



**RAMAIAH**  
Institute of Technology

# **CURRICULUM**

**for the Academic year 2020 – 2021**

**SCHOOL OF ARCHITECTURE**

**III & IV Semester B. ARCH**

**RAMAIAH INSTITUTE OF TECHNOLOGY**

(Autonomous Institute, Affiliated to VTU)

Bangalore – 560054.

## **About the Institute:**

Dr. M. S. Ramaiah a philanthropist, founded ‘Gokula Education Foundation’ in 1962 with an objective of serving the society. M S Ramaiah Institute of Technology (MSRIT) was established under the aegis of this foundation in the same year, creating a landmark in technical education in India. MSRIT offers 13 UG programs and 15 PG programs. All these programs are approved by AICTE. All the UG programs & 09 PG programs are accredited by National Board of Accreditation (NBA). The institute is accredited with ‘A’ grade by NAAC in 2014. University Grants Commission (UGC) & Visvesvaraya Technological University (VTU) have conferred Autonomous Status to MSRIT for both UG and PG Programs till the year 2029. The institute is a participant to the Technical Education Quality Improvement Program (TEQIP), an initiative of the Government of India. The institute has 380 competent faculty out of which 60% are doctorates. Some of the distinguished features of MSRIT are: State of the art laboratories, individual computing facility to all faculty members, all research departments active with sponsored funded projects and more than 300 scholars pursuing Ph.D. To promote research culture, the institute has established Centre of Excellence for Imaging Technologies, Centre for Advanced Materials Technology & Schneider Centre of Excellence. **M S Ramaiah Institute of Technology has obtained “Scimago Institutions Rankings” All India Rank 65 & world ranking 578 for the year 2020.**

The Centre for Advanced Training and Continuing Education (CATCE), and Entrepreneurship Development Cell (EDC) have been set up on campus to incubate startups. **M S Ramaiah Institute of Technology secured All India Rank 8<sup>th</sup> for the year 2020 for Atal Ranking of Institutions on Innovation Achievements (ARIIA), an initiative of Ministry of Human Resource Development (MHRD), Govt. of India.** MSRIT has a strong Placement and Training department with a committed team, a good Mentoring/Proctorial system, a fully equipped Sports department, large air-conditioned library with good collection of book volumes and subscription to International and National Journals. The Digital Library subscribes to online e-journals from Elsevier Science Direct, IEEE, Taylor & Francis, Springer Link, etc. MSRIT is a member of DELNET, CMTI and VTU E-Library Consortium. MSRIT has a modern auditorium and several hi-tech conference halls with video conferencing facilities. It has excellent hostel facilities for boys and girls. MSRIT Alumni have distinguished themselves by occupying high positions in India and abroad and are in touch with the institute through an active Alumni Association.

**As per the National Institutional Ranking Framework, MHRD, Government of India, M S Ramaiah Institute of Technology has achieved 59<sup>th</sup> rank among 1071 top Engineering institutions of India for the year 2020 and 1<sup>st</sup> rank amongst Engineering colleges (VTU) in Karnataka**

## **SCHOOL OF ARCHITECTURE**

Ramaiah Institute of Technology (RIT), Bangalore, is a leading institution offering undergraduate, postgraduate and research programs in the areas of engineering, management and architecture. The institute was established in the year 1962, under the aegis of Gokula Education Foundation. Its mission is to deliver global quality technical education by nurturing a conducive learning environment for a better tomorrow through continuous improvement and customization.

The School of Architecture, RIT Bangalore, was established in the year 1992. Since its establishment, the School has played a vital role in providing quality education. The Council of Architecture (COA) and All India Council for Technical Education (AICTE) have recognized this program.

The mission of the school is to uphold the RIT mission and to thus provide quality education to the students and mould them to be excellent architects with adequate design and management skills and noble human qualities.

Full time faculty members having postgraduate qualifications from prestigious institutions in India and abroad are teaching at The School of Architecture. Experienced and well-respected practicing architects are invited to provide their experiences as visiting faculty. New milestones are continually being set and achieved. The synergy of the progressive management, committed faculty and students are ensuring excellent academic results year after year. This is reflected in the high number of University ranks that are secured by the students of the School.

The School of Architecture is now autonomous (affiliated to VTU) providing scope for further improvement. The focus has been towards fostering novel concepts and solutions in Architectural Design. The student's response is very encouraging, and the school recognizes and appreciates such good students by awarding them. After graduation, many students have pursued higher studies in various universities in the country and abroad. There is a great demand for the school graduates in the industry and the School is developing initiatives towards co-branding of the industry and the School. Many students have started their own enterprise and architectural practices as well.

All this has been possible as a result of the efforts of the impeccable faculty of the School. The faculty is committed to the welfare and success of the students. The teachers of the school are also engaged in enhancing their knowledge and skills and many are engaged in research activities as well. The School has experts in specialized disciplines like Habitat Design, Product Design, Urban Design, Urban Planning, Landscape Architecture, and Interior Design. The faculty also actively participates in national and international conferences and publishes and presents papers.

The School as part of a consultancy had started off with the maiden project to redevelop the RIT engineering college campus and is now involved in various campus designs.

## **VISION OF THE INSTITUTE**

To be an Institution of International Eminence, renowned for imparting quality technical education, cutting edge research and innovation to meet global socio-economic needs.

## **MISSION OF THE INSTITUTE**

MSRIT shall meet the global socio-economic needs through -

- Imparting quality technical education by nurturing a conducive learning environment through continuous improvement and customization.
- Establishing research clusters in emerging areas in collaboration with globally reputed organizations.
- Establishing innovative skills development, techno-entrepreneurial activities and consultancy for socio-economic needs.

