail of wardrobes and showcases in wood, Ferro cement and stone.

Teaching-Learning Process	1. The subject teacher to link the studio work with on site work by arranging site visits in the nearby areas. 2. The subject teacher to highlight the uses of various types of Manufactured Wood used in buildings.

Module-2

3. **Interior residential construction:** modular kitchens and cabinet shelves.
4. **Interior office construction:** book selves, file cabinets and workstations. Partition systems: wall and ceiling using plywood, PVC, marble, granite, aerated concrete blocks, gypsum board, glass etc.

Teaching-Learning Process	1. Visit to interior sites/ factories/showrooms for hands on experience with materials and methods of construction. 2. Document and write a report on uses of various types of Manufactured Wood used in buildings. 3. Minimum one plate on each construction topic. Study of material applications in the form of a portfolio.

Module-3

5. **False ceiling systems**: Fibre board, plaster of Paris, particle board, wood wool, metals, straw and any other materials introduced in the market including acoustic ceiling. Study of recyclability of above mentioned false ceiling materials
6. **Pre stressing and post tensioning**: Introduction to pre-stressing and post tensioning of building components especially floor slabs and beams.

Teaching-Learning Process	1. Visit to interior sites/ factories/showrooms for hands on experience with materials and methods of construction. 2. Document and write a report on site visit. 3. Minimum one plate on each construction topic. Study of material applications in the form of a portfolio.

Module-4

7. **Introduction to Advanced foundation:** Mat foundations, Pile foundations; different types of piles, precast piles, cast-in-situ piles in wood concrete and steel.
8. **Pile foundation construction:** method of driving piles, Sheet piling, pile caps, etc.
9. **Earth retaining structure:** Selection, Design, Construction of retaining structures including gravity, cantilever, sheet pile, and anchored earth and mechanically stabilized earth (reinforced earth) walls.

Teaching-Learning Process	1. Visit to construction sites for hands on experience with materials and methods of construction. 2. Document and write a report on site visit. 3. Minimum one plate on each construction topic. Study of material applications in the form of a portfolio.

Module-5

10. **Bamboo Construction:** detailing of walls, wall panels, doors, windows and roof in Bamboo. Qualitatively and quantitatively study the material's contributions to/resistance to increased building solar heat gain in the tropics, increase or reduction in air conditioning load and hence artificial cooling energy needs, and ability/inability to promote natural unassisted night-time cooling through spontaneous release of accumulated heat Study the life cycle environmental impacts, carbon emissions and circularity (recyclability) of bamboo as a material used in building construction.

11. **Prefabrication in India:** Advantages and relevance in the Indian context. Prefabrication: Design, analysis and manufacture processes. Study of one example.

12. **Introduction to advanced methods of Building construction:** CAD /CAM fabrication and 3D printing. Analyze the larger impact of the advanced methods on the construction industry in Indian context.

Teaching-Learning Process	1. Visit to construction sites for hands on experience with materials and methods of construction. 2. Document and write a report on site visit. 3. Minimum one plate on each construction topic. Study of material applications in the form of a portfolio.

Course outcome (Course Skill Set)

1. The students will be able to work with ply wood and false ceiling system on Interior projects.
2. The students will be able to explore various advances such as pile foundation, Pre fabrication, Bamboo and 3D printing in building construction.

Assessment Details (both CIE and SEE)

(methods of CIE need to be define topic wise i.e.- Submission of construction drawing sheets, Journal of materials, Multiple Choice Question, Quizzes, Open book test, Seminar or micro project)

The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%. The student has to obtain a minimum of 50% marks individually both in CIE and 40 % marks in SEE to pass. Semester End Exam (SEE) is conducted for 50 marks (Viva-voce) and a minimum of 50% (50 marks out of 100) in the sum total of the CIE (Continuous Internal Evaluation) and SEE (Semester End Examination) taken together. Based on this grading will be awarded.

Continuous Internal Evaluation:

1. Methods suggested: Submission of Construction sheets, Journal of Materials, Test, Written Quiz, Seminar, report writing etc.
2. The class teacher has to decide the topics for the test, Written Quiz, and Seminar. In the beginning, only the teacher has to announce the methods of CIE for the subject.

Semester End Examination:

1. The student need to submit his/her works done throughout the semester, including rough sheets for Viva voce examination, atleast one day prior to Viva voce examination to the course teacher/coordinator.

2. The work will be evaluated by an external teacher appointed by the University along with Course teacher or

Suggested Learning Resources:

Books;

2. Chudley, "Construction Technology"
3. Barry, "Construction of Buildings

Web links and Video Lectures (e-Resources):

- https://ndl.iitkgp.ac.in
- https://www.youtube.com/watch?v=SFomXXXYMXw
- https://www.youtube.com/watch?v=YSV6YMqMO5k
- https://www.youtube.com/watch?v=UZmE5bxXoLY
- https://www.youtube.com/watch?v=ymMSz3qTfJU
- https://www.youtube.com/watch?v=mNH0ZaoUf74
- https://www.youtube.com/watch?v=aHsTFooJfq4
- https://www.youtube.com/watch?v=VHOC0ZaZErE
- https://www.youtube.com/watch?v=MlIoLYty_W0
- https://www.youtube.com/watch?v=vRjGVS1FIwk
- https://www.youtube.com/watch?v=XHSYEH133HA

Activity Based Learning (Suggested Activities in Class)/ Practical Based learning

Minimum one plate on each construction topic. Site visits to be arranged by studio teachers. Study of material applications in the form of portfolio.

VII Semester

Urban Design			
Course Code	**21ARC73**	CIE Marks	50
Teaching Hours/Week (L:T:P: S)	3:0:0:0	SEE Marks	50
Total Hours of Pedagogy	40	Total Marks	100
Credits	03	Exam Hours	3

Course objectives:

1. To introduce theoretical aspects of Urban Design
2. To understand the changing attitude toward Urban form/Space and Architecture
3. To familiarize Urban Design theory through traditional and contemporary examples
4. To comprehend and dissect the formality and informality of urban design interventions
5. To understand that city design must respond to new challenges - environmental challenges, low-carbon cities, compact cities, healthy cities, etc.

Teaching-Learning Process (General Instructions)

These are sample Strategies, which teacher can use to accelerate the attainment of the various course outcomes.

1. Use of theory, activities, sketches, drawings, assignment and tutorial for teaching.
2. Evaluation by quiz, tests, classroom activities.

Module-1

Behavioural /Perceptual approach: City as visual experience– walking, observing, documenting/recording and interpreting city/ and its elements –such as neighbourhood, street, block, building, architectural elements, green spaces, heterogeneous spaces (inclusive of different parts of the city) etc **Sub module:** Theories works of Gordon Cullen, Kevin Lynch. Examples: Organic and Planned development as highlighted through Old market roads (Chor Bazaar, Old Delhi, etc) and Newer settlements (Newer settlements, shopping streets, etc).	
Teaching-Learning Process	1) The teacher can use PPTs, Videos to discuss the topics. 2) The students need to sketch the urban design elements for their unique qualities. 3) Quizzes, models, seminars from students can be encouraged
Module-2	
Social cultural Approach: study of social and cultural layer that influence urban design and architecture. Study of the transition and dependencies between formal and informal spaces. **Sub Module:** Theories / approach by Jane Jacob, Kevin Lynch Examples: Studying smaller built environment settings like a part of the market, market adjoining roads, informal vendors, etc.	
Teaching-Learning Process	1) The teacher can use PPTs, Videos to discuss the topics. 2) The students need to sketch the urban design elements for their unique qualities. 3) Quizzes, models, seminars from students can be encouraged
Module-3	
Morphological approach: built and un-built, relation with scale, size and influence of byelaws and regulation. Example showing sustainable transformation quality of space and form. Understanding the differences between organic and planned city-making through the concepts of density, building-street ratio, safety, communal significance, etc. **Sub Module:** Theory and works of Collin Rowe - Street, public square facade. Notion of Collective Memory by Aldo Rossi	
Teaching-Learning Process	1) The teacher can use PPTs, Videos to discuss the topics. 2) The students need to sketch the urban design elements for their unique qualities. 3) Quizzes, models, seminars from students can be encouraged
Module-4	

Functional and Temporal approach: contextual formal and informal urban environment and readability differences, **Sub Module:** Approach by Kevin lynch through good city form, critical study by Charles Correa & Indian example such as Connaught place, church gate, Ballard estate, Gate way of India, Chor Bazaar (Mumbai), Old Delhi, Bada Bazaar (Kolkata), etc. (Activity 1)	
Teaching-Learning Process	1) The teacher can use PPTs, Videos to discuss the topics. 2) The students need to sketch the urban design elements for their unique qualities. 3) Quizzes, models, seminars from students can be encouraged
Module-5	
Environmental approach: Relationship with physical activity and built environment, human activity and building as environment. Components of a healthy city and a city that enables healthy citizens. **Sub Module**: study by Charles Correa & Indian example (Activity 2)	
Teaching-Learning Process	1) The teacher can use PPTs, Videos to discuss the topics. 2) The students need to sketch the urban design elements for their unique qualities. 3) Quizzes, models, seminars from students can be encouraged
Course outcome (Course Skill Set) 1) The students will be able to learn and compare urban design and it's relation to Architecture. 2) The students will be able to appreciate urban design and adopt it in urban level projects. 3) The students will be able to link the learnings in a systematic way while working on an urban level project.	

Assessment Details (both CIE and SEE)

The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%. The minimum passing mark for the CIE is 50% of the maximum marks (25 marks). A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to each subject/ course if the student secures not less than 40% (20 Marks out of 50)in the semester-end examination(SEE), and a minimum of 50% (50 marks out of 100) in the CIE (Continuous Internal Evaluation) and a minimum of 50% (50 marks out of 100) in the sum total of the CIE (Continuous Internal Evaluation) and SEE (Semester End Examination) taken together. Based on this grading will be awarded.

Continuous Internal Evaluation:

Three Unit Tests each of **20 Marks (duration 01 hour**)

First test at the end of 5th week of the semester

Second test at the end of the 10th week of the semester

Third test at the end of the 15th week of the semester

Two assignments each of **10 Marks**

First assignment at the end of 4th week of the semester

Second assignment at the end of 9th week of the semester

Group discussion/Seminar/quiz any one of three suitably planned to attain the COs and POs for **20 Marks** (**duration 01 hours**)

At the end of the 13th week of the semester

The sum of three tests, two assignments, and quiz/seminar/group discussion will be out of 100 marks and will be **scaled down to 50 marks**

(to have less stressed CIE, the portion of the syllabus should not be common /repeated for any of the methods of the CIE. Each method of CIE should have a different syllabus portion of the course).

CIE methods /question paper is designed to attain the different levels of Bloom's taxonomy as per the outcome defined for the course.

Semester End Examination:

Theory SEE will be conducted by University as per the scheduled timetable, with common question papers for the subject (**duration 03 hours)**

The question paper will have ten questions. Each question is set for 20 marks.

There will be 2 questions from each module. Each of the two questions under a module (with a maximum of 3 sub-questions), **should have a mix of topics** under that module.

The students have to answer 5 full questions, selecting one full question from each module..

Theory paper will be out of 100 marks and will be **scaled down to 50 marks.**

Suggested Learning Resources:

Books

1. Aldo Rossi, "Architecture of the City", Oppositions Book, The MIT Press
2. Christopher Alexander, "A Pattern Language ", Oxford University Press, 1977.
3. Rob krier, " Street, public square facade"
4. Kamu Iyer, "Bo mbay: From Precincts to Sprawl", Popular Prakashan Ltd; 2014.
5. Kevin Lynch, "The Image of the City", MIT Press, 1960.
6. Kevin Lynch, " Good City Form", MIT Press, 1981.
7. Gordon Cullen, " The Concise Townscape", Architectural Press, 1971.
8. Charles Correa, " Housing and Urbanisation: Building Ideas for People and Cities", Thames & Hudson Ltd, 2000.

Web links and Video Lectures (e-Resources):

- https://ndl.iitkgp.ac.in
- https://www.youtube.com/watch?v=q2SmO7pPIPg
- https://www.youtube.com/watch?v=iuyc8_Eo7XQ
- https://www.youtube.com/watch?v=IFjD3NMv6Kw
- https://www.youtube.com/watch?v=ZORzsubQA_M
- https://www.youtube.com/watch?v=BMPkmprdhTA
- https://www.youtube.com/watch?v=q2SmO7pPIPg&t=85s
- https://www.youtube.com/watch?v=LWepXTUb2W0

Activity Based Learning (Suggested Activities in Class)/ Practical Based learning

Activity 1 - Smart City or Common Sense City - One group supports the notion of creating smart cities, where technology is the go-to solution for every urban problem, and common sense takes a back-seat whereas other group supports the idea of common sense cities, which might not have the cutting edge, space age technology to solve the urban problems but would at least address the need of the citizens, amount of heat that the buildings gain and thermal comfort that is provided to the residents of all economic classes.

Activity 2 - **Addressing urban challenges** - Identify a city/town/village and document its major challenges (health of the city, pollution, noise, urbanization, destruction of greenery, etc). Make groups within the class to tackle each solution and intervene with urban design solutions with the following guidelines -

1. The insight collection and Intervention must be participatory in its solving approach
2. The solution should be minimal invasive, i.e, simple, effective and most energy efficient
3. The intervention should highlight its co-benefits for either the environment and the citizens (or community).

VII Semester

Professional Practice			
Course Code	**21ARC74**	CIE Marks	50
Teaching Hours/Week (L:T:P: S)	3:0:0:0	SEE Marks	50
Total Hours of Pedagogy	40	Total Marks	100
Credits	03	Exam Hours	3

Course objectives:

To understand the responsibilities & liabilities of the Profession. To appreciate the attitude of professionalism.

Teaching-Learning Process (General Instructions)

These are sample Strategies, which teacher can use to accelerate the attainment of the various course outcomes.

1. Use of theory, activities, assignment and tutorial for teaching.
2. Evaluation by quiz, tests, classroom activities.

Module-1

1. **Profession**: Idea of profession; differences between profession, trade and business.
2. **Moral and Ethical Orientation of Architects:** Non-negotiable values of architects practicing their profession in the era of climate crisis and breach of planetary limits. Understanding architecture as a profession for healthy coexistence between the natural and built environment.
3. **Profession of architecture:** Types and extent of services offered by architects, scale of fees, stages of payment, and contract between client and architect.
4. **Practice**: Types of Architectural firms, proprietorship, partnership, associate ship and private limited firms; advantages and disadvantages of each type of firm; building clientele and projects.
5. **Office Management:** Administration of Architectural firms; basic accounting procedures, financial literacy related to personal and office matters.

Teaching-Learning Process	1) The teacher can use PPTs, Videos to discuss the idea of architectural profession 2) Quizzes, models, seminars from students can be encouraged

Module-2

6. **Code of Professional Conduct**: Architects Act of 1972, role of Council of Architecture, Indian Institute of Architects in functioning of the Profession.
7. **Architectural competitions:** guidelines of COA, procedure of conduct of competitions. Recent developments with respect to the use of title 'Architect' and other design professionals in a design competition.

Teaching-Learning Process	1) The teacher can use PPTs, Videos to discuss professional Conduct and competitions. 2) Quizzes, models, seminars from students can be encouraged

Module-3

8. **Tender**: Tender document and its content. Types of tenders, advantages and disadvantages of each type; suitability to various projects. Tender notices, opening, scrutiny, process of selection and award.
   Architect's role in tender process.
   Earnest Money Deposit, Security Deposit, Retention Amount, Mobilization Amount and Bonus & Penalty Clauses.
   Issues arising out of tendering process and the role of an architect.
9. **Contract**: General Principles, types of contract; Contract document.
   Contract Management: Architect's role in Contract Management.
   Conditions and Scope of Contract; role of an architect in ensuring completion of contract.

Issues arising in Contract: i) Termination of contract, ii) Certificates of value and quality, iii) Virtual completion and final completion, iv) Defects liability period, v) Latent and patent defects, vi) Liquidated and un-liquidated damages, vii) Extension of time, delays and penalty, viii) Non tendered items, extras, extra work, additional works, variations, rate analysis and

architect's role in certification of variations,
ix) Prime cost, provisional sum.

Supervision and Contract Administration: Site visits, site meeting, co-ordination with various agencies, site book, site instructions, clerk of works and site office.
Bill checking, quality auditing, handover procedures and final certification.

Disputes in contract and architect's role in resolving disputes. Case studies from practice highlighting disputes in contract and methods adopted to solve such disputes.

Teaching-Learning Process	1) The teacher can use PPTs, Videos to discuss Tender and contract management 2) Quizzes, models, seminars from students can be encouraged

Module-4

10. **Byelaws**: Building byelaws, National Building Code, floor area ratio, floor space index, floating FAR, zoning regulations.
    Overview of Master Plan/CDP of relevant cities.
11. **Arbitration**: Arbitration and conciliation; arbitrator, umpire, order of reference, selection of arbitrators, powers and duties of arbitrators, arbitration award and implementation of award.
12. **Valuation and Dilapidation**: Definitions and architect's role in preparation of valuation and dilapidation reports and certifications; Physical and Economic life of buildings.
    Introduction to Valuation, essential characteristics, classifications and purpose of classifications. Methods of valuation, standard rent and cost of construction.

Teaching-Learning Process	1) The teacher can use PPTs, Videos to discuss use of building bye laws in submission plans, Arbitration and Valuation works. 2) Quizzes, models, seminars from students can be encouraged

Module-5

13. **Building Industry**: General overview of the industry; various participants and dimensions of building industry.
    Role of architect, employer, and contractor in sustainable buildings and developments.
    Types of insurance necessary during contract; fire insurance
14. **Easements**: easement rights, architect's role in protecting easement rights.
    Laws related to Property and Land: Land tenure, types of land holdings, land registration, easement rights, covenants, trespass and nuisance etc.
15. **General Law**: Overview & definition of common law, statute law, equity, criminal law, civil law etc., Role of courts in dispensing various types of cases.
    Overview of recent Bills and Acts: Real Estate (Regulation and Development) Act 2016; Land Acquisition Act, Rehabilitation Act and Resettlement Act 2013; Consumer Protection Act. FDI in real estate, Goods & Service Taxes and other taxes applicable in architecture practice and construction industry (Activity1).

Teaching-Learning Process	1) The teacher can use PPTs, Videos to discuss the challenges of Building Industry and laws related to it. 2) Quizzes, models, seminars from students can be encouraged

Course outcome (Course Skill Set)

1) The students will be able to understand of Architectural Profession set up.
2) The students will be able to handle the challenges of Architectural Profession.

Assessment Details (both CIE and SEE)

The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%. The minimum passing mark for the CIE is 50% of the maximum marks (25 marks). A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to each subject/ course if the student secures not less than 40% (20 Marks out of 50)in the semester-end examination(SEE), and a minimum of 50% (50 marks out of 100) in the CIE (Continuous Internal Evaluation) and a minimum of 50% (50 marks out of 100) in the sum total of the CIE (Continuous Internal Evaluation) and SEE (Semester End Examination) taken together. Based on this grading will be awarded.

Continuous Internal Evaluation:

Three Unit Tests each of **20 Marks (duration 01 hour**)

First test at the end of 5th week of the semester
Second test at the end of the 10th week of the semester
Third test at the end of the 15th week of the semester

Two assignments each of **10 Marks**

First assignment at the end of 4th week of the semester
Second assignment at the end of 9th week of the semester

Group discussion/Seminar/quiz any one of three suitably planned to attain the COs and POs for **20 Marks** (**duration 01 hours**)

At the end of the 13th week of the semester

The sum of three tests, two assignments, and quiz/seminar/group discussion will be out of 100 marks and will be **scaled down to 50 marks**

(to have less stressed CIE, the portion of the syllabus should not be common /repeated for any of the methods of the CIE. Each method of CIE should have a different syllabus portion of the course).

CIE methods /question paper is designed to attain the different levels of Bloom's taxonomy as per the outcome defined for the course.

Semester End Examination:

Theory SEE will be conducted by University as per the scheduled timetable, with common question papers for the subject (**duration 03 hours)**

The question paper will have ten questions. Each question is set for 20 marks.
There will be 2 questions from each module. Each of the two questions under a module (with a maximum of 3 sub-questions), **should have a mix of topics** under that module.

The students have to answer 5 full questions, selecting one full question from each module.
. Theory paper will be out of 100 marks and will be **scaled down to 50 marks.**

Suggested Learning Resources:

Books

1) Namavathi, Roshan, Professional Practice for Architects and Engineers, Lakhani Book, New Delhi, 2001.
2) Krishnamurthy K G and Ravindra S V, Professional Practice, S V Ravindra, 2009, Bangalore

Web links and Video Lectures (e-Resources):

- https://ndl.iitkgp.ac.in
- https://www.youtube.com/watch?v=nLUU6wcA3qE
- https://www.youtube.com/watch?v=tDhcuESzzpU
- https://www.youtube.com/watch?v=_zw1CFfe64E&list=RDCMUCtbDLHGwjicfYiH0UYU6dfw&index=19
- https://www.youtube.com/watch?v=rMGIVCgzF58
- https://www.youtube.com/watch?v=aGdPq2IATKM
- https://www.youtube.com/watch?v=KYw5p5Mklmg
- https://www.youtube.com/watch?v=ppchaXYwSxw
- https://www.youtube.com/watch?v=LH9cXw6rVgs
- https://www.youtube.com/watch?v=0S2T6crurEE

Activity Based Learning (Suggested Activities in Class)/ Practical Based learning

Activity 1: Decode and read one Act, rule, law: Divide the class into 3- groups and each group can pick up one law, rule, act, program and study in detail. Interpret its meaning and identify and understand the inclusivity and loopholes. Reflect on the policies that impact holistic architecture design.

VII Semester

Estimation & Costing			
Course Code	**21ARC75**	CIE Marks	50
Teaching Hours/Week (L:T:P: S)	2:1:0:0	SEE Marks	50
Total Hours of Pedagogy	40	Total Marks	100
Credits	03	Exam Hours	3

Course objectives:

To develop the necessary skills for establishing and writing specifications based on proposed materials for the preparation of Bill of Quantities leading to cost estimation of proposed architectural works. To develop the sensitivity and necessary skills for calculating the environmental cost of a building.

Teaching-Learning Process (General Instructions)

These are sample Strategies, which teacher can use to accelerate the attainment of the various course outcomes.

1. Use of theory, activities, sketches, drawings, assignment and tutorial for teaching.
2. Evaluation by quiz, tests, classroom activities.

Module-1

1) **Introduction to Estimation**: Need for estimation, relationship between choice of materials, their specifications, Bill of Quantities (BOQ), project costing, project quality/cost/ time management.

2) **Specifications:** How to arrive at abstract and detailed specifications for various materials leading to 'items of work' used in construction?. Including influence and impact of local and national building codes on specifications.

Teaching-Learning Process	1) The teacher can use PPTs, Videos to discuss the Estimation and Specification. 2) The students need to understand different terminologies used. 3) Quizzes, journals, seminars from students can be encouraged
Module-2	
3) **Bill of Quantities (BOQ)**: Why and how to build flexibility, resilience and redundancy in BOQ. 4) **Mandatory tests & Safety Measures in Specifications**: Procedures, frequency and submission of results as part of specifications and their inclusion in the BOQ for different materials document. Integrating workers' safety and material security into specifications.	
Teaching-Learning Process	1) The teacher can use PPTs, Videos to discuss the BOQ and Specifications. 2) The students need to practice the preparation of BOQ. 3) Quizzes, Journals, seminars from students can be encouraged.
Module-3	
5) **Introduction to Costing:** Why do rates vary? - Study of government rates (CPWD/ Karnataka PWD Schedule of Rates) and market rates. Concept of inflation and its effect on costing.eg. escalation clause, extra items, variations 6) **Introduction to Life Cycle Costing (Environmental and Financial) of a building:** This section will train students how to assess the emissions and cost tradeoffs of increased material use and/or integration of passive design/low-carbon systems features (e.g. increased embodied carbon emissions of concrete in thick-walls vs. conventional walls, increased capital cost of double-glazing versus single-glazing, increased capital cost of radiant cooling vs. conventional air conditioning etc.) to determine the overarching long-term financial and environmental cost benefits of sustainable designs relative to business-as-usual architecture **(Activity - Calculate the environmental valuation of any of your studio's design)** 7) **Detailed rate analysis of building**: Basic knowledge of items as per current schedule of rates (CSR) of local PWD. Percentages (based on thumb rule calculations) of various bulk materials used in construction like cement, steel, rubble, metal, sand, brick, tiles etc.	
Teaching-Learning Process	1) The teacher can use PPTs, Videos to discuss the Costing and rate analysis. 2) The students need to practice the preparation of BOQ. 3) Quizzes, Journals, seminars from students can be encouraged
Module-4	

8) **Introduction to sequence of construction activity:** Project time/ labour /materials costing and impact of delay in project on costing.
9) **Term project 1**: Detailed specifications writing and estimation of Bill of Quantities (BOQ) for an RCC framed house with an attached temporary shed.
10) **Term project 2**: Detailed specifications writing and estimation of Bill of Quantities (BOQ) for an office interior work.

Teaching-Learning Process	1) The teacher can use PPTs, Videos to discuss the construction activity. 2) The students need to practice the preparation of specification writing and estimation of BOQ for a given assignment. 3) Quizzes, Journals, seminars from students can be encouraged

Module-5

11) **Term project 3**: Detailed specifications writing and estimation of Bill of Quantities (BOQ) for Water supply and sanitary works including overhead tanks and Sump tanks.
12) **Term project 4**: Detailed specifications writing and estimation of Bill of Quantities (BOQ) for a typical residential layout plan with roads, culverts, pavements, etc.
13) **Term project 5**: Detailed specifications writing and estimation of Bill of Quantities (BOQ) for a typical low cost housing layout plan (a rehabilitated slum) with roads, culverts, pavements, water distribution, power distribution, all basic amenities included etc.
14) **Billing requirements:** Role of the architect in monitoring the specifications follow-up for quality control, the measurement book (MB), RA bills, interim and final checking and certification of works on site based on the BOQ and terms of contracts.

Teaching-Learning Process	1) The teacher can use PPTs, Videos to discuss the specification writing. 2) The students need to practice the preparation of specification writing and estimation of BOQ for a given assignment. 3) Quizzes, Journals, seminars from students can be encouraged

Course outcome (Course Skill Set)

1) The students will be able to prepare specifications, Rate Analysis and estimation for a small building.
2) The students will be able to follow up quality measures through specifications.
3) The students will be able prepare Bill of quantities.

Assessment Details (both CIE and SEE)

The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%. The minimum passing mark for the CIE is 50% of the maximum marks (25 marks). A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to each subject/ course if the student secures not less than 40% (20 Marks out of 50)in the semester-end examination(SEE), and a minimum of 50% (50 marks out of 100) in the CIE (Continuous Internal Evaluation) and a minimum of 50% (50 marks out of 100) in the sum total of the CIE (Continuous Internal Evaluation) and SEE (Semester End Examination) taken together. Based on this grading will be awarded.

Continuous Internal Evaluation:

Three Unit Tests each of **20 Marks (duration 01 hour**)

First test at the end of 5th week of the semester

Second test at the end of the 10th week of the semester

Third test at the end of the 15th week of the semester

Two assignments each of **10 Marks**

First assignment at the end of 4th week of the semester

Second assignment at the end of 9th week of the semester

Group discussion/Seminar/quiz any one of three suitably planned to attain the COs and POs for **20 Marks** (**duration 01 hours**)

At the end of the 13th week of the semester

The sum of three tests, two assignments, and quiz/seminar/group discussion will be out of 100 marks and will be **scaled down to 50 marks**

(to have less stressed CIE, the portion of the syllabus should not be common /repeated for any of the methods of the CIE. Each method of CIE should have a different syllabus portion of the course).

CIE methods /question paper is designed to attain the different levels of Bloom's taxonomy as per the outcome defined for the course.

Semester End Examination:

Theory SEE will be conducted by University as per the scheduled timetable, with common question papers for the subject (**duration 03 hours)**

The question paper will have ten questions. Each question is set for 20 marks.

There will be 2 questions from each module. Each of the two questions under a module (with a maximum of 3 sub-questions), **should have a mix of topics** under that module.

The students have to answer 5 full questions, selecting one full question from each module.

Theory paper will be out of 100 marks and will be **scaled down to 50 marks.**

Suggested Learning Resources:

Books

1. DuttaB.N ,Estimating and Costing in Civil Engineering- Theory and Practice, UBS Publishers, 1993.
2. Rangwala, Estimating, Costing and Valuation, Charotar Publishing House.

Web links and Video Lectures (e-Resources):

- https://ndl.iitkgp.ac.in
- https://www.youtube.com/watch?v=7rc-pG3f0DM&list=PLWbmeZJ9qIMae-i-sx9MiIRIHuY0svIsO&index=2
- https://www.youtube.com/watch?v=K8swOXombek
- https://www.youtube.com/watch?v=Cm4VgLLXtss&list=RDCMUCfk6bln_Pp8dYgDk1f5FWCQ&index=9
-

Activity Based Learning (Suggested Activities in Class)/ Practical Based learning

1) Visit to PWD sub division office and observe the preparation of an estimate and specification as per PWD norms.
2) Practicing/ making of small building estimation with specification as per PWD norms.
3) Practicing/ making rate analysis in the estimation above as per PWD norms.

VII Semester

Interior Design			
Course Code	**21ARC76**	CIE Marks	50
Teaching Hours/Week (L:T:P: S)	0:0:3:0	SEE Marks(VIVA)	50
Total Hours of Pedagogy	40	Total Marks	100
Credits	03	Exam Hours	----

Course objectives:

This course aims to introduce the students to the discipline of Interior Design and to develop skills required for handling interior design projects. The course shall equip the students with theoretical, conceptual, practical and creative aspects of Interior Design along with its allied fields with particular emphasis on ***commercial****,* ***habitat [residential & hospitality], educational*** *and* ***public space interiors.***

Teaching-Learning Process (General Instructions)

These are sample Strategies, which teacher can use to accelerate the attainment of the various course outcomes.

1. Use of theory, activities, sketches, drawings, assignment and tutorial for teaching.
2. Evaluation by studio work, quiz, tests, classroom activities.

Module-1

- **INTRODUCTION:**
  Definition and process of interior design; difference between interior design and decoration; vocabulary of interior design through elements in interior design like colour, materials, furniture, lighting; aspects of interior design related specifically to typology and function, difference between themes and concepts in interior design.

- **OVERVIEW:**

Overview of history of Interior Design in the Western, Asian and Indian context through the ages relating to contemporary design; theories and design movements in Interior Design; evolution of space planning concepts and design ideas; influence of the vernacular, folk arts and crafts of a region on its Interior Design; role of activity and anthropometrics in Interior Design; design psychology and perception through color, light, scale, proportion, enclosure and fenestration

Teaching-Learning Process	1) The teacher can use PPTs, Videos to discuss the Interior design. 2) The students need to sketch/draw the designs. 3) drawings, models, seminars from students can be encouraged

Module-2	
• **COMPONENTS OF INTERIOR DESIGN:** Functional, aesthetic and psychological aspects of interior space components; design, material choice, method of construction, treatment and finishes of components such as floors, ceilings, walls, partitions, fenestrations; fixtures in relation to space design and construction technology.	
Teaching-Learning Process	1) The teacher can use PPTs, Videos to discuss the Interior design. 2) The students need to sketch/draw the designs. 3) drawings, models, seminars from students can be encouraged
Module-3	
• **INTEGRATION OF INTERIOR SPACE WITH SERVICES:** Addressing user specific needs and scope of design of services as fundamental aspects of interior design; enhancement of space experience with integration of supporting services like climatic comfort, air conditioning, plumbing and sanitation, electrical, lighting, air conditioning and acoustics.	
Teaching-Learning Process	1) The teacher can use PPTs, Videos to discuss the designs. 2) The students need to sketch/draw the designs. 3) drawings, models, seminars from students can be encouraged
Module-4	
• **ALLIED FIELDS – FURNITURE DESIGN & PLANTSCAPE:** Role of furniture, ergonomic factors of furniture design and materials used; Design and types of furniture based on its style, characteristics and functional application, barrier free and inclusive design; design for the specially abled; materials and methods of construction of furniture, design trends, the concept of reuse and repurpose, innovations and ideas of furniture for specific types of interiors; integration of interior landscaping elements like plants, water, paving, artifacts, etc. and their physical properties and effects on spaces.	
Teaching-Learning Process	1) The teacher can use PPTs, Videos to discuss the designs. 2) The students need to sketch/draw the designs. 3) drawings, models, seminars from students can be encouraged
Module-5	
• **ALLIED FIELDS – LIGHTING DESIGN:** Concepts and perceptions in interior lighting design; day lighting natural over artificial, its modulation of lighting [artificial and natural lighting] to develop strategies for interior space and element relationship; quantitative vs. qualitative aspects of lighting design; emphasis of design features like focal points in interior design using lighting; different types of interior lighting fixtures - their effects and suitability in different contexts.	