## **QUALITY POLICY**

We at MS Ramaiah Institute of Technology strive to deliver comprehensive, continually enhanced, global quality technical and management education through an established Quality Management System complemented by the synergistic interaction of the stake holders concerned.

## **VISION OF THE DEPARTMENT**

To achieve and propagate high standards of excellence in architectural education.

## **MISSION OF THE DEPARTMENT**

- The School's commitment is to prepare people to make a difference;
- To create an environment that shall foster the growth of intellectually capable, innovative and entrepreneurial professionals, who shall contribute to the growth of the society by adopting core values of learning, exploration, rationality and enterprise; and
- To contribute effectively by developing a sustainable technical education system to meet the changing technological needs incorporating relevant social concerns and to build an environment to create and propagate innovative designs and technologies.

## **PROGRAM EDUCATIONAL OBJECTIVES (PEOs):**

**PEO 1:** Use the knowledge and skills of Architecture to analyze the real-life problems and interpret the results.

**PEO 2:** Effectively design, implement, improve and manage the integrated socio-technical systems.

**PEO 3:** Build and lead cross-functional teams, upholding the professional responsibilities and ethical values.

**PEO 4:** Engage in continuing education and life-long learning to be competitive and enterprising.

## **PROGRAM OUTCOMES (POs):**

**PO1: Architectural knowledge:** Apply the knowledge of mathematics, science, architectural fundamentals, and an architectural specialization to the solution of complex architectural problems.

**PO2: Problem analysis:** Identify, formulate, review research literature, and analyse complex architectural problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

**PO3: Design/development of solutions:** Design solutions for complex architectural problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

**PO4: Conduct investigations of complex problems:** Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

**PO5: Modern tool usage:** Create, select, and apply appropriate techniques, resources, and modern architectural and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

**PO6: The architect and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional architectural practice.

**PO7: Environment and sustainability:** Understand the impact of the professional architectural solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

**PO8: Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the architectural practice.

**PO9: Individual and teamwork:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

**PO10: Communication:** Communicate effectively on complex architectural activities with the architectural community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

**PO11: Project management and finance:** Demonstrate knowledge and understanding of architectural and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

**PO12: Life-long learning:** Recognize the need for and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

## **PROGRAM SPECIFIC OUTCOMES (PSOs):**

- a) Apply knowledge and skills of arts and sciences to the various architectural scenarios.
- b) Design and develop projects based on function, form and analysis.
- c) Design and improve integrated systems of people, materials, information, facilities, and technology.
- d) Function as a member of a multi-disciplinary team.
- e) Identify, formulate and solve industrial requirements and problems.
- f) Understand and respect professional and ethical responsibility.
- g) Communicate effectively both orally and in writing.
- h) Understand the impact of design solutions in a global and societal context.
- i) Recognize the need for and an ability to engage in life-long learning.
- j) Have knowledge of contemporary issues in industrial and service sectors.
- k) Use updated techniques, skills and tools of architecture throughout their professional careers.
- l) Implement the concepts of project and construction management to satisfy customer expectations.

## **BOARD OF STUDIES FOR THE TERM 2020 - 2021**

- |                                  |                          |
|----------------------------------|--------------------------|
| 1. Prof. (Dr.) Pushpa Devanathan | Chairperson              |
| 2. Ar. Chitra Vishwanath         | VTU Nominee              |
| 3. Ar. Vidyadhar S. Wodeyar      | External Industry Expert |
| 4. Ar. Prasad G                  | External Industry Expert |
| 5. Dr. Rama R S                  | Academician              |
| 6. Dr. Chidambara Swamy          | Academician              |
| 7. Ar. Subbiah T S               | Alumni Industry Expert   |
| 8. Prof. Vishwas Hittalmani      | Member                   |
| 9. Prof. (Dr.) Rajshekhar Rao    | Member                   |
| 10. Dr. Rashmi Niranjana         | Member                   |
| 11. Ar. Meghana K Raj            | Member                   |
| 12. Ar. Reema H Gupta            | Member                   |
| 13. Er. Vijayanand M             | Member                   |

## SCHOOL OF ARCHITECTURE

### TEACHING FACULTY

Sl No	Name	Qualification	Designation
1	Prof. Pushpa Devanathan	M Arch, P.G.D.I. (PhD)	Professor & HOD
2	Prof. Vishwas Hittalmani	M Des	Professor
3	Prof. Rajshekhar Rao	M L Arch (PhD)	Professor
4	Prof. Jotirmay Chari	M Arch (PhD)	Professor
5	Ar. Prasad G	M Arch	Professor (Tenure Faculty)
6	Dr. Rashmi Niranjana	MFA (Fine arts), PhD	Associate Professor
7	Dr. Monalisa	M Arch, PhD	Associate Professor
8	Ar. Surekha R	M L Arch	Associate Professor
9	Ar. Lavanya Vikram	M L Arch (PhD)	Associate Professor
10	Ar. Sudha Kumari	M Arch – Habitat Design (PhD)	Associate Professor
11	Ar. Meghana K Raj	M L Arch	Associate Professor
12	Ar. Tejaswini H	M L Arch	Associate Professor
12	Ar. Reema Harish Gupta	M Arch – Urban Design	Associate Professor
13	Ar. Mallika P V	M L Arch	Associate Professor (Tenure Faculty)
14	Ar. Sudhir Chougule	M L Arch	Associate Professor (Tenure Faculty)
15	Ar. Nikhil V Wodeyar	P G Dip – Urban Design	Associate Professor (Tenure Faculty)
16	Ar. Ashwini Mani	M Arch – Advanced Architecture	Assistant Professor (Tenure Faculty)
17	Er. Vijayanand M	M Tech (PhD)	Assistant Professor
18	Er. Aruna Gopal	B E	System Analyst
19	Ar. Shiv Deepthi Reddy	M Arch	Assistant Professor
20	Ar. Kriti Bhalla	B Arch	Assistant Professor