DESIGN PROJECT – MINOR AND MAJOR:

Interior design is a user centric approach where both the function and aesthetics get their due consideration. The understanding of all the above listed aspects related to interior design will be explored, designed and detailed through two design projects [Minor and Major]. The project will delve into interior design through function, user and aesthetic based space planning and visualizations, material specification and detailing, colours, textures, furniture design and lighting design along with interior landscaping if needed. Design will be explored as a holistic approach of plan, section, details, materials, technology, services integration and views.

The minor project can look at Adaptive re-use of a space intended for completely different uses. Application of basic structural knowledge, ideas and concepts of materials, lighting, services, etc. to be applied in the project.

ASSESSMENT:

The design projects will be evaluated as assignments done individually. The assessment will be through presentations, concept / story board, all relevant drawings like plans, sectional elevations, reflected ceiling plans, flooring plans, wall sections, services layout, construction details, views, models, material samples and specification boards.

Teaching-Learning Process	Design ideation, desk feedback / crits and juries for design projects that incorporate all the learnings.

Course outcome (Course Skill Set)

1) The students will be able to learn and compare various styles of Interior Design through history.
2) The students will be able to generate schemes for interiors along with various parameters like services, furniture, space requirements, etc.
3) The students will be sensitive in using various materials judiciously.

Assessment Details (both CIE and SEE)

The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%. The student has to obtain a minimum of 50% marks individually both in CIE and 40 % marks in SEE to pass. Semester End Exam (SEE) is conducted for 50 marks (Viva-voce) and a minimum of 50% (50 marks out of 100) in the sum total of the CIE (Continuous Internal Evaluation) and SEE (Semester End Examination) taken together. Based on this grading will be awarded

Continuous Internal Evaluation:

Three Unit Tests each of **20 Marks (duration 01 hour**)

First test at the end of 5th week of the semester

Second test at the end of the 10th week of the semester

Third test at the end of the 15th week of the semester

Two assignments each of **10 Marks**

First assignment at the end of 4th week of the semester

Second assignment at the end of 9th week of the semester

Group discussion/Seminar/quiz any one of three suitably planned to attain the COs and POs for **20 Marks** (**duration 01 hours**)

At the end of the 13th week of the semester

The sum of three tests, two assignments, and quiz/seminar/group discussion will be out of 100 marks and will be **scaled down to 50 marks**

(to have less stressed CIE, the portion of the syllabus should not be common /repeated for any of the methods of the CIE. Each method of CIE should have a different syllabus portion of the course).

CIE methods /question paper is designed to attain the different levels of Bloom's taxonomy as per the outcome defined for the course.

Semester End Examination:

1. The student needs to submit his/her works done throughout the semester, including rough sheets for the Viva examination, at least one day prior to the Viva work examination to the course teacher/coordinator.
2. The Viva-voce will be evaluated by an external teacher appointed by the University along with Course teacher or an internal examiner.

The SEE marks list generated is to be signed by both internal and external examiners and submitted to VTU in the sealed cover through the Principal of the institution.

Suggested Learning Resources:

Books

1. Pile, John.F, "Interior Design", Pearson; 4 edition (2007)
2. Ching, Francis D.K., "Interior Design Illustrated", John Wiley & Sons; 3 edition (2012)
3. Panero, Julius and Zelnik, Martin, "Human Dimension and Interior Space: A Source Book of Design Reference Standards", Watson-Guptill; New edition (1979)
4. DeChiara, Joseph, Panero, Julius and Zelnik, Martin "Time Saver's Standards for Interior Design", McGraw-Hill Professional (2001)
5. Rengel, Roberto J, "The Interior Plan: Concepts and Exercises", Bloomsbury Academic USA; 2nd Revised edition (2016)
6. Mitton, Maureen, "Interior Design Visual Presentation: A Guide to Graphics, Models and Presentation Techniques", John Wiley & Sons; 4 edition (2012)
7. Pile, John.F, "A History of Interior Design Hardcover", John Wiley & Sons Inc (2000)
8. Kurtich, John &Eakin, Garret, "Interior Architecture", John Wiley & Sons (1995)

Web links and Video Lectures (e-Resources):

- https://ndl.iitkgp.ac.in
- https://www.youtube.com/watch?v=MCFhn7szorA
- https://www.youtube.com/watch?v=3lYNWsyZ720
- https://www.youtube.com/watch?v=DVPp2iEYgf0
- https://www.youtube.com/watch?v=YJQPlS4uCHc
- https://www.youtube.com/watch?v=cTP5hdwdF_M
- https://www.youtube.com/watch?v=WFXieuIcPdU
- https://www.youtube.com/watch?v=6cHGEgW3urw
- https://www.youtube.com/watch?v=hlo2_rth8NQ

Activity Based Learning (Suggested Activities in Class)/ Practical Based learning

- Presentations and discussions on various concepts and components of interior design, integration of services with interior design and allied fields like furniture design and lighting design.

- Interactions with industry experts like interior designers, lighting designers and service consultants to share their experience and perspective on interior design.

- Visit to interior construction sites to understand the process of construction and prototyping and lighting product manufacturing factory visits.

- Material sample and specification compilation along with vendor input to augment the understanding of material detailing with latest technology.

- Design ideation, desk feedback / crits and juries for design projects that incorporate all the learnings.

VII Semester

Working Drawing-II			
Course Code	21ARC77	CIE Marks	100
Teaching Hours/Week (L:T:P: S)	0:0:0:4	SEE Marks	---
Total Hours of Pedagogy	50	Total Marks	100
Credits	04	Exam Hours	---

Course objectives:

Introduction to 'Good for Construction' drawings; Preparation of Structural, Electrical, Water Supply and Sanitary drawings for the project from previous semester; Comprehensive set of drawings.

Teaching-Learning Process (General Instructions)

These are sample Strategies, which teacher can use to accelerate the attainment of the various course outcomes.

1) The teacher can use PPTs, Videos, and a working drawing portfolio to demonstrate the preparation of working drawing for a building.

2) The students need to observe and practice the preparation of working drawing for a simple building.

OUTLINE:

1. Project Work: Project continued from previous semester; Preparation of structural and services drawings and details.
2. Structural drawings: Conventions & symbols; Foundations, Columns, Beams, Slab.
3. Electrical drawings: Conventions & symbols; Plans at all levels.
4. Water Supply drawings: Conventions & symbols; Plans at all levels.
5. Sanitary drawings: Conventions & symbols; Plans at all levels; Site Plan, Terrace Plan
6. Mechanical drawings: Conventions & symbols; Plans at all levels; Details of Lift.
7. Complete integration of Architectural, Structural and Services drawings and details

Teaching-Learning Process	1) The teacher can use PPTs, Videos, and a working drawing portfolio to demonstrate the preparation of working drawing for a building. 2) The students need to observe and practice the preparation of working drawing for a simple building.

Course outcome (Course Skill Set)

1) The students will be able to produce working drawings along with details for a small project.

2) The students will be able to work in groups and coordinate other consultants like Structural consultants, MEP consultants, Electrical consultants, Networking, fire and other consultants.

Assessment Details (CIE)

(methods of CIE need to be defined topic wise i.e.- Studio/ Class room/Tutorial discussions, Reviews, Time problems, test, Seminar or micro project)

The weightage of Continuous Internal Evaluation (CIE) is 100% and there is no Semester End Exam (SEE) .The student has to obtain a minimum of 50% marks in CIE and is conducted for 100 marks. Based on the CIE marks grading will be awarded.

Continuous Internal Evaluation:

Methods suggested:

1. Studio discussions, Reviews, Time problems, CIE tests, Seminar or micro project, Quiz, Portfolio preparation etc.
2. The class teacher has to decide the course of learning for the working drawing subject, in the beginning only. The teacher has to announce the methods of CIE for the subject in advance in writing.

Semester End Examination:

1. There is no Semester End Exam (SEE) The CIE marks list generated is to be signed by the internal examiners and submitted to VTU as per the procedure through the Principal of the institution.

Suggested Learning Resources:

Books

Time saver standards by Callender.
Time saver standards by E & OE
Time saver standards by Nuferts.

Web links and Video Lectures (e-Resources):

- https://ndl.iitkgp.ac.in
- https://www.youtube.com/watch?v=YDQqMFqjChY
- https://www.youtube.com/watch?v=FZiFAAvsJqc
- https://www.youtube.com/watch?v=Pyaw8ivOz6Q

Activity Based Learning (Suggested Activities in Class)/ Practical Based learning

1) Students to prepare structural and service detailing for working Drawing.
2) Individual/ Group work on typical service details in staircases, Lift well, Toilets, etc for working Drawing.

VII Semester

Elective-5			
Course Code	**21ARC78X**	CIE Marks	100
Teaching Hours/Week (L:T:P: S)	2:0:0:0	SEE Marks	---
Total Hours of Pedagogy	25	Total Marks	100
Credits	02	Exam Hours	---

Course objectives:

1) To gain experience in aspects of Architecture not offered in the regular curriculum.
2) To study particular areas of the curriculum in greater depth.
3) To explore career opportunities in the allied fields.

a) CRAFT IN ARCHITECTURE:

OBJECTIVE:

- *Awareness of rich traditions of Architectural craft*
- *Ways of imagining the potential of existing systems*
- *Broaden the mind beyond available construction systems*
- *Explore possibilities in Crafting of Architecture*
- *Sustainable practices in Art & Crafts.*

COURSE CONTENT:

- Introduction
- Case Studies
- Field Trip , Research to identify potential area of interest for participants to focus further on
- Interaction with Craftsmen to understand the function, material and technique
- Design Exercises focusing on crafting certain elements / parts of a Building or the overall.
- Using recyclable materials (like paper Mache), natural materials for building models.

COURSE METHODOLOGY:

- Lecture Sessions,
- Case Studies,
- Discussions,
- Research,
- Field Trips,
- Short Design Exercises.

COURSE OUTCOME:

- Appreciate finer nuances of making of Architecture into a reality.
- Overview towards the wealth of traditional / existing practices.
- Insight to potential direction of evolution of making of Architecture.
- Attempts to take forward existing systems.
- Introduction of systems form across the border of the discipline.

- Develop ability to craft making of Architecture.
- Use of sustainable materials for craft.

REFERENCES:

1. Peter Davey, "Arts & Crafts Architecture", 1997, Phaidon Press, London.
2. Maureen Meister, " Arts& Crafts Architecture", 2014, University Press of New England.
3. Miriam Delaney, "Studio Craft & Technique for Architects", 2015, Laurence King Publishing , London.
4. Brian Mackay-Lyons, "Local Architecture: Building Place, Craft and Community", 2014, Princeton Architectural Press, New York.

b) ARCHITECTURAL WRITINGS AND JOURNALISM OBJECTIVE:

This course aims to introduce writing on architecture as a method to study and interpret the built environment through analysis, criticism and review. The course shall equip the students with the fundamentals, relevant skills and techniques of various genres of architectural writing and journalism. The course should support students to write in a way that situates architecture in its social, ecological and economic context. The course shall sensitize students to the need to highlight built space issues through their journalistic endeavours.

OUTLINE:

Introduction: Overview and objectives of role of writing and journalism in architecture; Writing and Journalism skills: research, writing, editing and criticism.

Creative Writing: Techniques and methods of expressing an architectural narrative or description through forms of creative writings such as fiction, poetry, travel writing, blogging which are based on architecture or employ architecture as a context.

Analytical Writing: Techniques and methods of researching, analyzing and critiquing formal and informal architecture through forms of analytical writings such as research papers, journal writings and critical essays.

Documentation and Technical Writing: Techniques and methods of recording, authenticating and examining architecture through documentation and technical writings.

Architectural Journalism: Introduction, scope and constraints of print, audio and visual architectural journalism in the context of newspapers, radio, film, and television. Roles of an architectural journalist in furthering socio-ecological issues in built spaces (activity 1, activity 2) as a reporter, reviewer, cartoonist, interviewer, feature writer and specialist writer.

Contemporary Architectural Writing and Journalism: Issues and Potential:
Role of an architect as a writer and journalist in scripting the narrative of formal and informal architecture; Topics relevant and needed in an architectural journals and current issues; Mass Media and Public Opinion – critique of architecture through new age journalism and

technology; Issues of code of ethics, copyright, royalty, publishing rights and policies; Citation and plagiarism.

METHODS:

- Presentations on the techniques of writing different genres
- Discussions of various readings to familiarize and analyze the methods and styles of writing.
- Writing assignments related to the genres culminating in a term paper
- Interactions with architectural writers and journalists to share their experience / perspective
- Visit to Publication / Media house to understand the process of publishing

Assessment:

The individual assignments will be assessed via presentations, writings and term paper.

REFERENCES:

1. Wiseman, Carter (2014), "Writing Architecture: A Practical Guide to Clear Communication about the Built Environment", Trinity University Press
2. Lange, Alexandra (2012), "Writing About Architecture: Mastering the Language of Buildings and Cities", Princeton Architectural Press
3. Schmalz, Bill 92014), "The Architect's Guide to Writing: For Design and Construction Professionals", Images Publishing Dist Ac
4. Sykes, A. Krista (2007), "The Architecture Reader: Essential Writings from Vitruvius to the Present", George Braziller Inc.
5. Musa, Majd, Al-Asad, Mohammad (2007), "Architectural Criticism and Journalism", Umberto Allemandi& Co
6. Edward Jay Friedlander and John Lee (2000), "Feature Writing for Newspapers and Magazines", 4th edition, Longman.

Activity based learning:

Activity 1: Students are asked to critically analyse contemporary architecture media narratives and their representation of architecture in socially marginalized spaces.

Activity 2: Students are asked to visit a slum redevelopment site in the city and write an opinion essay based on their observations and interviews with relevant stakeholders.

c) BIOMIMICRY:

OBJECTIVE:

1. *To understand 'Bio mimicry' and 'Biophilia'*
2. *Reconnect with nature: learning to observe nature by function*
3. *To understand and explore how biology can be integrated with design*
4. *To examine how the 'bio mimicry approach' can influence sustainable designs and innovations*

COURSE CONTENTS:

a) Understanding Bio mimicry : theory and case studies
b) Reconnect with Nature (including a field trip)
c) Patterns of Biophilia
d) Life's principles: the universal principles all of life follows to be sustainable
e) Integrating Biology in Design: the design process along with design exercise to realize the process of discovering biological inspiration and its application

METHODOLOGY:

The course would follow the following modes of teaching:

1. Lectures sessions interwoven with games and activities to understand biomimicry concepts
2. Field trip & outdoor exercises to reconnect and seek inspiration from nature
3. Discussions & presentations
4. Library/ web research & reading
5. Interviewing scientists/ biologists
6. Design exercises (Activity 1)

LEARNING OUTCOME:

The course aims to educate and equip students in the following way:

a. Appreciate and understand cross disciplinary design practice of Biomimicry
b. Understanding of Biomimicry and biophilia& its relevance in design
c. Appreciate the importance of 'reconnection/ connection' with nature
d. Understanding Life's overarching Principles & how this can inform sustainable solutions
e. Understanding and being able to 'integrating biology in design'

REFERENCES:

1. Michael Pawlyn, "Biomimicry in Architecture", 2011, RIBA Publishing, London.
2. Dora Lee, "Biomimicry: Inventions Inspired by Nature", 2011, Kids Can Press, Toronta, Canada.
3. Stephen R. Kellert, "Biophilic Design: The Theory, Science and Practice of Bringing Buildings to Life, 2011, John Wiley & Sons, New Jersey.
4. Stephen R. Kellert, "Nature by Design: The Practice of Biophilic Design", 2018, Yale Univ.Press.
5. Benjamin R. Krueger, "Biomimicry: Nature as Designer", 2016, CreateSpace Independent Publishing Platform

Activity Based learning :

Activity 1: Visit an informal settlement and/or rural area and study the built and un built environment. Identify the existing character, forces and challenges of the setting and design

a common community space (anganwadi, community hall, toilets etc) through bio mimicking.
.

` OPEN ELECTIVE:

The college has the discretion to offer an open elective in the areas/subject/fie other than already covered under the syllabus. The college can decide to offer need based electives depending on the availability of the expertise. However, the college will require to submit the title of such electives with the course outline stating learning objectives and mode of delivering the content to the Registrar/ Registrar (evaluation) within the 15 days of the commencement of the semester.

Assessment Details (CIE)

(methods of CIE need to be defined topic wise i.e.- Studio/ Class room/Tutorial discussions, Reviews, Time problems, test, Seminar or micro project)

The weightage of Continuous Internal Evaluation (CIE) is 100% and there is no Semester End Exam (SEE) .The student has to obtain a minimum of 50% marks in CIE and is conducted for 100 marks. Based on the CIE marks grading will be awarded.

Continuous Internal Evaluation:

Methods suggested:

1. Studio discussions, Reviews, Time problems, CIE tests, Seminar or micro project, Quiz, report writing etc.
2. The class teacher has to decide the course of learning for the Elective subject, in the beginning only. The teacher has to announce the methods of CIE for the subject in advance in writing.

Semester End Examination:

1. There is no Semester End Exam (SEE) The CIE marks list generated is to be signed by the internal examiners and submitted to VTU as per the procedure through the Principal of the institution.

Web links and Video Lectures (e-Resources):

- https://ndl.iitkgp.ac.in
- https://www.youtube.com/watch?v=tKcyrlysQwA&t=51s
- https://www.youtube.com/watch?v=_a-QGF4p_c&t=71s
- https://www.youtube.com/watch?v=ztSxJDxGfFI
- https://www.youtube.com/watch?v=0fzKAgydTzs
- https://www.youtube.com/watch?v=f89x0rEtye8
- https://www.youtube.com/watch?v=RtZYxYEzx5k
- https://www.youtube.com/watch?v=ZzsG_AbkmmM
- https://www.youtube.com/watch?v=xwVM3DiEvdU

- https://www.acedge.in/courses/writings-in-architecture
- https://www.archdaily.com/891269/were-hiring-join-our-content-team

- https://www.youtube.com/watch?v=gRCNvZ55M2A
- https://biomimicry.org/next-design-innovation-built-environment-learning-nature/
- https://www.youtube.com/watch?v=1BNbXBQnhGg
- https://www.youtube.com/watch?v=wvAXzlHpSs8

Activity Based Learning (Suggested Activities in Class)/ Practical Based learning

1) Participating in Bamboo construction as a craft.

VII Semester

Traffic Awareness & Road Safety			
Course Code	**21ARC79**	CIE Marks	100
Teaching Hours/Week (L:T:P: S)	1:0:0:0	SEE Marks	--
Total Hours of Pedagogy	12	Total Marks	100
Credits	01	Exam Hours	--

Course objectives:

To Introduce he concept, principles, tools and aids of Road Safety and Civic Sense to the students of B Arch. To acquaint them with the design and safety standards for roads. Also inculcate the practice of safe road behaviour and civic sense among them.

Teaching-Learning Process (General Instructions)

These are sample Strategies, which teacher can use to accelerate the attainment of the various course outcomes.

1. Use of theory, activities, sketches, drawings, assignment and tutorial for teaching.
2. Evaluation by quiz, tests, classroom activities.

Module-1

1) **Introduction to Road Safety.**

Road as an active space, Types of users, User behaviour, Sensory Factors like Vision and Hearing in User Behaviour.

Types of Vehicles: Heavy Vehicles, Light Motor Vehicle, Two Wheelers, Auto- Rickshaw, Bicycles and Cycle Rickshaws, Non Motorised Vehicles.

Vehicle Characteristics: Dimensions, Weight, Turning Radii, Braking Distance, Lighting System, Tyres, etc.

Types of Hazards: Conflicts and Accidents.

Teaching-Learning Process	1) The teacher can use PPTs, Videos to discuss the topic 2) The students need to sketch/draw the technical details. 3) Quizzes, reports, seminars from students can be encouraged

Module-2

2) Typology of Roads: Components and Design

Road Classification: National Highways, State Highways, District Roads (MDR and ODR), Village Roads.

Urban Road Classification: Expressways, Arterial, Sub-Arterial, Collector, Local, Service Roads, One-Way, Two-Way etc. Mountainous Roads. Speed Limits of Road types.

Design of Roads: Cross Sectional Elements- Right of Way, Carriageway, Median, Shoulders, Side Walks, Lanes, Cycling Track, Green Strip, Curbs, Camber, etc. Spatial Standards for the Cross-Section Design. Relationship between Road design and Road Safety.

3) Intersections

Types of Road Intersections: Basic forms of at-grade Junctions (T, Y, Staggered, Skewed, Cross, Scissors, Rotary, etc. Grade Separated Junctions (with or without interchange): Three –Leg, Four-Leg, Multi-Leg, etc.

Design of Intersections: Design and Spatial Standards for Traffic Islands, Turns, Turning Radii, Directional Lanes, Pedestrian Crossings, Median Openings, Traffic Calming Components like Speed Breakers and Table-Top Crossings etc.

Design Considerations for Diverging, Merging and Weaving Traffic.

Location and Design for Traffic Signals.

Teaching-Learning Process	1) The teacher can use PPTs, Videos to discuss the topic 2) The students need to sketch/draw the technical details. 3) Quizzes, reports, seminars from students can be encouraged

Module-3

4) Pedestrian Circulation and Barrier Free Design

Requirement of Pedestrian Infrastructure: Sidewalks and footpaths, Recommended Sidewalk widths, Pedestrian Crossing, Pedestrian Bridges, Subways, Cycle Tracks, etc.

Barrier free design: Location and Design Standards for Ramps for wheel Chair Access, Other Provisions like Tactile for Visually Challenged etc.

Safety Provisions: Pedestrian Railings, Anti-skid Flooring, Pedestrian Signal, Walk Button, etc.

Teaching-Learning Process	1) The teacher can use PPTs, Videos to discuss the topic 2) The students need to sketch/draw the technical details. 3) Quizzes, reports, seminars from students can be encouraged

Module-4

5) Traffic Signs and Road Markings Types of Traffic Signs: Principles and Types of Traffic Signs, Danger Signs, Prohibitory Signs, Mandatory Signs, Informatory Signs, Induction Signs, Direction Signs, Place Identification Signs, Route Marker Signs, etc. Reflective Signs, LED Signs, Static and Dynamic signs. Standards for Traffic Signs: Location, Height and Maintenance of Traffic Signs. Types of Road Markings: Centre Lines, Traffic Lane Lines, Pavement Edge Lines, No Overtaking Zone Markings, Speed Markings, Hazard Markings, Stop Lines, Pedestrian Crossings, Cyclist Crossings, Route Direction Arrows, Word Messages, Marking at Intersections, etc. Material, Colour, and Typography of the Markings. **6) Traffic Signals, Traffic Control Aids, Street Lighting** Traffic Signals: Introduction, Advantages and Disadvantages Signal Indications: Vehicular, Pedestrian and Location of the Signals. Signal Face, Illustration of the Signals, Red, Amber, Green Signals and its significance, Flashing Signals Warrant of Signals, Co-ordinated Control of Signals. Traffic Control Aids: Roadway Delineators (Curved and Straight Sections) Hazard Markers, Object Markers, Speed Breakers, Table Top Crossings, Rumble Strips, Guard Rails and Crash Barriers etc. Street Lighting: Need for Street Lighting, Type of Lighting, Illumination Standard, Location and Intermediate Distance.	
Teaching-Learning Process	1) The teacher can use PPTs, Videos to discuss the topic 2) The students need to sketch/draw the technical details. 3) Quizzes, reports, seminars from students can be encouraged
Module-5	

7) Road Accidents

Nature and Types of Road Accidents (Grievously Injured, Slightly Injured, Minor Injury, Non injury, etc)
The Situation of Road Accidents in India (yearly), Fatality Rates, etc
Factors (and Violations) that cause accidents. Prevention and First Aid to Victims.
Collision Diagrams and Condition Diagram exercises.
Traffic Management Measures and their influence in Accident Prevention.

8) Road Safety and Civic Sense

Need for Road Category of Road Users and Road Safety Suggestions.
Precautions for Driving in Difficult Conditions (Night, Rain, Fog, Skidding Conditions, Non Functional Traffic lights, etc.)

Type of Breakdowns and Mechanical Failures. Accident Sign (Warning Light, Warning Triangle, etc.)

Introduction to Concept of Civic Sense and its relationship to Road Safety: Importance of Civic Sense, Road Etiquettes and Road User Behaviour, Rules of Road, Right of the Way. Providing Assistance to Accident Victim. Sensitisation against Road Rage.

9) Traffic Regulations, Laws & Legislations

Indian Motor Vehicle Act (Chapter VIII: Control of Traffic to be discussed in detail)
Regulation Concerning Traffic: Cycles, Motor Cycles and Scooters, Rules for Pedestrian Traffic, Keep to the Left Rule, Overtaking Rules, Turning Rules, Priority Rules, Hand Signals, etc.
Speed and Hazard Management. Penal Provisions.
National Road Safety Policy, Central Motor Vehicle Rules, State Motor Vehicle Rules.
Introduction to Good Practices.

Teaching-Learning Process	1) The teacher can use PPTs, Videos to discuss the topic 2) The students need to sketch/draw the technical details. 3) Quizzes, reports, seminars from students can be encouraged

Course outcome (Course Skill Set)

1) The students will be able to learn various aspects of road safety.
2) The students will be able to apply technical details in design of various types of road and road geometrics.
3) The students will be able to understand legislations with respect to road safety.

Assessment Details (CIE)

(methods of CIE need to be defined topic wise i.e.- Studio/ Class room/Tutorial discussions, Reviews, Time problems, test, Seminar or micro project)

The weightage of Continuous Internal Evaluation (CIE) is 100% and there is no Semester End Exam (SEE) .The student has to obtain a minimum of 50% marks in CIE and is conducted for 100 marks. Based on the CIE marks grading will be awarded.

Continuous Internal Evaluation:

Methods suggested:

1. Studio discussions, Reviews, Time problems, CIE tests, Seminar or micro project, Quiz, report writing etc.
2. The class teacher has to decide the course of learning for the subject, in the beginning only. The teacher has to announce the methods of CIE for the subject in advance in writing.

Semester End Examination:

1. There is no Semester End Exam (SEE) The CIE marks list generated is to be signed by the internal examiners and submitted to VTU as per the procedure through the Principal of the institution.

Suggested Learning Resources:

Books

1. Introduction to Traffic Engineering, R Srinivasa Kumar
2. Traffic Engineering and Transport Planning, L R Kadiyali
3. Book on Road Safety Signage and Signs, Ministry of RoadTransport and Highways, Government of India.
4. MORT&H Pocketbook of Highway Engineers, 2019(Third Revision)
5. Publication by UTTIPEC namely, Street Design Guidelines, UTTIPEC guidelines for Road Marking, UTTIPEC guideline and specification for Crash Barriers, Pedestrian Railing and Dividers, UTTIPEC Standard Type Crossing Design.
6. Street Design Standards as provided in Timesavers, Neuferts etc.
7. Publications by Indian Road Congress.

Web links and Video Lectures (e-Resources):

- https://ndl.iitkgp.ac.in
- https://www.youtube.com/watch?v=5sl9kDnFTbg
- https://www.youtube.com/watch?v=imtg0SYq5IM
- https://www.youtube.com/watch?v=BZQFNvYMAm8
- https://www.youtube.com/watch?v=sCXtcXD17qU

Activity Based Learning (Suggested Activities in Class)/ Practical Based learning

1. Visit to Regional Transport office to observe variety of activities and discussion with officials.
2. Participation in Traffic Surveys.
3. Preparation of a street plan and drawings for pedestrian friendly environment.

VIII Semester

ARCHITECTURAL DESIGN –VIII (ARCHITECTURE IN URBAN DESIGN CONTEXT)			
Course Code	**21ARC81**	CIE Marks	100
Teaching Hours/Week (L:T:P: S)	0:0:8:0	SEE Marks(VIVA)	100
Total Hours of Pedagogy	95	Total Marks	200
Credits	8	Exam Hours	----

Course objectives:

(a) *To introduce the key components & terminology with respect to processes and aspects of urban environment and their inter-relationships; to explore specific themes/issues in the public realm such as public spaces, physical infrastructure, socio-cultural aspects (heritage, gender, urban growth, informality, place identity, collective memory, walkability, livability, zoning regulations) and the role of architecture in shaping the urban fabric.*

(b) *To learn basic methods/techniques to read, analyse and interpret (mapping, diagramming and theoretical premise) the dynamics and various dimensions of the urban environment.*

(c) To create /design Architecture that is linked seamlessly with Urban Planning and Urban design strategies and guidelines

Teaching-Learning Process (General Instructions)

These are sample Strategies, which teacher can use to accelerate the attainment of the various course outcomes.

1. Use of theory, activities, sketches, drawings, assignment and studio works for teaching.
2. Evaluation by studio discussions, internal and external juries, students seminars, etc.

INTRODUCTION:

In an increasingly urbanized world, architecture plays a vital role in shaping and influencing a complex urban environment (the design of cities) and creating meaningful places that enrich the lives of people. It is important to understand the many scales at which architecture can engage with the urban context, from building on the unique local character/form to enhance public spaces to urban development projects (infrastructure/transport interchanges/terminals) that impact larger geographic regions beyond the city. The Studio intent is to introduce the discipline of urban design (interdisciplinary premise, scope, techniques and best practices) and understand architecture as a part of implementing urban design projects, from gathering insights into urban fabric (and critically examining its metabolic relationship with ecological cycles), understanding how communities use spaces, to understanding how policies influence and guide urban design. The studio intends to develop a sense of orientation and a grounding of how to respond and fit in the immediate urban context and how the intervention modifies the quality and character of the urban environment.

OUTLINE:

The studio will be divided into two components

(a) Rigorous, directed and brief study of an urban context (techniques mapping, diagramming) that will lead to clear understanding of dynamic networks, issues affecting the area and design strategies that build on the strength and opportunities to create meaningful spaces for communities. Various case studies (literature/site visits) will be analyzed at various stages. Developing an understanding of the urban development in India and its role in accelerating ecological imbalance and intensifying the concentration of population in urban areas. Critically reviewing and analyzing current infrastructure projects and the idea of Smart City, AMRUT and HRIDAY cities (Activity1 and 2).

(b) Suitable design intervention addressing concerns such as the need to create public realm as extension of the private domain of buildings; the impact and relationship of buildings to the larger context. The key ideas informing the selection of the design projects are multi- functional spaces, public access to the majority of spaces, large gathering and event spaces which can be extended to immediate urban context. The probable architectural design projects include urban infill, revitalization and renewal of urban fragments, adaptive reuse, urban waterfront development, transportation nodes/interchanges, multi-use urban complexes including museums, performing arts centres.

Note:

(a) The design shall be sensitive to the needs of differently abled, aged people and children.

(b) One major project to be tackled in the semester, along with minor research component in the programmes of urban design thinking.

(c) Design shall address Place making/Sense of Place/ Visual identity/ Character/Socio cultural values etc.

Course outcome (Course Skill Set)

(a) Study and Analysis of an delineated Urban Precinct with respect to Urban renewal/Revitalisation/development/Conservation compiled and presented as drawings, models and report explaining the intent and inferences from the study & Analysis undertaken (25% grade)

(b) Framing urban design Strategies and Guidelines to link Architectural design project. (Research work- Minor project) (25% grade)

(c) Architectural Design within the precinct with drawings and models (Manual/Digital) explaining the design process (50% grade)

Assessment Details (both CIE and SEE)

(methods of CIE need to be defined topic wise i.e.- Studio discussions, Reviews, Time problems, test, Seminar or micro project)

The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%. The student has to obtain a minimum of 50% marks individually both in CIE and 40 % marks in SEE to pass. Semester End Exam (SEE) is conducted for 100 marks (Viva-voce) and a minimum of 50% (50 marks out of 100) in the sum total of the CIE (Continuous Internal Evaluation) and SEE (Semester End Examination) taken together. Based on this grading will be awarded.

Continuous Internal Evaluation:

Methods suggested:

1. Studio discussions, Reviews, Time problems, CIE tests, Seminar or micro project, Quiz, report writing etc.
2. The class teacher has to decide the topic for the Design and Seminars if any, in the beginning only. The teacher has to announce the methods of CIE for the subject in advance in writing.

Semester End Examination:

1) The student needs to submit his/her works done throughout the semester, including rough sheets for the Viva examination, at least one day prior to the Viva work examination to the course teacher/coordinator.

2) The Viva-voce will be evaluated by an external teacher appointed by the University along with Course teacher or an internal examiner.