21	Ar. Aishwarya Yoganand	M Sc – Sustainable Building Systems	Assistant Professor
22	Ar. Divya Susanna Ebin	M Arch – Urban Design	Assistant Professor
23	Ar. Yashas Hegde	M Arch – Urban Design	Assistant Professor
24	Ar. Arpita Sarkar	M L Arch	Assistant Professor
25	Ar. Jyotsna Rao J	M L Arch	Assistant Professor
26	Ar. Ranjitha Govindaraj	M L Arch	Assistant Professor
27	Ar. Trisha Sinha	M Tech (Infrastructure systems)	Assistant Professor
28	Ar. Theju Gowda	M Sc - Architecture	Assistant Professor
29	Ar. Akshata Shagoti	M Arch – Architectural Design	Assistant Professor
30	Ar. Amala Anna Jacob	M Arch – Urban Design	Assistant Professor
31	Ar. Meghana M	M A – World Heritage Studies	Assistant Professor
32	Ar. Sheethal B S	M Plan – Regional Planning	Assistant Professor
33	Ar. Megha Ann Jose	Masters in Interior Arch & Design	Assistant Professor
34	Ar. Pooja M Naik	M Arch – Urban Planning & Mgmt.	Assistant Professor

#### ADMINISTRATIVE STAFF

1	Mr. Nagesh B. L	Dip. in Mech Engg.	Instructor
2	Mrs. Ambika	M Tech	Assistant Instructor
3	Ms. Swathi P	B. Com	SDA

#### SUPPORT STAFF

1	Mr. Ramachandra Chari	Attender
2	Mrs. Varalakshmi R	Attender

## BREAKDOWN OF CREDITS FOR B. ARCH DEGREE CURRICULUM (Semester I to X)

BATCH 2019 - 2024

(as per Council of Architecture)

SEMESTER	HUMANITIES & SOCIAL SCIENCES (HSS)	ARTS & SCIENCE (AS)	BASIC ARCHITECTURE & ENGINEERING (BAE)	PROFESSIONAL CORE SUBJECTS (PCS)	ELECTIVES	PROJECT/ INTERNSHIP	TOTAL CREDITS
I	1	7	7	11	-	-	26
II	-	8	7	11	-	-	26
III	-	6	8	11	-	1	26
IV	1	3	11	11	-	-	26
V	2	6	6	11	-	1	26
VI	2	-	13	11	-	-	26
VII	3	-	9	11	3	-	26
VIII	2	-	6	15	3	-	26
IX	-	-	-	-	-	26	26
X	-	-	-	5	3	18	26
<b>Total</b>	<b>11</b>	<b>30</b>	<b>67</b>	<b>97</b>	<b>9</b>	<b>46</b>	<b>260</b>

**SCHEME OF TEACHING & EXAMINATION - III SEMESTER B. ARCH**  
**ACADEMIC YEAR 2020 - 2021**

2019 Batch			Teaching scheme per week					Examination scheme		
Sl. No	Code	Subject	Lecture / Studio	Tutorial	Practical (Study Tour/ Case Study)	Total	Contact hours	Exam	CIE Marks	SEE Marks
1	AR 301	Architectural Design II	6	0	1	7	8	SEE (viva voce)	50	50
2	AR 302	Building Materials & Construction Technology III	3	0	1	4	5	SEE (viva voce)	50	50
3	AR 303	Theory of Architecture I	3	0	0	3	3	SEE	50	50
4	AR 304	History of Architecture III	3	0	0	3	3	SEE	50	50
5	AR 305	Architectural Structures III	3	0	0	3	3	SEE	50	50
6	AR 306	Building Services I	3	0	0	3	3	SEE	50	50
7	AR 307	Computers in Architecture II	1	0	1	2	2	CIE	100	
8	AR 308	Study Tour	0	0	1	1	2	SEE (viva voce)	100	
		<b>TOTAL</b>	<b>22</b>	<b>0</b>	<b>4</b>	<b>26</b>	<b>29</b>			

CIE = CONTINUOUS INTERNAL EVALUATION

P = Pass

SEE = SEMESTER END EXAMINATION

F = Absent & Fail

### EVALUATION PATTERN: Marks allocation for SEE

Subject Code	Subject Name	Design	Drawing	Viva voce	Elective/ Book Review
<b>AR301</b>	<b>Architectural Design II</b>	20	20	05	10

Subject Code	Subject Name	Portfolio	Viva voce
<b>AR302</b>	<b>Building Materials &amp; Construction Technology III</b>	40	10
<b>AR308</b>	<b>Study Tour</b>	60	40

Subject Code	Subject Name	Assignment	Project
<b>AR307</b>	<b>Computers in Architecture II</b>	50	50

#### Note:

- Literature survey will be a requirement for Architectural Design study. Periodic review by external juror for subjects going for viva voce.
- National / international tours may be arranged during vacation for students, to study examples of good architecture.
- For all viva voce examinations one internal faculty and one external faculty will conduct the exam.
- Portfolios have to be submitted on prescribed date announced by the department for all the subjects for one year.
- All students have to register on the first day at the beginning of the **Viva voce exam**.
- All students have to register on the first day of **Term work exams**.