3) The SEE marks list generated is to be signed by both internal and external examiners and submitted to VTU in the sealed cover through the Principal of the institution.

Suggested Learning Resources:

Books:

REFERENCES:

(a) Donald Watson, "Time Savers Standard for Urban Design", 2005, McGraw Hill.

(b) Jon Lang , "Urban Design: A Typology of Procedures and Product", 2005, Routledge.

(c) Edmund Bacon , "Design of Cities", 1976, Penguin Books.

(d) Gosling and Maitland , "Urban Design", 1984, St. Martin's Press.

(e) Kevin Lynch , "Site Planning", 1967, MIT Press, Cambridge.

(f) **Ephemeral Urbanism -** by Rahul Mehrotra (Author), Felipe Vera (Author), Jose Antonio Mayoral.

(g) **Bombay : The Cities Within -** by Rahul Mehrotra, SharadaDwivedi (Author).

(h) **The Kinetic City and Other Essays -** by Rahul Mehrotra (Author), Rajesh Vora (Photographer), RanjitHoskote (Foreword), Kaiwan Mehta (Afterword)

Web links and Video Lectures (e-Resources):

- https://ndl.iitkgp.ac.in
- https://www.youtube.com/watch?v=IFjD3NMv6Kw&t=45s
- https://www.youtube.com/watch?v=06dV9tzztKY
- https://www.youtube.com/watch?v=zOnvfLr5GaE
- https://www.youtube.com/watch?v=dtEhGtq8ycE
- https://www.youtube.com/watch?v=_40yzE74oKM
- https://www.youtube.com/watch?v=YoB_uA7z-jk
-

Activity Based Learning (Suggested Activities in Class)/ Practical Based learning

Activity 1: A part in whole, whole in part:

"Always design a thing by considering it in its next larger context – a chair in a room, a room in a house, a house in an environment, an environment in a city plan." — Eliel Saarinen

Reflect on urban design from this perspective and identify the critical components for holistic urban design.

Activity 2: Component of Smart city Mission.

Students will develop an ability to understand ongoing government schemes in few smart cities.

VIII Semester

Materials and Methods in Building Construction -VIII			
Course Code	**21ARC82**	CIE Marks	50
Teaching Hours/Week (L:T:P: S)	1:0:3:0	SEE Marks(VIVA)	50
Total Hours of Pedagogy	55	Total Marks	100
Credits	04	Exam Hours	----

Course objectives:

To study contemporary building construction systems, as an integrative discipline, connecting across various technology areas impacting the construction industry. The focus to be on methods, materials and technology prevailing in the industry, with case study examples.

Teaching-Learning Process (General Instructions)

These are sample Strategies, which teacher can use to accelerate the attainment of the various course outcomes.

1. The subject teacher to link the studio work with on site work by arranging site visits in the nearby areas.
2. The subject teacher to highlight the uses of various types of Innovation in building industry

Module-1

Innovations in Construction industry:

1. New directions in Construction Industry: Impact of Automation, Information, Prefabrication, Modular Construction, New Materials, Equipment and Environmental concerns on Building Construction.

2. Special Constructions: Under water constructions, underground constructions, kinetic constructions

High Rise Buildings:

3. Form work in High-rise buildings: Issues and Constraints. Materials used; some examples like Maivan, Doka. PERI

4. Enclosure Systems: Types, properties and materials

5. Special and Light Weight materials, eg. Concretes, plastics, recycled or materials out of waste, wood? (Activity 1)

Teaching-Learning Process	1. Visit to sites/ factories/showrooms for hands on experience with materials and methods of construction. 2. Document and write a report on high rise buildings and innovation in construction industry. 3. Minimum one plate on each construction topic. Study of material applications in the form of a portfolio.

Module-2

Technology integration:

Influence of Informatics in construction Industry: Big Data, Cloud Collaboration, Information Management, Modelling, Simulation, 3D Printing
Construction Equipment: New advances in Construction Equipment

Teaching-Learning Process	1) Use of theory, activities, sketches, drawings, assignment and tutorial for teaching. 2) Evaluation by quiz, tests, classroom activities.

Module-3

Retrofit and Repairs:

Life Cycle concept of buildings and materials.
Repairs: Types of damage to buildings; Types of Repairs used Retrofit: Reuse of buildings, Renovations. (Activity 2)

Teaching-Learning Process	1) Use of theory, activities, sketches, drawings, assignment and tutorial for teaching. 2) Evaluation by quiz, tests, classroom activities.

Module-4

Green Building Concepts: Green Building Concepts, Various Green rating agencies in India, Green Construction, materials (Activity 3) Net Zero Energy Building Concepts – Case Study - http://fairconditioning.org/showcase/net-zero-energy-nze-building-at-cept-university/	
Teaching-Learning Process	1) Use of theory, activities, sketches, drawings, assignment and tutorial for teaching. 2) Evaluation by quiz, tests, classroom activities.
Module-5	
High Performance Materials: Smart Materials: Properties of Smart Materials, Applications in Building Industry Nano Materials: Introduction to Nanotechnology in building materials, Applications in Building Industry.	
Teaching-Learning Process	1) Use of theory, activities, sketches, drawings, assignment and tutorial for teaching. 2) Evaluation by quiz, tests, classroom activities.
Course outcome (Course Skill Set) 1. The students will be able to adopt innovation in Building Industry and use it in high rise projects. 2. The students will be able to apply various advances in High Performance Materials in building construction.	

Assessment Details (both CIE and SEE)

(methods of CIE need to be define topic wise i.e.- Submission of construction drawing sheets, Journal of materials, Multiple Choice Question, Quizzes, Open book test, Seminar or micro project)

The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%. The student has to obtain a minimum of 50% marks individually both in CIE and 40 % marks in SEE to pass. Semester End Exam (SEE) is conducted for 50 marks (Viva-voce) and a minimum of 50% (50 marks out of 100) in the sum total of the CIE (Continuous Internal Evaluation) and SEE (Semester End Examination) taken together. Based on this grading will be awarded

Continuous Internal Evaluation:

1. Methods suggested: Submission of Construction sheets, Journal of Materials, Test, Written Quiz, Seminar, report writing etc.
2. The class teacher has to decide the topics for the test, Written Quiz, and Seminar. In the beginning, only the teacher has to announce the methods of CIE for the subject.

Semester End Examination:

1. The student need to submit his/her works done throughout the semester, including rough sheets for Viva voce examination, atleast one day prior to Viva voce examination to the course teacher/coordinator.

2. The work will be evaluated by an external teacher appointed by the University along with Course teacher or an internal examiner.

3. The SEE mark list generated is to be signed by both internal and external examiners and submitted to VTU in sealed cover through the Principal of the institution.

Suggested Learning Resources:

Books

1. Andrew Watts, "Modern Construction Handbook", : 4th Edition
2. Andrew Watts, "Modern Construction Case Studies: Emerging Innovation in Building Techniques", Birkhauser Basel.

Web links and Video Lectures (e-Resources):

- https://ndl.iitkgp.ac.in
- https://www.youtube.com/watch?v=UasKtLCNcrA
- https://www.youtube.com/watch?v=2-t2c9eiFyQ&t=44s
- https://www.youtube.com/watch?v=ZHVXWxEFqWI
- https://www.youtube.com/watch?v=TGEdMKjSieg
- https://www.youtube.com/watch?v=VE2tpwGCN0U
- https://www.youtube.com/watch?v=8FCyq6Tq_jo
-

Activity Based Learning (Suggested Activities in Class)/ Practical Based learning

Activity 1 - **Exploring Recycled Materials** - research and documentation on material innovations, repurposed or made out of waste and their applications globally (Ecoboard, Using plastic for roads, plastic based pavers, Carbon captured products, Bio-waste, etc.)

Activity 2 - **Building Surgery** - Identify a settlement or a locality (informal / very old/ heritage) and enlist problems the space and the dwellers are experiencing. Derive ways for an architect to address them through repurposing and retrofitting.

Activity 3 - **Green Building** - Critical analysis of the green building concept. Debate and discuss the future implications of green buildings.

VIII Semester

Urban Planning			
Course Code	**21ARC83**	CIE Marks	50
Teaching Hours/Week (L:T:P: S)	3:0:0:0	SEE Marks	50
Total Hours of Pedagogy	40	Total Marks	100
Credits	03	Exam Hours	3

Course objectives:

To familiarize students with the origins and basic concepts of urban planning.

Teaching-Learning Process (General Instructions)

These are sample Strategies, which teacher can use to accelerate the attainment of the various course outcomes.

1. Use of theory, activities, sketches, drawings, assignment and tutorial for teaching.
2. Evaluation by quiz, tests, classroom activities.

Module-1

1. Evolution, origins and growth of settlements:- Characteristics of Rural and Urban settlements; Urban form based on different determinants – Natural (climate, topography, resources, geography) and Man-made (cultural, economic, religious, administrative, political).

2. Planning efforts and impacts on historical cities - Ancient civilizations (Mesopotamia, China, Egypt, Indus Valley, Mayan); Classical cities (Greek, Roman, Medieval, Neoclassical, Renaissance, Baroque, City Beautiful); Indian cities – (Vedic/Indo-Aryan, Colonial, Dravidian, Mughal). Study how an old town grew and built itself organically in the nearby area.

Teaching-Learning Process	1) The teacher can use PPTs, Videos to discuss the topics. 2) The students need to sketch and note the discussions. 3) Quizzes, models, seminars from students can be encouraged

Module-2	
3. City Planning in Post-Industrial Revolution Era: - Responses to impacts of industrialization in cities: Legislative reforms to public health, work and living conditions; Spatial responses to Poor Living Conditions (Railroad tenements, Dumbbell plan); Utopian visions - Model Towns (Robert Owen, J.S. Buckingham, George Cadbury), Tony Garnier (*Cité Industrielle)*. 4. Pioneers in planning theories - Ebenezer Howard (Garden City), SoriaY.Mata (The Linear City), Patrick Geddes (Outlook Tower, Valley Section, Folk-Work-Place, Civic Survey), Le Corbusier (*Ville Contemporaine*), Frank Lloyd Wright (Broadacre City), Ludwig Hilberseimer (Decentralized City), Constantinos A Doxiadis (Ekistics), Clarence Arthur Perry (Neighbourhood Unit); Clarence Stein (American Garden Cities). 5. Planned and Built Cities: - Brasilia (Oscar Niemeyer), Chandigarh (Le Corbusier), Islamabad (Constantinos A Doxiadis), Tel Aviv (Patrick Geddes). 6. Alternate visions for cities: – Arcosanti (Paolo Soleri), New Urbanism (Peter Calthorpe, Andres Duany, ElizabethPlater-Zyberk).	
Teaching-Learning Process	1) The teacher can use PPTs, Videos to discuss the topics. 2) The students need to sketch and note the discussions. 3) Quizzes, models, seminars from students can be encouraged
Module-3	
7. Urbanization in India: - Trends in urbanization in post-independence India; Planned cities in Post-Independence India (Bhubaneswar, Gandhinagar, Jamshedpur) (Activity1); Census classification of Indian cities (based on population size); Growth, issues and management of Metropolitan cities; Slums (official definitions and slum statistics) (Activity2), quality of infrastructure, environment and life in the Urban areas. 8. Urban housing typologies – City Development Authority layouts, Public Sector Townships, Affordable housing, Slum Rehabilitation Projects (Activity 3, 4).	
Teaching-Learning Process	1) The teacher can use PPTs, Videos to discuss the topics. 2) The students need to sketch and note the discussions. 3) Quizzes, models, seminars from students can be encouraged
Module-4	
9. Urban Structure: - Internal spatial structure of the city: Concentric Zone theory; Sector theory; Multiple Nuclei Theory; Characteristics of Central business district, Urban nodes (Origin and/or destination of trips, location of major transport nodes, interfaces of local/regional transport), Suburbs, Peri-urban areas. 10. Land use and Zoning: - Land use categories and representation; Relationship between Land use and Zoning; Zoning Types: Euclidian Zoning, Performance Zoning, Form-	

based Codes, Incentive Zoning, Height Zoning (Activity 5), Open Space Zoning (Activity 6).	
Teaching-Learning Process	1) The teacher can use PPTs, Videos to discuss the topics. 2) The students need to sketch and note the discussions. 3) Quizzes, models, seminars from students can be encouraged
Module-5	
11. Planning Processes and Tools: - Urban Redevelopment: Renewal, Rehabilitation, Conservation; Scales of Planning: Master plan/Comprehensive Development Plan, Area Plan, Regional Plan, Perspective Plan, URDPFI Guidelines; Steps of urban planning.	
Teaching-Learning Process	1) The teacher can use PPTs, Videos to discuss the topics. 2) The students need to sketch and note the discussions. 3) Quizzes, models, seminars from students can be encouraged
Course outcome (Course Skill Set) 1) The students will be able to learn and compare the planning efforts during various eras. 2) The students will be able to adopt planning ideas of pioneers in their projects. 3) The students will be able learn and apply various planning standards, bye laws, rules in present context.	

Assessment Details (both CIE and SEE)

The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%. The minimum passing mark for the CIE is 50% of the maximum marks (25 marks). A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to each subject/ course if the student secures not less than 40% (20 Marks out of 50)in the semester-end examination(SEE), and a minimum of 50% (50 marks out of 100) in the CIE (Continuous Internal Evaluation) and a minimum of 50% (50 marks out of 100) in the sum total of the CIE (Continuous Internal Evaluation) and SEE (Semester End Examination) taken together. Based on this grading will be awarded.

Continuous Internal Evaluation:

Three Unit Tests each of **20 Marks (duration 01 hour**)

13. First test at the end of 5th week of the semester
14. Second test at the end of the 10th week of the semester
15. Third test at the end of the 15th week of the semester

Two assignments each of **10 Marks**

16. First assignment at the end of 4th week of the semester
17. Second assignment at the end of 9th week of the semester

Group discussion/Seminar/quiz any one of three suitably planned to attain the COs and POs for **20 Marks** (**duration 01 hours**)

18. At the end of the 13th week of the semester

The sum of three tests, two assignments, and quiz/seminar/group discussion will be out of 100 marks and will be **scaled down to 50 marks**

(to have less stressed CIE, the portion of the syllabus should not be common /repeated for any of the methods of the CIE. Each method of CIE should have a different syllabus portion of the course).

CIE methods /question paper is designed to attain the different levels of Bloom's taxonomy as per the outcome defined for the course.

Semester End Examination:

Theory SEE will be conducted by University as per the scheduled timetable, with common question papers for the subject (**duration 03 hours)**

11. The question paper will have ten questions. Each question is set for 20 marks.
12. There will be 2 questions from each module. Each of the two questions under a module (with a maximum of 3 sub-questions), **should have a mix of topics** under that module.

The students have to answer 5 full questions, selecting one full question from each module.

Theory paper will be out of 100 marks and will be **scaled down to 50 marks.**

Suggested Learning Resources:

Books:

1. Kostof, S., Castillo, G., & Tobias, R. 1992. The city assembled: The elements of urban form through history. London: Thames and Hudson
2. Eisner, Simon; Gallion, Arthur; Eisner, Stanley. 1993. The Urban Pattern. Wiley.
3. Greed, Clara. 1993. Introducing Town Planning. Longman
4. Kostof, Spiro. 1993. The City Shaped: Urban Patterns and Meanings through History. Bulfinch.
5. Morris, A.E.J. 1994. History of Urban Form Before the Industrial Revolution. Longman Scientific & Technical.
6. Hall, Peter. 1996. Cities of tomorrow: An intellectual history of urban planning and design in the twentieth century. Oxford, UK: Blackwell Publishers.
7. Sivaramakrishnan, K. C.; Amitabh Kundu; and B. N. Singh. 2005. A Handbook of Urbanization in India: An Analysis of Trends and Processes, Oxford University Press, New Delhi.

8. Rathbone, Dominic. 2009. Civilizations of the Ancient World. Thomas & Hudson.
9. Ministry of Urban Development, GoI. 2014. Urban and Regional Development Plans Formulation and Implementation Guidelines. MoUD Government of India.