**SCHEME OF TEACHING & EXAMINATION - IV SEMESTER B. ARCH  
ACADEMIC YEAR 2020 - 2021**

2019 Batch			Teaching scheme per week				Examination scheme			
Sl. No	Code	Subject	Lecture / Studio	Tutorial	Practical (Study Tour/ Case Study)	Total	Contact hours	Exam	CIE Marks	SEE Marks
1	AR 401	Architectural Design III	6	0	1	7	8	SEE (viva voce)	50	50
2	AR 402	Building Materials & Construction Technology IV	3	0	1	4	5	SEE (viva voce)	50	50
3	AR 403	Theory of Architecture II	3	0	0	3	3	SEE	50	50
4	AR 404	Climate Responsive Architecture	2	0	1	3	3	SEE	50	50
5	AR 405	Architectural Structures IV	3	0	0	3	3	SEE	50	50
6	AR 406	Building Services II	3	0	0	3	3	SEE	50	50
7	AR 407	Computers in Architecture III	1	0	1	2	3	CIE	100	
8	AR 408	Constitutional Law	1	0	0	1	1	SEE	50	50
<b>TOTAL</b>			<b>22</b>	<b>0</b>	<b>4</b>	<b>26</b>	<b>27</b>			

CIE = CONTINUOUS INTERNAL EVALUATION

P = Pass

SEE = SEMESTER END EXAMINATION

F = Absent & Fail

## EVALUATION PATTERN: Marks allocation for SEE

Subject Code	Subject Name	Design	Drawing	Viva voce	Elective / Book Review
<b>AR401</b>	<b>Architectural Design – III</b>	20	15	05	10

Subject Code	Subject Name	Portfolio	Viva
<b>AR402</b>	<b>Building Materials &amp; Construction Technology IV</b>	40	10

Subject Code	Subject Name	Theory	Project
<b>AR404</b>	<b>Climate Responsive Architecture</b>	30	20

Subject Code	Subject Name	Assignment	Project
<b>AR407</b>	<b>Computers in Architecture III</b>	50	50

### Note:

- Literature survey will be a requirement for Architectural Design study. Periodic review by external juror for subjects going for viva voce.
- National / international tours may be arranged during vacation for students, to study examples of good architecture.
- For all viva voce examinations one internal faculty and one external faculty will conduct the exam.
- Portfolios have to be submitted on prescribed date announced by the department for all the subjects for one year.
- All students have to register on the first day at the beginning of the **Viva voce exam**.
- All students have to register on the first day of **Term work exams**.

## SEMESTER – III

### ARCHITECTURAL DESIGN II

**Course Code: AR301**

**Prerequisite: Nil**

**Course Coordinator: Prof. Pushpa Devanathan**

**Course Credits: 6 : 0 : 1**

**Contact Hours: 112 hours**

#### **Course Objectives:**

Students will be introduced to -

- Creation of space with a complimentary form.
- Effects of light, movement, scale, and the structure on the built environment.
- Relation between site and building.
- Relation between the user and the space.
- Study models for form development.

#### **Course Contents:**

##### **UNIT - I**

Introduction to small scale public buildings, Case studies of projects (including literature study), Explore the relationship between spaces and architectural forms, observe aspects of design like lighting, circulation, structures in relation to form and the building. Scale: monumental scale, human scale, study circulation flow, analyze and interpret data – form guidelines for design.

##### **UNIT - II**

Concept development – site studies/analysis and zoning based on functions, concept related discussions and group activities, evolution of conceptual sketches and encouraging study models to understand volumes, massing and frame aesthetics; reviews & revisions to emphasize design process.

##### **UNIT - III**

Manual drafted drawing – Emphasis on transformation of conceptual drawings to the 2D drawings. Basics of preparation of floor plans, elevations and sections, reviews, and revisions.

##### **UNIT - IV**

Drafting, rendering using different medium views and sketches and enable the students towards presentation techniques and understanding the form by 3D manual study models.

## UNIT - V

Preparation of final sheets with all the requirements with final models.

### References:

1. Bryan Lawson, 'How Designers Think'; Architectural Press; 4th Edition, 2005
2. John Callender, 'Time-saver Standards for Architectural Design Data'; McGraw-Hill, 1982
3. Joseph De Chiara, Michael J Crosbie, 'Time - Saver Standards for Building Types'; McGraw Hill Education, 2017
4. Ernst Neufert, 'Architects' Data'; Wiley Blackwell, 2019

### Course outcomes (COs):

The students will be able to –

- a) Develop their design philosophy through case study and literature studies. (PO: 4; PSO: e)
- b) Demonstrate the relationship between the site and building. (PO: 3; PSO: b)
- c) Interpret conceptual sketches into 2D drawings. (PO: 5; PSO: k)
- d) Establish relationship between space making & form generation. (PO: 1; PSO: a)
- e) Adopt manual presentation techniques. (PO: 10; PSO: g)

**Evaluation Pattern:** Marks allocation for SEE

Subject Code	Subject Name	Design	Drawing	Viva voce	Elective/ Book
AR301	Architectural Design II	20	20	05	10

## SEMESTER – III

### BUILDING MATERIALS & CONSTRUCTION TECHNOLOGY –III

**Course Code: AR302**

**Course Credits: 3: 0: 1**

**Prerequisite: Nil**

**Contact hours: 70 hours**

**Course Coordinators: Prof. Vishwas Hittalmani**

#### Course Objectives:

To introduce to the students to -

- The fundamental principles of RCC in framed structures.
- The fundamental principles of Staircases and its constructions.
- An understanding of the basic building materials.