Web links and Video Lectures (e-Resources):

- https://ndl.iitkgp.ac.in
- https://www.youtube.com/watch?v=BrhRpxL1rz4
- https://www.youtube.com/watch?v=2F0Bdfb1GqY
- https://www.youtube.com/watch?v=q_XmlG3CwNk&list=PLLy_2iUCG87AAaDRVrD02Y1z44OXt5shB
- https://www.youtube.com/watch?v=vHop5VgamRc&list=PLLy_2iUCG87AAaDRVrD02Y1z44OXt5shB&index=3
- https://www.youtube.com/watch?v=j_5GldeUpRg&list=PLLy_2iUCG87AAaDRVrD02Y1z44OXt5shB&index=4
- https://www.youtube.com/watch?v=zuM3u0du_5g&list=PLLy_2iUCG87AAaDRVrD02Y1z44OXt5shB&index=5
- https://www.youtube.com/watch?v=K9kst7RAfco&list=PLLy_2iUCG87AAaDRVrD02Y1z44OXt5shB&index=6
- https://www.youtube.com/watch?v=Gkq-is4aLcQ&list=PLLy_2iUCG87AAaDRVrD02Y1z44OXt5shB&index=7
- https://www.youtube.com/watch?v=P4P6bAqq2hk&list=PLLy_2iUCG87AAaDRVrD02Y1z44OXt5shB&index=8
- https://www.youtube.com/watch?v=XcrSwGqdo_U&list=PLLy_2iUCG87AAaDRVrD02Y1z44OXt5shB&index=9
- https://www.youtube.com/watch?v=PJ9gNQBfoOA&list=PLLy_2iUCG87AAaDRVrD02Y1z44OXt5shB&index=10
- https://www.youtube.com/watch?v=i8LhbDJf2WU&list=PLLy_2iUCG87AAaDRVrD02Y1z44OXt5shB&index=11
- https://www.youtube.com/watch?v=xKT8dOhJ0l0&list=PLLy_2iUCG87AAaDRVrD02Y1z44OXt5shB&index=12
- https://www.youtube.com/watch?v=f_R4KL0z2D4&list=PLLy_2iUCG87AAaDRVrD02Y1z44OXt5shB&index=41

Activity Based Learning (Suggested Activities in Class)/ Practical Based learning (select any two)

Activity 1: Comparison of organic city and planned city: Study an old city and a new city and analyze and delayer the organic and planned form of development; Identify and break down in its similarities, differences, responsiveness, habitability, scale, standard of living, infrastructure, etc.

Activity 2: Spontaneous city: Study an existing slum eg. Dharavi, Ram pir, etc. for newer perspectives of inclusivity and understanding the forces behind its throbbing growth. The earlier policies of slum removal, slum relocation, and slum resettlement have been renewed as redevelopment and up-gradation. Ref: J09025054.pdf (ijres.org)

Activity 3: Experience a slum redevelopment project: Visit a slum redevelopment project. Interview the slum residents and reflect on the pros and cons of the project. Identify what were the economic/political aspirations of this project and the impact of this project on the mindset of the residents?

Activity 4: Experience a slum rehabilitation project: Visit a slum redevelopment project. Interview the slum residents and reflect on the pros and cons of the project. Identify what were the economic/political aspirations of this project and the impact of this project on the mindset of the residents?

Activity 5: Linkages between high rises and informal settlements (slums): Visit an area, (commercial, residential) with high FSI and high rises and map the number and proximity of slums in and around the area. Research and read about the dynamics between that. This activity hints at the direct relationship between the development and growth of slums.

Activity 6: Open Space Index (slums): Study and map the number of open spaces in different zones (commercial, residential areas, office, institutional) and try to understand the open space index, planning approach and accessibility of them for different economic sections. Research about the open space index in different cities, countries and the quality of life

VIII Semester

Thesis Seminar			
Course Code	**21ARC84**	CIE Marks	100
Teaching Hours/Week (L:T:P: Studio: Seminar)	2:0:4:0:1	SEE Marks	--
Total Hours of Pedagogy	85	Total Marks	100
Credits	07	Exam Hours	7

Course objectives:

(a) To outline the larger focus and relevance of the Thesis topic (design/research), its architectural implications and projected design results.

(b) Alternatively to conceptually formulate an architectural proposition, explore and articulate ideas through research and critically evaluate the feasibility of the Thesis Proposal. This includes determining the Project, context where it shall be explored and its significance to architecture.

(c) To encourage students to pose relevant questions on the discipline (theoretical/design); to undertake self- directed study with inquisitiveness, rigor and demonstrate a depth of inquiry in exploring the chosen topics.

(d) To focus on innovation, experimentation (theoretical premise/ tectonics/modes of representation/other) as some of the learning outcomes and draw inspiration/build on the various Electives/ Design Studios proposed/taken through the undergraduate Program

Teaching-Learning Process (General Instructions)

These are sample Strategies, which teacher can use to accelerate the attainment of the various course outcomes.

INTRODUCTION/OVERVIEW:

The Thesis Seminar course is designed to discover, frame and develop a Proposal for 21ARC94 Architectural Design Project (attempted in the X Semester). The objective of the Thesis Seminar is to expand the scope and focus of the student by introducing diverse topics in architecture (allied disciplines) and to nurture design/research projects that can make creative and technically competent contributions to the field of architecture. Every undergraduate student is required to undertake Thesis Seminar during their penultimate year.

The intent of the Thesis Seminar is to encourage new ideas/ research avenues/ design experimentation in architecture (allied disciplines); to provide a larger framework (structure) within which systematic research on a chosen topic can be undertaken; to develop a proposition, narrative and methodology for the chosen topic which can be tested through design in X Semester.

The Thesis Proposals can be developed from important issues on architecture (inter-disciplinary), hypothetical scenarios connected with architecture (theoretical premise) or live/ current projects proposed by government or other organizations.

Note:

a) The students are encouraged to continually read, discuss, clarify further and engage

with their chosen topics through IX Semester.

b) Professional Training done in the VIII Semester should be seen as an opportunity to bring in new learning from the field/ industry into the chosen topic and be applied during designing and detailing in the Architectural Design Project in the X Semester.

Teaching-Learning Process	1) The teacher can use PPTs, Videos to discuss the thesis details. 2) The students need to choose topic based on their literature study. 3) Studio discussions, seminars from students.

Course outcome (Course Skill Set)

The final outcome shall include a formal submission of

(a) Written Synopsis (key ideas on the topic including premise, description/ justification and conclusion) and Thesis Proposal Document (booklet) clearly highlighting/explaining the Project type; architectural Proposition/ Premise; Site/ Location; Scope and Limitations; Program (includes basic documentation with drawings, images or photographs of context, case studies, citations to various sources)

(b) Portfolio of presentations, critical readings, drawings/ models produced by the student on the chosen topic (urban issue/ conservation/ sustainability/ digital architecture/ other)

The grading shall consider the participation and depth of inquiry presented by each student and the various submissions/ reviews on each topic organized through the term.

Assessment Details (CIE)

(methods of CIE need to be defined topic wise i.e.- Studio discussions, Reviews, Time problems, test, Seminar or micro project)

The weightage of Continuous Internal Evaluation (CIE) is 100% and there is no Semester End Exam (SEE) .The student has to obtain a minimum of 50% marks in CIE and is conducted for 100 marks. Based on the CIE marks grading will be awarded.

Continuous Internal Evaluation:

Methods suggested:

1. Studio discussions, Reviews, Time problems, CIE tests, Seminar or micro project, Quiz, report writing etc.

2. The class teacher has to decide the topic for the Thesis Seminars, in the beginning only. The teacher has to announce the methods of CIE for the subject in advance in writing.

Semester End Examination:

1. There is no Semester End Exam (SEE) The CIE marks list generated is to be signed by the internal examiners and submitted to VTU as per the procedure through the Principal of the institution.

Suggested Learning Resources:

REFERENCES:

- All references will be project specific and will include a wide range of subjects (history, theory and criticism; services; material and construction) from architecture and allied fields addressed through critical papers, essays,

documented studies and books. ● Linda Grant and David Wang, Architectural Research Methods, John Wiley Sons, 2002 • Iain Borden and Katerina Rüedi, The Dissertation, Architectural press 2000
Web links and Video Lectures (e-Resources):
• https://ndl.iitkgp.ac.in • https://www.youtube.com/watch?v=GKTbeG9NdpU • https://www.youtube.com/watch?v=_eW9Ma6nKnU • https://www.youtube.com/watch?v=5cM3n_naMHY •
Activity Based Learning (Suggested Activities in Class)/ Practical Based learning 1) Library study, site visits, documentation of the learnings. 2) Individual seminars on the chosen topics. 3) Presentation in the form of portfolio, report, etc.

VIII Semester

Construction and Project Management			
Course Code	**21ARC85**	CIE Marks	50
Teaching Hours/Week (L:T:P: S)	2:1:0:0	SEE Marks	50
Total Hours of Pedagogy	40	Total Marks	100
Credits	03	Exam Hours	3

Course objectives:

To enhance the professional ability of the student to manage a construction project by exposing the students to the currently prevalent techniques in the planning, programming and management of a construction project. To enhance the professional ability of students towards a mindful project management approach as against a 'mechanistic' approach.

Teaching-Learning Process (General Instructions)

These are sample Strategies, which teacher can use to accelerate the attainment of the various course outcomes.

1. Use of theory, activities, sketches, drawings, assignment and tutorial for teaching.
2. Evaluation by quiz, tests, classroom activities.

Module-1

(Introduction to Construction Project Management & Construction Organization)

1. **Introduction to Project, its Stages and Construction Project management**: Project, Organisation, need for management of building/construction projects, Principles and Objectives of Project Management, brief understanding about study areas in Project Management. Types of Construction Projects, Life Cycle Stages of a Project (Construction Project).

2. **Construction Organisation**: Types of construction firms/ companies. Types of organization, study of organizational structures suitable for building and construction projects, the roles of the various members of a typical construction organization, qualities of an ideal construction organization, ethics in construction industry.

Teaching-Learning Process	1) The teacher can use PPTs, Videos to discuss topic. 2) Quizzes, models, seminars from students can be encouraged

Module-2

(Decision Making & Role of Project Managers)

3. **Decision making and Feasibility Study**: Involvement and Roles of Consultants and Contractor in decision making at various stages. Basic understanding of decision making principles and tools (e.g. Decision Tree, SWOT Analysis, Cost-Benefit Analysis), Value Engineering, Investment Criteria, Project Feasibility Study.
   Computer applications in Project Management: Introduction to use of computers for solving inventory, scheduling and other issues related to construction and management.

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

Teaching-Learning Process	1) The teacher can use PPTs, Videos to discuss topic. 2) Quizzes, models, seminars from students can be encouraged

Module-3

(Construction Management Techniques: Project Planning & Scheduling)

5. **Time, Cost and Resource Management in Construction:** Activity definition, Activity Sequencing, Estimation of Resource Requirements, Time & Cost for an Activity, Schedule Development, Budgeting, Schedule control, Cost Control.
   Construction Management Techniques: Project Planning – Work Breakdown Structure;
6. **Construction Management Techniques: Project Scheduling** – Bar Chart, Milestone Chart, Network Theories (CPM and PERT analysis) - Event, activity, dummy, network rules, graphical guidelines for network, numbering of events;

   Project Cost analysis (Indirect project cost, direct project cost, slope of the direct cost curve, total project cost) & brief understanding of about time, cost and resource optimization; Project Crashing (using CPM).

Teaching-Learning Process	1) The teacher can use PPTs, Videos to discuss topic. 2) Quizzes, models, seminars from students can be encouraged

Module-4

(Construction Management Techniques: Project Monitoring and Control)

7. **Construction Management Techniques: Project Monitoring and Control** – Role of the project manager in monitoring the specifications, Follow-up for quality control, the measurement book (MB), RA bills, interim and final checking and certification of works on site based on the BOQ and terms of contracts. Project updating, Progress Curves.

8. **Quality Management in Construction:** Quality Planning and Quality Control. Technical Specifications and Procedures. Codes and Standards.

Construction Health and safety and management: Safety Measures and management: Integrating workers' Health and Safety into management.

Teaching-Learning Process	1) The teacher can use PPTs, Videos to discuss topic. 2) Quizzes, models, seminars from students can be encouraged

Module-5

(Use of Construction Equipment)

9. **Construction Equipment**: The role of equipment/machinery in construction industry, factors affecting selection of construction machinery, standard versus special equipment, and understanding of the various issues involved in owning, operating and maintaining of construction equipment, economic life of equipment.

10. **Types of Construction Equipment:** earth moving (JVB, tractors, excavators, dragline, trenching equipment, etc.,) transporting (various types of trucks), spreading and compacting (motor graders and various types of rollers) and concreting equipment (including concrete mixers, transporting and pumping equipment), hoisting machines, form work, shoring material etc.

Best practices - Dealing with uncertainty, complexity, timelines, in a mindful way.

Teaching-Learning Process	1) The teacher can use PPTs, Videos to discuss topic. 2) Quizzes, models, seminars from students can be encouraged

Course outcome (Course Skill Set)

1) The students will be able to analyse the challenges in a construction project.
2) The students will be able to appreciate the over view of
3) The students will be able to understand the various roles to perform as a project manager.

Assessment Details (both CIE and SEE)

The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%. The minimum passing mark for the CIE is 50% of the maximum marks (25 marks). A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to each subject/ course if the student secures not less than 40% (20 Marks out of 50)in the semester-end examination(SEE), and a minimum of 50% (50 marks out of 100) in the CIE (Continuous Internal Evaluation) and a minimum of 50% (50 marks out of 100) in the sum total of the CIE (Continuous Internal Evaluation) and SEE (Semester End Examination) taken together. Based on this grading will be awarded.

Continuous Internal Evaluation:

Three Unit Tests each of **20 Marks (duration 01 hour**)

First test at the end of 5th week of the semester

Second test at the end of the 10th week of the semester

Third test at the end of the 15th week of the semester

Two assignments each of **10 Marks**

First assignment at the end of 4th week of the semester

Second assignment at the end of 9th week of the semester

Group discussion/Seminar/quiz any one of three suitably planned to attain the COs and POs for **20 Marks** (**duration 01 hours**)

At the end of the 13th week of the semester

The sum of three tests, two assignments, and quiz/seminar/group discussion will be out of 100 marks and will be **scaled down to 50 marks**

(to have less stressed CIE, the portion of the syllabus should not be common /repeated for any of the methods of the CIE. Each method of CIE should have a different syllabus portion of the course).

CIE methods /question paper is designed to attain the different levels of Bloom's taxonomy as per the outcome defined for the course.

Semester End Examination:

Theory SEE will be conducted by University as per the scheduled timetable, with common question papers for the subject (**duration 03 hours)**

The question paper will have ten questions. Each question is set for 20 marks.

There will be 2 questions from each module. Each of the two questions under a module (with a maximum of 3 sub-questions), **should have a mix of topics** under that module.

The students have to answer 5 full questions, selecting one full question from each module.

Theory paper will be out of 100 marks and will be **scaled down to 50 marks.**

Suggested Learning Resources:

Books/References:

1) Dr.B.C.Punmia et al. "*Project planning and control with PERT and CPM", Laxmi Publications*, New Delhi
2) S.P.Mukhopadyay, "*Project management for Architects' and civil Engineers*", IIT, Kharagpur, 1974
3) Jerome D.Wiest and Ferdinand K.Levy, *"A Management Guide to PERT/ CPM"*, prentice Hall of India Pub, Ltd.,New Delhi, 1982
4) R.A. Burgess and G.White, *"Building production and project Management"*, The construction press, London,1979.
5) A Guide to Project Management Body of Knowledge; 5th ed. – An American national standard – ANSI/PMI 99 – 001-2004
6) Krishnamurthy K. G., Ravindra S. V., *"Construction and Project management for Engineers, architects, planners and Builders",* CBS Publishers
7) Codes and standards –
   - NBC 2016 – Part 7
   - IS 3696 Safety code for scaffolds and ladders:
     (Part 1) : 1987 Scaffolds
     - (Part 2) : 1991 Ladders
   - IS 3764 : 1992 Code of practice for excavation work (first revision)
   - IS 4082 : 1996 Recommendations on stacking and storage of construction materials and components atsite (second revision)
   - IS 4130 : 1991 Safety code for demolition of buildings (second revision)
   - IS 4912 : 1978 Safety requirements for floor and wall openings, railing and toe boards (first revision)
   - IS 5121 : 2013 Code of safety for piling and other deep foundations (first revision)
   - IS 5916 : 2013 Safety code for construction involving use of hot bituminous materials (first revision)
   - IS 7205 : 1974 Safety code for erection of structural steel work
   - IS 7969 : 1975 Safety code for handling and storage of building materials
   - IS 8989 : 1978 Safety code for erection of concrete framed structures
   - IS 13415 : 1992 Safety code for protective barrier in and around buildings
   - IS 13416 Recommendations for preventive measures against hazards at work places:
     - (Part 1) : 1992 Falling material hazards prevention
     - (Part 2) : 1992 Fall prevention
     - (Part 3) : 1994 Disposal of debris
     - (Part 4) : 1994 Timber structures
     - (Part 5) : 1994 Fire protection
   - IS 13430 : 1992 Code of practice for safety during additional construction and alteration to existing buildings
   - IS 15883 (Part 1) : Guidelines for construction project management: Part 1 General2009
   - IS 16601 : 2016 Guidelines for habitat and welfare requirements for construction workers.

Web links and Video Lectures (e-Resources):

- https://ndl.iitkgp.ac.in
- https://www.youtube.com/watch?v=pwv1Nu3TO4A&list=PLWnoy5z_3BObBvFtBlowxM05D-q0VAWEs
- https://www.youtube.com/watch?v=4yzPzVCgRH4&list=PLWnoy5z_3BObBvFtBlowxM05D-q0VAWEs&index=2
- https://www.youtube.com/watch?v=GAGoqqZSPh4&list=PLWnoy5z_3BObBvFtBlowxM05D-q0VAWEs&index=3
- https://www.youtube.com/watch?v=kuCHsNXeNMc&list=PLWnoy5z_3BObBvFtBlowxM05D-q0VAWEs&index=5
- https://www.youtube.com/watch?v=Nto1VbJSQWs&list=PLWnoy5z_3BObBvFtBlowxM05D-q0VAWEs&index=14
- https://www.youtube.com/watch?v=ki0ld-KXfic&list=PLWnoy5z_3BObBvFtBlowxM05D-q0VAWEs&index=15
- https://www.youtube.com/watch?v=ypTiYyh7YT0&list=PLWnoy5z_3BObBvFtBlowxM05D-q0VAWEs&index=27
- https://www.youtube.com/watch?v=pwv1Nu3TO4A&list=RDCMUCwEBggd6uleGIwY5B0GVFng&index=4

Activity Based Learning (Suggested Activities in Class)/ Practical Based learning

1) Visit to a medium size construction site to observe, discuss the challenges with stake holders.
2) Group or Individual seminar on learnings.
3) Quizzes, debates on a selected topic.

VIII Semester

EARTH QUAKE RESISTANT STRUCTURES			
Course Code	**21ARC86**	CIE Marks	50
Teaching Hours/Week (L:T:P: S)	2:1:0:0	SEE Marks(VIVA)	50
Total Hours of Pedagogy	40	Total Marks	100
Credits	03	Exam Hours	----

Course objectives:

Integration of structures with architectural objectives by developing informed intuition for structures, emphasizing underlying concepts, synergy of form and structure towards creative design integration. To develop an understanding and design of structures for gravity and lateral seismic loads.

Teaching-Learning Process (General Instructions)
These are sample Strategies, which teacher can use to accelerate the attainment of the various course outcomes.

1. Use of theory, activities, sketches, drawings, assignment and tutorial for teaching.
2. Evaluation by quiz, tests, classroom activities.

Module-1

1. **Term project Introduction:** High Rise Building (Plan and elevation with general framing arrangement).
2. **National Building Code load calculation:** Gravity loading: Dead and live load calculation.

Teaching-Learning Process	1) The teacher can use PPTs, Videos to discuss the topic. 2) The students need to sketch and note the discussions. 3) Quizzes, models, seminars from students can be encouraged

Module-2

3. **Understanding earthquakes and Seismology:** Earthquake- Origin and Propagation; Complexity of Ground Motion; Earthquake occurrence in the world, plate tectonics, faults, earthquake hazard maps of India & and the States. Causes of earthquake, seismic waves; magnitude, intensity, epicenter and energy release, characteristics of strong earthquake ground motions, Seismological Instruments: Seismograph, Accelerograph and Seismoscope.

Teaching-Learning Process	1) The teacher can use PPTs, Videos to discuss the topic. 2) The students need to sketch and note the discussions. 3) Quizzes, models, seminars from students can be encouraged

Module-3

4. **Earthquake Effects on Buildings:** How buildings respond to earthquakes; Building forms and Seismic effects related to building configuration. Materials, Plan & vertical irregularities, redundancy. Horizontal & vertical eccentricities in mass and stiffness distribution, soft storey etc.
5. **Earthquake Resistant Design Strategies**: Concept of seismic design, stiffness, strength, period, ductility, damping, hysteric energy dissipation, center of mass, center of rigidity, torsion, design eccentricities.
a. Seismic Resistance System
b. Seismic Isolation System
c. Seismic Damping System

Teaching-Learning Process	1) The teacher can use PPTs, Videos to discuss the topic. 2) The students need to sketch and note the discussions. 3) Quizzes, models, seminars from students can be encouraged

Module-4

6. **Seismic Design to Satisfy Indian Codes:** Seismic loading based on IS 1893 Code Static Analysis Procedure: Horizontal seismic co-efficient, valuation of base shear, distribution of shear forces in single and multistory building.
7. **Structural Detailing in Earthquake Resistant Construction:** Seismic Detailing of Masonry buildings (IS: 4326), Seismic Designs & Detailing of RC & Steel Buildings: IS: 1893 - 2002; IS: 13920 - 1993; IS: 456 - 2000; IS: 800 - 2004. .

Teaching-Learning Process	1) The teacher can use PPTs, Videos to discuss the topic. 2) The students need to sketch and note the discussions. 3) Quizzes, models, seminars from students can be encouraged

Module-5

8. **Recent techniques:** Recent techniques like dampers, base isolation and other energy absorbing devises used in Earthquake resistant design.
9. A case study highlighting the above concepts.

Note: Studio work is involved in topics 1, 4, 5, 6, 7 and 9.

Teaching-Learning Process	1) The teacher can use PPTs, Videos to discuss the topic. 2) The students need to sketch and note the discussions. 3) Quizzes, models, seminars from students can be encouraged

Course outcome (Course Skill Set)

1) The students will be able to learn the importance of Earthquake Resistant Structures
2) The students will be able apply NBC and other safety measures while designing a Project.
3) The students will be able to observe the construction details required in a building.

Assessment Details (both CIE and SEE)

The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%. The student has to obtain a minimum of 50% marks individually both in CIE and 40 % marks in SEE to pass. Semester End Exam (SEE) is conducted for 50 marks (Viva-voce) and a minimum of 50% (50 marks out of 100) in the sum total of the CIE (Continuous Internal Evaluation) and SEE (Semester End Examination) taken together. Based on this grading will be awarded

Continuous Internal Evaluation:

Three Unit Tests each of **20 Marks (duration 01 hour**)

First test at the end of 5th week of the semester
Second test at the end of the 10th week of the semester
Third test at the end of the 15th week of the semester

Two assignments each of **10 Marks**

First assignment at the end of 4th week of the semester
Second assignment at the end of 9th week of the semester

Group discussion/Seminar/quiz any one of three suitably planned to attain the COs and POs for **20 Marks** (**duration 01 hours**)

At the end of the 13th week of the semester

The sum of three tests, two assignments, and quiz/seminar/group discussion will be out of 100 marks and will be **scaled down to 50 marks**

(to have less stressed CIE, the portion of the syllabus should not be common /repeated for any of the methods of the CIE. Each method of CIE should have a different syllabus portion of the course).

CIE methods /question paper is designed to attain the different levels of Bloom's taxonomy as per the outcome defined for the course.

Semester End Examination:

1. The student needs to submit his/her works done throughout the semester, including rough sheets for the Viva examination, at least one day prior to the Viva work examination to the course teacher/coordinator.
   1. The Viva-voce will be evaluated by an external teacher appointed by the University along with Course teacher or an internal examiner.
   2. The SEE marks list generated is to be signed by both internal and external examiners and submitted to VTU in the sealed cover through the Principal of the institution.

Suggested Learning Resources:

Books/References:

1. Martin Bechthold, Daniel L Schodek , "Sructures", PHI Learning Private limited.
2. Pankaj Agrawal and Manesh Shrikande , "Earthquake resistant design of structures", PHI learning Pvt. Ltd.
3. Dr Vinod Hosur , "Earthquake resistant design of building structures", Wiley Precise.
4. "Learning earthquake design and construction- earthquake tips", IIT Kanpur- NICEE
5. IS: 4326- Seismic detailing of Masonry buildings.
6. IS: 1893-2002, IS: 13920-1993 , IS: 456-2000, IS: 800-2007 – Seismic design and detailing of RC and steel structures.

Web links and Video Lectures (e-Resources):

- https://ndl.iitkgp.ac.in
- https://www.youtube.com/watch?v=qht_3ONz80s
- https://www.youtube.com/watch?v=9N8iQ9Ch8nw
- https://www.youtube.com/watch?v=f2tw4FA3gPA
- https://www.youtube.com/watch?v=JG54nYputwQ
- https://www.youtube.com/watch?v=V6pxxan8bDg
- https://www.youtube.com/watch?v=NT_fVQ1LdQY
- https://www.youtube.com/watch?v=3oGPPejwFXw
-

Activity Based Learning (Suggested Activities in Class)/ Practical Based learning

1) Sketching of the typical details required in building components for earth quake resistance.
2) Group or Individual seminar on a EQRS and disaster management.
3) Quizzes, debates on a selected topic.

VIII Semester

Elective-6			
Course Code	**21ARC87X**	CIE Marks	100
Teaching Hours/Week (L:T:P: S)	2:0:0:0	SEE Marks	--
Total Hours of Pedagogy	25	Total Marks	100
Credits	02	Exam Hours	2

Course objectives:

1) To gain experience in aspects of Architecture not offered in the regular curriculum.
2) To study particular areas of the curriculum in greater depth.
3) To explore career opportunities in the allied fields.

Teaching-Learning Process (General Instructions)

These are sample Strategies, which teacher can use to accelerate the attainment of the various course outcomes.

1) The teacher may use conventional method or an innovative method to deal with the subject.
2) The students need to work with hands on experiences to gain an expertise of the chosen field.
3) The teacher needs to use performance assessments to develop real life skills in the students.

a) RESEARCH METHODS: (21ARC87A)

Objectives:

Introduction to research in architecture – its significance, research design, types of research, literature study, methods of research in architecture (interviewing / visual methods / content analysis); data documentation and analysis, introduction to statistics, presenting the data and reporting the research.

- To increase the student understands of the role of research in architecture.
- To increase the student's abilities to interpret and evaluate research.
- To increase the student's abilities to conduct architecture research.
- To increase the student's abilities to present research results.
- To increase the student understands of data, information, and knowledge.

OUTLINE:

Unit 1- Introduction: Introduction to "research" and its significance in architecture – meaning of research. Relationship between design and research. Types of research in architecture, areas of research in architecture, qualitative and quantitative paradigms.

Unit 2- Research Design: Components of research design – formulating the research questions, hypothesis, choosing the sample, methods of data collection, analysing the data and inferring from the data. Concepts of dependent and independent variables, unit of analysis. Defining the scope and limitations of a research plan, significance of the research outcome.

Unit 3- Literature Study and Research: Significance of literature study in research, different sources of information such as books, journals, newspapers, internet, magazines, audio recordings, etc. Referencing and documenting the bibliography.

Unit 4- Methods of Research in Architecture: Interview Techniques: Questionnaires /Face to face Interviews / Internet survey. Designing a Questionnaire / Interview schedule. Visual Techniques: Observations (participant / nonparticipant / direct), activity mapping, accession/erosion trace observations, cognitive maps, etc. Content Analysis: Secondary data analysis. Understanding the relative advantages, disadvantages and application of various methods mentioned above and choosing a method appropriate for a research to achieve its objectives.

Unit 5- Data Documentation and Analysis: Understanding the nature of data collected and methods of analysis suitable for that data (graphical / numerical / descriptive). Converting data into numerical form for data analysis.

Unit 6- Introduction to the Statistics: Introduction to the simple statistical methods of analysing numerical data – frequencies / percentages, mean / median / mode, inferring from the data and interpreting the meaning of those inferences. Use of MS Excel for statistical data analysis.

Unit 7- Presentation of the Data: Techniques of presenting the numerical data – graphical (pie charts, bar charts, line graphs etc.), tabulations, verbal qualitative data, architectural drawings / maps.

Unit 8 - Reporting the Research: Different sections of a research report, technical writing and language (tense, voice, etc.), formatting of a report.

REFERENCES:

1. Groat, Linda N. and Wang, David C. 2002. **Architectural Research Methods.** New York: John Wiley.

Norman K Denzin and Yvonna S Lincoln (Eds.) **Handbook of Qualitative Research**, Thousand Oaks : Sage Publications, pp. 377392. 1994.

b) PRINCIPLES OF REAL ESTATE DEVELOPMENT:21ARC87b)

OBJECTIVE:

To provide students with understanding of fundamentals of real estate practices, perspectives & development, and enable them widen their professional capabilities to support endeavours based on socio-ecologically just development practices. To provide students with an understanding of the governing bodies and authorities dealing with housing and land, in the context of residential, commercial, infrastructure, commons in the local context.

OUTLINE:

Unit-1: Introduction: Definition of real estate, economic importance of real estate, overview of real estate industry**.**

Characteristics of land / real estate: Economic and physical characteristics, personal property; Tangible and intangible personal property.

Unit-2: Concepts of Ownership: Forms of ownership, physical rights of ownership of land, land tenure insecurity of Informal settlements and underlined reasons for that.

Transfer of Title: Voluntary and involuntary transfer of property, types of deeds and legal conveyance.

Unit-3: Real Estate Finance: Sources and techniques, financing large scale constructions.

Unit-4: Land use and Control: Public control of private property, zonal laws, enforcement of zonal laws, urban development, emerging patterns of urban land use, urban infrastructure development activities leading to forced evictions of people inhabiting marginalized settlements. (Research based Activity: Studying and critically analysing eviction laws and their impact. Case Studies of urban development projects that have lead to evictions of marginalized settlements) [Ref:*] (Activity1)

Unit-5: Role players in real estate development: Stages in real estate development, real estate development process.

REFERENCES:

1. Mike E. Miles, Laurence M. Netherton, and Adrienne Schmitz, "*Real Estate Development Principles and Process*" (5th Edition, 2015) by Urban Land Institute (ULI): Washington, D.C.
2. Richard B Peiser& Anne B. Frej, *"Professional Real Estate Development"* – The ULI guide to the business – (2003), Urban Land Institute U.S.A.
3. Tanya Davis, "*Real Estate Developer's Handbook*", (2007), Atlantic pub company, Ocala, USA.

4. Gerald R Cortesi, "*Mastering Real Estate Principles*" (2001), Dearborn Trade Publishing, NewYork, U.S.A.
5. Donald A. Corb& Richard A. Giovangelo, "*Real Estate Principles*", 2014 , Lee Institute, Inc., Brookline, Massachusetts, USA.
6. *https://www.hlrn.org.in/documents/Forced_Evictions_2018.pdf
7. **https://thewire.in/urban/housing-rights-covid-19-city-space-delhi-mumbai

Activity based learning:

Activity 1: Students are to watch, critically analyse and have group discussions based on movies depicting land rights related challenges in informal settlements.

c) ADAPTIVE RE-USE OF BUILT FORM:(21ARC87C)

Objective: To understand the theoretical and practical background for a systematic process to support adaptive re-use of the built environment for sustainable development.

OUTLINE

1. Introduction

- Introduction to the concept of adaptive reuse – history and various theories of adaptive reuse.
- Understanding adaptive re-use of buildings as a key to sustainable development. To explore the relationship between financial, environmental and social parameters associated with the adaptive re-use of buildings.

2. Case studies

- Understanding the application of the concept of adaptive-reuse through various case studies (within the country and abroad). Critical appraisal of the design approach of the case studies.
- Case studies should include examples of domestic, commercial, industrial, ecclesiastical and public building types. Analysis of the case studies should be based on the spatial attributes, structural knowledge and materiality of the existing structures and the strategies and tactics of adaptive reuse in architecture.

3. Design generation processes in Adaptive re-use

- Analysis of the existing structure - Importance of building assessment report – process of documentation and condition mapping in deciding design recommendations.
- Understanding the design logic. Role of various parameters in concept generation.
- Strategies for re-modelling.

4. Adaptive re-use of heritage buildings

- Understanding Adaptive re-use as an important strategy towards conservation of built heritage.
- Appreciation of the various values (architectural, cultural, historical, associational, social, etc.) that is associated with heritage buildings. Developing an ethical approach for adaptive re-use.

Note: The culmination of the elective could be a smaller scale adaptive re-use project done by the students inculcating all the ideas covered throughout the subject.