#### Course Contents:

##### UNIT - I

Scaffolding and formwork:

Materials used and scaffolding methods, its advantages, and disadvantages.

##### UNIT - II

RCC Foundation and Columns: RCC footings, raft foundation, grilled foundation, and columns.

##### UNIT - III

Trusses: Types of timber roof trusses, detail study of king post truss and queen post truss.

##### UNIT - IV

Material study: Study of Concrete as a construction material including its composition, characteristic properties, application etc.

##### UNIT - V

Material study: Different types of floor finishes.

#### References:

1. Roy Chudley, 'Construction Technology'; Pearson Education, 2014
2. Arora & Bhindra, 'A Textbook of Building Construction'; Dhanpat Rai Publishing Co, 2010
3. Mario Salvarodi, 'The Art of Construction'; Chicago Review Press, 3<sup>rd</sup> Edition 2000
4. Glenn M Hardie, 'Building Construction Principles, Practices and Materials', Prentice Hall, 1995

**Course Outcomes (COs):**

Students will be able to -

- a) Understand scaffolding methods used in building construction. (PO: 2; PSO: c)
- b) Describe the different types of foundations and columns used for RCC construction. (PO: 3; PSO: c)
- c) Demonstrate the construction of timber trusses. (PO: 3; PSO: c)
- d) Use innovative materials and details in construction. (PO: 3; PSO: k)
- e) Draft and read architectural drawings of a framed structure. (PO: 10; PSO: g)

**Evaluation Pattern:** Marks allocation for SEE

<b>Subject Code</b>	<b>Subject Name</b>	<b>Portfolio</b>	<b>Viva voce</b>
AR302	Building Materials & Construction Technology III	40	10

## SEMESTER – III

### THEORY OF ARCHITECTURE - I

**Course Code: AR303**

**Course Credits: 3 : 0 : 0**

**Prerequisite: Nil**

**Contact Hours: 42 hours**

**Course coordinator: Assoc. Prof. Sudha Kumari**

#### **Course Objectives:**

To enable students to -

- Explore how design compositions are made.
- Analyze, criticize and appreciate compositions based on principles.
- Explore various aspects of aesthetics in design.

#### **Course Contents:**

##### **UNIT - I**

Introduction to Theory of Architecture, Organizing principles in design – axis, symmetry, asymmetry, datum, linear arrangement, radial arrangement, concentric arrangement.

##### **UNIT - II**

Principles of Architectural Composition - unity, duality, rhythm, repetition, scale, theory of proportions.

##### **UNIT - III**

Principles of Architectural Composition- contrast, restraint, repose, punctuation/ definition, strength, accentuation, gradation, hierarchy, balance, harmony, vitality, dynamism.

##### **UNIT - IV**

Spatial Organization - central, linear, radial, clustered, grid organizations  
ornamentation, character/style in architecture.

##### **UNIT - V**

Building Materials: stone, brick, concrete, timber, iron, steel, glass.

Generation of forms- Pragmatic, analogic, canonic, and iconic.

#### **References:**

1. Francis D K Ching, 'Architecture: Form, Space, & Order'; Wiley, 2014
2. William Lidwell, Kritina Holden, Jill Butler, 'Universal Principles of Design'; Rockport Publishers, 2010

3. Michael DeSiano, 'Elements and Principles of Art and Design'; Royal Fireworks Press
4. Karen Cordes Spence, 'A Primer on Theory in Architecture'; Routledge, 2016
5. Mihalis Karavatzis, Massimo Giovanardi, Maria Michrou, 'Inclusive Place Branding: Critical Perspectives on Theory and Practice'; Routledge, 2017
6. Leonard S. Parker, Hajin Yu, 'Basic Design Principles of Architecture'; Createspace Independent Publishers, 2011
7. Rob Krier, 'Architectural Composition'; Edition Axel Menges, 2010

### **Course Outcomes (COs):**

Students will be able to -

- a) Assess spatial programming and organizing principles possible for a given site. (PO: 1; PSO: b)
- b) Critique architectural projects for principles of composition. (PO: 1; PSO: b)
- c) Understand how variations in architectural compositions affect the form and aesthetics of a building. (PO: 3; PSO: b)
- d) Understand and analyse concepts of spatial organization for their influence on function and aesthetics of the building and site. (PO: 4; PSO: c)
- e) Understand and analyse the influence of materials on aesthetics, function, and character of buildings. (PO: 3; PSO: c)

## SEMESTER – III

### HISTORY OF ARCHITECTURE -III

**Course Code: AR304**

**Course Credits: 3 : 0 : 0**

**Prerequisite: Nil**

**Contact hours: 42 hours**

**Course Coordinator: Assoc. Prof. Reema H. Gupta**

#### **Course Objective:**

- The students should be able to understand Hindu and Islamic architectural styles.

#### **Course Contents:**

##### **UNIT - I**

Chalukyas - Influences & Architectural Character, Study of Ladkhan temple, Aihole; Durga Temple, Aihole, Papanath temple and Virupaksha temple at Pattadakal ; Dravidian Temple.

Introduction and Architectural Character.

Pallavas - Influences & Architectural Character, Rock cut and structural temples.

Study of Shore temple and Rathas of Mamallapuram, Kailashnath temple and Vaikunta Perumal temple at Kanchipuram.

Cholas - Influences & Architectural Character, Study of Brihadeeswara temple at Tanjore.

Pandyas - Influences & Architectural Character, Gopurams.

Vijayanagar - Influences & Architectural Character – Study of Vittala temple and

Hazara Rama temple at Hampi. Nayaks - Influences & Architectural Character, Study of Meenakshi temple at Madurai

##### **UNIT - II**

Later Chalukyans and Rashtrakutas - Influences & Architectural Character

Study of Mahadeva temple at Ittagi and Kailashnath temple at Ellora

Hoysala - Influences & Architectural Character, Study of Keshava temple at Somnathpur and Hoysaleswar temple at Halebid

##### **UNIT – III**

Jain Architecture with Study of Adinath temple at Ranakpur

Gupta Architecture with Study of Dasavatara temple at Deogarh

Orissa- Influences & Architectural Character, Study of LingRaja temple at Bhuvanesar and Sun temple at Konark

Central India - Influences & Architectural Character, Study of Khandariya

Mahadev temple at Khajuraho

Gujarat - Influences & Architectural Character, Study of Sun temple at Modhera

## UNIT – IV

Islamic Architecture -Introduction, principal parts of mosque and tomb

Slave Dynasty - Influences & Architectural Character, Study of QutbMinar and Quwwat. - ul - Islam mosque at Delhi, Tomb of Iltutmish.

Khalji Dynasty - Influences & Architectural Character, Study of Alai Darwaza

Tughlaq Dynasty - Influences & Architectural Character, Study of Tomb of Ghias- ud-din Tughlaq, Khirki Masjid.

Sayyed and Lodi Dynasties- Influences & Architectural Character.

Moghul period- Influences & Architectural Character, Study of Humayun’s tomb, Fatehpur Sikri, Tai Mahal

## UNIT - V

Provincial styles

Punjab - Influences & Architectural Character, Study of Tomb of Shah Rukn - I -Alam

Bengal - Influences & Architectural Character, Study of Eklakhi tomb and Adina Masjid

Jaunpur- Influences & Architectural Character, examples – Study of Atala Masjid

Bijapur - Influences & Architectural Character, examples – Study of GolGumbaz

Sur Dynasty- Influences & Architectural Character

### References:

1. Percy Brown, ‘Indian Architecture - Buddhist and Hindu Period’; CBS, 2016
2. Percy Brown, ‘Indian Architecture: Islamic Period’; CBS, 2005
3. Satish Grover, ‘Buddhist and Hindu Architecture in India’; CBS, 2017
4. Christopher Tadgell, ‘History of Architecture in India’; Phaidon, 1992
5. George Michell, ‘World of Art Hindu Art and Architecture’; Thames and Hudson, 2000
6. Adam Hardy, ‘The Temple Architecture of India’; John Wiley & Sons, 2007

### Course outcomes (COs):

Students will be able to -

- a) Understand the influences, architectural characters evolved during Hindu rulers in southern parts of India. (PO: 1; PSO: a)
- b) Differentiate the architectural styles from early to later developments. (PO: 2; PSO: h)
- c) Understand and identify the architectural practices in central and northern parts of India during Hindu rulers. (PO: 1; PSO: a)
- d) Understand the development of Islamic architecture during different dynasties. (PO: 1; PSO: a)
- e) Study the evolution of the provincial styles of Islamic architecture in India. (PO: 1; PSO: h)

## **SEMESTER – III**

### **ARCHITECTURAL STRUCTURES – III**

**Course Code: AR305**

**Course Credits: 3 : 0 : 0**

**Prerequisite: NIL**

**Contact hours: 42 hours**

**Course Coordinator: Asst. Prof. M. Vijayanand**

#### **Course Objectives:**

To enable the students to -

- Learn and understand the analysis of structural system.
- Develop the ability to interpret data and analyze structural system.

#### **Course Contents:**

##### **UNIT - I**

Statically Determinate and Statically Indeterminate Structures: Introduction, statically indeterminate, external redundancy, internal redundancy, statically indeterminacy of structures with hinges, space frames, and pin jointed structures, kinematic indeterminacy.

##### **UNIT - II**

Slope and Deflection: Introduction, application of Macaulay's method to statically determinate beams, problems, introduction to moment area method, application of moment area method for statically determinate beams, problems.

##### **UNIT - III**

Consistent Deformation Method for Statically Indeterminate Structure: Introduction, procedure for the analysis of propped cantilever and fixed beams. Problems.

##### **UNIT - IV**

Moment Distribution Method for Continuous Beam without Settlement: Introduction, basic theorems, sign conventions, propped cantilever beam, continuous beam (two span and three span). Problems.

##### **UNIT - V**

Moment Distribution Method for Symmetrical Non-Sway Frames and Rectilinear Frames: Introduction, analysis of rectilinear frame, analysis of portal frame. Problems.

**References:**

1. B. C. Punmia, Ashok Kumar Jain, Arun Kumar Jain, 'Theory of Structures'; Laxmi Publications, 2017
2. K. U. Muthu, Azmi Ibrahim, M. Vijayanand, 'Basic Structural Analysis', I K International Publishing House, 2015
3. K. U. Muthu, H. Narendra, Maganti Janardhana, M. Vijayanand, 'Indeterminate Structural Analysis'; I K International Publishing House, 2014

**Course Outcomes (COs):**

The students will be able to –

- a) Describe different forms of structures and evaluate their indeterminacy. (PO: 2; PSO: a)
- b) Analyze the slope and deflection by different methods. (PO: 4; PSO: c)
- c) Analyze the indeterminate structures using the method of consistent deformation method. (PO: 2; PSO: c)
- d) Analyze the continuous beams with moment distribution method. (PO: 4; PSO: a)
- e) Analyze the frames with moment distribution method. (PO: 2; PSO: a)

## SEMESTER – III

### BUILDING SERVICES –I

**Course Code: AR306**

**Prerequisite: NIL**

**Course Coordinator: Prof. Vishwas Hittalmani**

**Course Credits: 3 : 0 : 0**

**Contact hours: 42 hours**

#### **Course objectives:**

- Study the building services of water supply and sanitation and their integration with architectural design.