- Field visits and case studies help in better understanding of the concept of adaptive re-use.

REFERENCES:

1. Liliane Wong, " Adaptive Reuse: Extending the Lives of Buildings", 2016, Birkhauser Architecture, Switzerland.
2. J. Stanley Rabun, "Building Evaluation for Adaptive Reuse and Preservation", 2009, John Wiley & Sons.
3. Robert W. Burchell, "The Adaptive Reuse Handbook", Transaction Publishing , New Jersey.
4. Chris Van Uffelen, "Re-use Architecture", 2010, Braun Publishing, Switzerland.

Robert T. Ratay, "Structural Condition Assessment" 2005, Wiley.

d) FUNDAMENTALS OF ENTREPRENEURSHIP (21ARC87d)

Objectives:

The key objective is to introduce the students to the fundamentals of entrepreneurship to develop entrepreneurial -mindset and personality that permeate the 21st century.

- To understand who an entrepreneur is, importance of entrepreneurship, Key terms in entrepreneurship.
- To understand entrepreneurial traits, importance, and management of available resources
- To understand need to develop entrepreneurial mind- set, basics of business models
- To learn from success stories.
- To formulate business idea and develop Lean Canvas for a start-up

OUTLINE:

Unit 1- INTRODUCTION: Need of entrepreneurship, Innovation and entrepreneurship, Entrepreneur's vocabulary, Entrepreneurs V/S Wealth, Concepts of Entrepreneurship,

Unit 2- ENTREPRENEURIAL TRAITS & RESOURCE MANAGEMENT: Entrepreneurial traits, Resource organization and value creation, Types of resources, Entrepreneurial support system,

Unit 3- ENTREPRENEURIAL MIND-SET & BUSINESS MODEL: Entrepreneurial mind-set,

Misconceptions and myths about entrepreneurship, Business models, big company Vs Start ups

Unit 4- Entrepreneurial success stories: Lessons from various Case Studies

Unit 5- Business Pitch for a Start up: Developing Lean Canvas, Business Plan & Growth Strategies.

Teaching-Learning Process (General Instructions)

- Hands on exercise can be formulated after each chapter to apply the theoretical learning of the same with the help of case studies or scenario-based activities.
- Lean Canvas can be developed for the major project which will be their idea for a startup.
- A pitch video of 3 to 5 mins can also be developed as part of final submission

REFERENCES:

2. Arya Kumar (2012), "Entrepreneurship -Creating and Leading an Entrepreneurial Organization"
3. D.F.Kuratko, T.V.Rao 2009, "Entrepreneurship- A south-Asian Perspective

OPEN ELECTIVE:

The college has the discretion to offer an open elective in the areas/subject/fie other than already covered under the syllabus. The college can decide to offer need based electives depending on the availability of the expertise. However, the college will be required to submit the title of such electives with the course outline stating learning objectives and mode of delivering the content to the Registrar/ Registrar (evaluation) within the 15 days of the commencement of the semester.

Course outcome (Course Skill Set)

1) To gain experience in aspects of Architecture not offered in the regular curriculum.
2) To study particular areas of the curriculum in greater depth.
3) To explore career opportunities in the allied fields.

Assessment Details (CIE)

(methods of CIE need to be defined topic wise i.e.- Studio/ Class room/Tutorial discussions, Reviews, Time problems, test, Seminar or micro project)

The weightage of Continuous Internal Evaluation (CIE) is 100% and there is no Semester End Exam (SEE) .The student has to obtain a minimum of 50% marks in CIE and is conducted for 100 marks. Based on the CIE marks grading will be awarded.

Continuous Internal Evaluation:

Methods suggested:

1. Studio discussions, Reviews, Time problems, CIE tests, Seminar or micro project, Quiz, report writing etc.
2. The class teacher has to decide the course of learning for the Elective subject, in the beginning only. The teacher has to announce the methods of CIE for the subject in advance in writing.

Semester End Examination:

1. There is no Semester End Exam (SEE) The CIE marks list generated is to be signed by the internal examiners and submitted to VTU as per the procedure through the Principal of the institution.

Web links and Video Lectures (e-Resources):

- https://ndl.iitkgp.ac.in
- https://sjbsap.edu.in/sthala-volume-2/
- https://www.youtube.com/watch?v=ZMMS71vYy5k
- https://www.youtube.com/watch?v=JIvGQm7KZTQ
- https://www.youtube.com/watch?v=nv7MOoHMM2k
- https://www.youtube.com/watch?v=7A-enw0rivY
- https://www.youtube.com/watch?v=mRux8G7X6L4
- https://www.youtube.com/watch?v=7bMpgBuoZY0
- https://www.youtube.com/watch?v=UEngvxZ11sw

Activity Based Learning (Suggested Activities in Class)/ Practical Based learning

1) Participating in research method workshops/seminar
2)Visiting a real estate developer to get insight into the challenges of the real estate industry
3) Visiting a start-up to discuss the challenges they are facing to scale-up.

IX Semester

ARCHITECTURAL DESIGN PROJECT (Thesis)			
Course Code	**21ARC91**	CIE Marks	100
Teaching Hours/Week (L:T:P: S)	0:0:0:16	SEE Marks(VIVA)	200
Total Hours of Pedagogy	16	Total Marks	300
Credits	16	Exam Hours	----

Course objectives:

a) To demonstrate an ability to comprehend the nature of architectural problem and create a brief which sets the frame work for design.
b) To demonstrate an advanced level design ability to convert the brief set forth earlier into a speculative proposition of design.
c) To articulate and delineate the propositions of design into an architectural solution addressing all the dimensions using diagrams, analog or digital drawings and models.

Teaching-Learning Process (General Instructions)

These are sample Strategies, which teacher can use to accelerate the attainment of the various course outcomes.

1. Studio discussions, activities, sketches, drawings, assignments for learning.
2. Evaluation by submission of drawings, Reports, open juries.

INTRODUCTION:

In principle, the final year Architectural Design Project, positioned at the culmination of multi- year architectural education program, constitutes the threshold between student's academic learning and the profession. It provides an opportunity to do more than demonstrate the accumulated skills and focus on actively engaging with the discipline by contributing new ideas, design solutions or exploring new dimensions to existing or current issues in the field. Ideally, the Architectural Design Project should continue with the Project Proposal submitted during 21ARC93 Thesis Seminar (conducted in the Ninth semester) and build/enhance/improve on the architectural narrative that sets the premise for design demonstration.

OUTLINE:

Listed below are a few parameters that could govern, frame and aid in evaluating the projects. These parameters and stages should fine-tuned depending on the resources. It is advised that the projects should be run as a design studio with individual guidance under one or more guides and project coordinator.

(a) Guidelines (scope, scale and limitations):

- All projects should be grounded in some kind of critical enquiry; the depth of enquiry can be extended and the time spent on design can be reduced in a specific case, but such a project should demonstrate clarity in terms of research design. The suggested maximum weightage for study will be 25% in the case of a Study + Design Project.
- Selected projects can be of any scale and size (in terms of built areas) as long as the required rigor and depth is demonstrated by the student to merit consideration as a final project. It is advised not to attempt very large projects that have numerous structures and tend towards repetitive design with minimal variations or very complex projects due to time constraint.
- The scope of the project should firmly be in the purview of architecture even though it can have an interdisciplinary premise. All genres of projects (study or design) should end with a design solution or research dissertation.

(b) Generic studio model highlighting the salient stages

- **Project seminar–** Student shall present a seminar on the project topic which would include the following
  1. Precedents of similar projects, either actual visit to such projects or through literature reviews.
  2. Cultural, contextual, historical, technological, programmatic concerns of the project.
  3. Prevalent or historical models of architectural approach to such projects and a critique of such models
  4. A rhetorical or a speculative statement that would be the basis of further investigation. (For example: Architecture in the information age: Design of libraries in the new virtual reality regime). Documentation which is a part of this presentation shall be taken as completion of "case study" part of the final requirement.
- **Mid Review–** There shall be a review to clarify the conceptual statements and assumptions of the students. Students shall present a clearly articulated design response to context, program and users. Conceptual framework and preliminary architectural scheme using drawings and models shall be the end products of this stage.
- **Final Review –** Final review should consist of all the works which would be presented at the viva. Mode of presentation shall be tentative but the body of work presented should demonstrate the intellectual rigour and skill of the student through the design process and must include various iterations (including study models) and the final design outcome. Number of sheets shall be limited to maximum of 20 plus two case study sheets.

(c) Final output/outcomes:

- The final output or body of work should include a report; detailed and completed analog and digital drawings and presentation model. In case of research dissertation an in depth research study of a specialised architectural component should be undertaken and presented in the form of a detailed report with proper references and appendix and a plagiarism check report not exceeding 15%.

(d) Project Report:

- Three copies of the reports shall be submitted for evaluation in the Viva. The report in typed or computer printed form shall provide an overview of the entire process from formulation of the project to the design resolution. It should discuss the program, site-analysis, literature review, case studies, design criteria, concept and include detailed design drawings from all stages and photographs of the models.

Note:

a) The requirements pertaining to the differently abled, elderly people and children are to be addressed in design and detailing.

b) At the time of Viva examination, the student shall show to the jurors the portfolio containing the evolution of his/her design from the beginning to the final output. All the drawings and reports shall be certified by the Principal of the School of Architecture as bona fide work carried out by the student during the semester.

Teaching-Learning Process	1. Studio discussions, activities, sketches, drawings, assignment for learning. 2. Evaluation by submission of drawings, Reports.

Course outcome (Course Skill Set)

1) The students will be able to learn the preparation of a Project Report.
2) The students will be able to apply his learning in the preparation of a Project Report.
3) The students will be able to work with a team or individually on a given assignment/project.

Assessment Details (both CIE and SEE)

(methods of CIE need to be defined topic wise i.e.- Studio discussions, Reviews, Time problems, test, Seminar or micro project)

The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%. The student has to obtain a minimum of 50% marks individually both in CIE and 40 % marks in SEE to pass. Semester End Exam (SEE) is conducted for 200 marks (Viva-voce). Based on this grading will be awarded.

The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%. The student has to obtain a minimum of 50% marks individually both in CIE and 40 % marks in SEE to pass. Semester End Exam (SEE) is conducted for 200 marks (Viva-voce) and a minimum of 50% (150 marks out of 300) in the sum total of the CIE (Continuous Internal Evaluation) and SEE (Semester End Examination) taken together. Based on this grading will be awarded

Continuous Internal Evaluation:

Methods suggested:

1. Studio discussions, Reviews, Time problems, CIE tests, Seminar or micro project, Quiz, report writing etc.
2. The class teacher has to decide the topic for the Design and Seminars if any, in the beginning only. The teacher has to announce the methods of CIE for the subject in advance in writing.

Semester End Examination:

1. The student needs to submit his/her works done throughout the semester, including rough sheets for the Viva examination, at least one day prior to the Viva work examination to the course teacher/coordinator.

2. The Viva-voce will be evaluated by Two external teacher appointed by the University along with Course teacher or an internal examiner.

3. The SEE marks list generated is to be signed by both internal and external examiners and submitted to VTU in the sealed cover through the Principal of the institution.

Suggested Learning Resources:

Books/ SUGGESTED REFERENCES:

All references will be project specific and will include a wide range of subjects (history, theory, services, material and construction) from architecture and allied fields addressed through critical papers, essays, documented studies and books.

Web links and Video Lectures (e-Resources):

- https://ndl.iitkgp.ac.in
- https://www.youtube.com/watch?v=oO3eZwvgb-c (From COA social)
- https://www.youtube.com/watch?v=SHwT6XwTTlY (From COA social)
- https://www.youtube.com/watch?v=5cM3n_naMHY&t=15s
- https://www.youtube.com/watch?v=jW9oPt7-TA4
- https://www.youtube.com/watch?v=M1TiUa7cpm0
- https://www.youtube.com/watch?v=677ZtSMr4-4

Activity Based Learning (Suggested Activities in Class)/ Practical Based learning
1) Sketching of the concepts, detailing. Working with study models. 2) Individual seminar on the project periodically to showcase the improvement. 3) Preparation of reports, editing the report, etc.

X Semester

Professional Training			
Course Code	**21ARC101**	CIE Marks	----
Teaching Hours/Week (L:T:P: S)	--	SEE Marks(VIVA)	200
Total Hours of Pedagogy	16WEEKS DURATION	Total Marks	200
Credits	18	Exam Hours	----

Course objectives:
To provide exposure to the various aspects of architectural practice

Teaching-Learning Process (General Instructions)
These are sample Strategies, which teacher can use to accelerate the attainment of the various course outcomes.

Orientation under an architect that would include the process of development of conceptual ideas, presentation skills, involvement in office discussions, client meetings, development of the concepts into working drawings, tendering procedure, site supervision during execution and coordination with the agencies involved in the construction process and to facilitate the understanding of the evolution of an architectural project from design to execution.

OUTLINE:

The student is expected to be exposed to preparation of working drawing, detailing, preparation of architectural models, computer applications in design and drafting, filing system in respect of documents, drawing and preparation of tender documents. Site experience may be given in respect of supervision of the construction activity, observing the layout on site, study of the stacking methods of various building materials, study of taking measurement and recording.

Students should also acquaint themselves with local building byelaw.

Monitoring of Training:

A. Submission of Joining report: To be submitted within one week from the date of joining. Students must report for the training from the day of commencement of 9th semester as notified by VTU.

B. Submission of periodical reports: Students shall maintain a day to day record of their engagement for the period of training. This will be recorded in an authorized diary to be counter signed by the architect at the end of each week and the same diary shall be sent to the training co-ordinator once in a month.

C. Completion certificate: At the end of the training period, a student shall produce a certificate of satisfactory completion of training in duplicate.

Submission of Portfolio:

Students shall present a portfolio containing the following works before the examiners for Viva-Voce Examination:

1) Training Report: This shall contain copies of only such drawings which have been dealt, drafted or designed by student. It shall also contain a brief description of works handled during the training along with photographs, pencil sketches etc.

2) Building Study – This shall include a detailed critical study of a building designed by the architect with whom the student has worked. The study should include of function, aesthetics, context, structure etc., This shall be presented through drawings, photographs, write ups etc.

3) Building Material Study – This shall be a detailed study of new or relatively new building materials available in the market. A study of its properties, uses, cost, maintenance etc., is expected to be done. Samples of materials shall also be obtained and presented.

4) Detailing study – This shall be a study of interesting details done in the firm where the student has undertaken the training. This shall include sketches and photographs of the detail.

Note:

1. Students shall work only in architectural firms functioning over 5 years and headed by an architect registered with Council of Architecture, New Delhi.
2. In case of an architectural firm abroad, the Principal Architect of the firm should hold the title of architect under the law of that country.

Teaching-Learning Process	1) Students need to observe the technical details and detailing used in the office while preparing drawings. 2) Students need to observe the procedures and systems of the office while submitting the drawings, reports etc. 3) Students need to be proactive for the assignments given to them.

Course outcome (Course Skill Set)

1) The students get exposed to the professional work and field work.
2) The students will relate the academic work with professional work.
3) The students will appreciate the pace of the work in profession and learn to work as a team member.

Assessment Details (both CIE and SEE)

Continuous Internal Evaluation:

4) There is no Continuous Internal Evaluation Marks for this subject. However students to send their appointment order and joining letter to HOD/Principal as record.
5) The students need to update their progress to the institution on monthly basis
6) The students need to submit a portfolio of work done by them in an Architect's office as per the details given in the submission portfolio above.

Semester End Examination:

4. The student needs to submit his/her works done throughout the semester, including rough sheets for the Viva examination, at least one day prior to the Viva work examination to the course teacher/coordinator.
5. The Viva-voce will be evaluated by an external teacher appointed by the University along with Course teacher or an internal examiner.

The SEE marks list generated is to be signed by both internal and external examiners and submitted to VTU in the sealed cover through the Principal of the institution.

Suggested Learning Resources:

Books

Professional Practice by Roshan Namavati

Web links and Video Lectures (e-Resources):

- https://ndl.iitkgp.ac.in
- https://www.youtube.com/watch?v=NPj-Jiz2cJk
- https://www.youtube.com/watch?v=6ASoSf_DaYU
- https://www.youtube.com/watch?v=34gw4FfyeUg
- https://www.youtube.com/watch?v=0k-ii9vJA_0

Activity Based Learning (Suggested Activities in Class)/ Practical Based learning

1) The student can visit sites along with office staff and document the learning.
2) The student to collect the information on various materials and document the same.
3) The student to document a building of the Architect and critically analyse the same.