#### **Course Contents:**

##### **UNIT - I**

Introduction, per capita water demand, sources of water supply, qualitative and quantitative aspects.

Water quality, physical, chemical, and bacteriological quality, drinking water standards. Water borne diseases.

##### **UNIT - II**

Water Purification – Flow sheet of treatment plant – sedimentation, coagulation, filtration, slow sand filter, rapid sand filter and pressure filter.

Disinfection - objective of disinfection, methods of disinfection, break point chlorination.

##### **UNIT - III**

Distribution system – methods of layout of distribution pipes.

Provision for firefighting – fire hydrants.

Domestic water supply system – mains, ferrules, service pipe, water meter, sump, pumps, overhead tanks, distribution pipes, cold water and hot water supply for single and multistoried buildings. Pipe sizes, fittings valves, types of taps. Rainwater harvesting.

##### **UNIT - IV**

Introduction, importance and purpose of sanitation, methods of sanitation, definitions.

Systems of drainage – separate, combined and partially separate system, advantages, and disadvantages of each system. Sanitary requirements for various types of buildings, types of pipes.

Manholes – drop manholes, manhole with intercepting trap, inspection chambers, self-cleansing velocity

Sewage treatment- flow sheet, purposes of each unit.

Sewage treatment and activated sludge process – trickling filter - sketch & description.

## UNIT V

House drainage – principles, traps-floor trap, multi-trap, gully trap, grease and oil trap, urinals, Indian, European, Anglo Indian type of water closets, squatting, urinal, wash basins, sink, bathtubs, flushing cistern.

Systems of plumbing – single stack, one pipe, one pipe partially ventilated, two pipe disposal of wastewater from buildings. solid waste management.

Typical plan of residence – showing all the traps, inspection chambers, pipes connected to public sewer line.

Septic tanks – soak pit, soak well, design aspects, disposal of effluent.

oxidation ponds- Sketch & description

### References:

1. B. C. Punmia, Ashok Kumar Jain and Arun Kumar Jain, 'Water Supply Engineering'; Laxmi Publications Pvt Ltd, 1994
2. R. S. Deshpande, S. E. Wadia, 'Textbook of Sanitary Engineering'; United Books, 1959
3. S. K. Hussain, 'Textbook of Water Supply and Sanitary Engineering'; Oxford & IBH Publishing Co Pvt. Ltd, 2017
4. Journal of Water, 'Sanitation and Hygiene for Development'; IWA Publishing
5. Baldwin Latham, 'Sanitary Engineering: A Guide to the Construction of Works of Sewerage and House Drainage, with Tables for Facilitating the Calculations of the Engineer'; Arkose Press, 2015

### Course outcomes (COs):

The students will be able to -

- a) Explain the sources of water supply and then requirements with quality and quantity in the distribution system. (PO: 1; PSO: c)
- b) Understand the various water treatment methods for water supply system. (PO: 1; PSO: a)
- c) Suggest the water supply scheme for any building. (PO: 3; PSO: c)
- d) Provide the sanitation scheme for any building. (PO: 3; PSO: c)
- e) Suggest various fixtures available in the market to suit the context. (PO: 3; PSO: c)

## SEMESTER – III

### COMPUTERS IN ARCHITECTURE -II

**Course Code: AR307**

**Course Credits: 1 : 0 : 1**

**Prerequisite: Nil**

**Contact Hours: 28 hours**

**Course Coordinator: Asst. Prof. Aruna Gopal**

#### **Course Objectives:**

To enable students to develop skills for -

- Using computers as a tool for architectural design representation
- Drawing management & standard practices
- Creating detailed drawings using annotations
- Learning presentation techniques & plotting of drawings

#### **Course Contents:**

##### **UNIT - I**

Introduction to AutoCAD & User interface Tour, units, limits, Draw tools, Exercises.

##### **UNIT - II**

Modify: All modify tools.

Measuring tools: Enquiry commands Drafting settings, Exercises.

##### **UNIT - III**

Drawing Organization: Layers, Properties, Line types, Line weights, colors.

##### **UNIT - IV**

Annotations: Texts & dimensions.

##### **UNIT - V**

Plotting & Presentation: Blocks, Layouts, page setup manager, plotting to scale, plot styles.

#### **References:**

1. Engineering Drawing and Graphics Using Autocad - T Jeyapooan
2. AutoCAD 2020: A project-based Tutorial - AutoCAD official website
3. Books Tutorial, 'AutoCAD 2020 A Project-Based Tutorial'; Kishore Publishers, 2020
4. T. Jeyapooan, 'Engineering Drawing and Graphics Using Autocad'; Vikas Publishing House, 2010

5. George Omura and Brian C. Benton, 'Mastering AutoCAD 2019 and AutoCAD LT 2019'; Wiley 2018
6. Cheryl R. Shrock, Steve Heather, 'Beginning AutoCAD 2018: Exercise Workbook'; Industrial Press, 2017
7. Terence M. Shumaker, David A. Madsen, 'Autocad and Its Applications'; Goodheart-Willcox Publishers, 2010
8. James A. Leach, Shawna Lockhart, Eric Tilleson, 'AutoCAD 2019 Instructor'; SDC Publications, 2018

**Course outcomes (COs):**

The students will be able to –

- a) Use CAD drawing tools to represent 2D graphics of their designs. (PO: 5; PSO: k)
- b) Organise and create standards for CAD drawings. (PO: 5; PSO: k)
- c) Detail the drawings created with annotations. (PO: 5; PSO: k)
- d) Present design drawings and learn to plot at different scales. (PO: 10; PSO: k)
- e) Apply CAD to their varied drawing requirements. (PO: 5; PSO: k)

**Evaluation Pattern:** Marks allocation for SEE

Subject Code	Subject Name	Assignment	Project
AR307	Computers in Architecture II	50	50

## SEMESTER – III

### STUDY TOUR

**Course Code: AR 308**

**Prerequisite: Nil**

**Course Coordinator: Assoc. Prof. Meghana Raj**

**Course Credits: 0: 0: 1**

**Contact Hours: Nil**

#### **Course Objectives:**

To expose the students to -

- Understand the evolution of the building process.
- Understand existing projects.
- Understand various elements of buildings and their transformation over the years.

#### **Course Contents:**

##### **UNIT - I**

Site visits to include Modern architectural styles, theories practiced through built spaces and their evolution and influences.

Study of materials used to be integral part of the site visits.

#### **Course Outcomes (COs):**

The students will be able to -

- a) Measure and complete the measured drawing of simple buildings. (PO: 2; PSO: a)
- b) Represent different elements of architecture. (PO: 10; PSO: g)
- c) Translate their ideas in the form of drawings. (PO: 10; PSO: g)

**Evaluation Pattern:** Marks allocation for SEE

<b>Subject Code</b>	<b>Subject Name</b>	<b>Portfolio</b>	<b>Viva</b>
AR308	Study Tour	60	40

## SEMESTER – IV

### ARCHITECTURAL DESIGN – III

**Course Code: AR401**

**Prerequisite: Nil**

**Course Coordinator: Prof. Pushpa Devanathan**

**Course Credits: 6 : 0 : 1**

**Contact Hours: 112 hours**

#### **Course Objectives:**

The students will be introduced to -

- The concept of community living and interactive spaces
- The need for privacy, circulation, socio-economic determinants
- Regulatory controls.

#### **Course Contents:**

##### **UNIT - I**

Data collection, Literature survey, Behavioral study, Case study of neighborhoods, Services study,

##### **UNIT - II**

Introduction to projects related to community living,

##### **UNIT - III**

Site-study, Analysis, Zoning and Concept.

##### **UNIT - IV**

Development of Master Plan

##### **UNIT - V**

Preparation of detailed plans, sections, elevations, views, and model

#### **References:**

1. Steen Eiler, Rasmussen, 'Experiencing Architecture'; The MIT Press, 1964
2. William Lidwell , Kritina Holden, Jill Butler, 'Universal Principles of Design'; Rockport Publishers, 2010
3. John Hancock Callender, 'Time-Saver Standards for Architectural Design Data'; McGraw-Hill, 1997
4. John Ray Hoke Jr., Charles George Ramsey, 'Architectural Graphic Standards', Wiley, 2000
5. Christopher Alexander, Sara Ishikawa, Murray Silverstein, 'A Pattern Language:

- Towns, Buildings, Construction’; Oxford University Press, 1977
6. Paul Rand, Michael Beirut, ‘Thoughts on Design’; Chronicle Books, 2014
  7. Sandra Reicis, ‘Concept Development and the Design Process’; Fairchild Books, 2019
  8. Kenneth Hall and Gerald Porterfield, ‘Community by Design: New Urbanism for Suburbs and Small Communities’; McGraw-Hill Education, 2001

**Course outcomes (COs):**

The students will be able to -

- a) Evaluate the collected data and behavioral studies. (PO: 2; PSO: b)
- b) Describe the socio-economic determinants and apply concepts of community living to their design. (PO: 6; PSO: h)
- c) Outline the conditions of a site and derive their concept. (PO: 2; PSO: b)
- d) Strategise design at the overall scale of the site. (PO: 3; PSO: c)
- e) Render and present their design effectively. (PO: 10; PSO: g)

**Evaluation Pattern:** Marks allocation for SEE

<b>Subject Code</b>	<b>Subject Name</b>	<b>Design</b>	<b>Drawing</b>	<b>Viva voce</b>	<b>Elective / Book</b>
AR401	Architectural Design – III	20	15	05	10

## SEMESTER – IV

### BUILDING MATERIALS & CONSTRUCTION TECHNOLOGY -IV

**Course Code: AR402**

**Course Credits: 3 : 0 : 1**

**Prerequisite: Nil**

**Contact Hours: 70 hours**

**Course Coordinator: Prof. Vishwas Hittalmani**

#### Course Objectives:

- To introduce various RCC roofing systems
- To develop an understanding about deep foundation construction techniques.
- To understand the details of slab construction for various spanning conditions of structure.

#### Course Contents:

##### UNIT - I

Introduction to slabs, Column position and centerline drawing, RCC One-way slab, Two-way slab, One-way Continuous slab, Cantilever slabs, overhangs.

##### UNIT - II

Flat Slab, Ribbed Slab, Waffle slab

##### UNIT - III

Filler Slab, Coffered Slab, Precast Slab

##### UNIT - IV

Dome, Vaults, Pitched Roof and Lean-to-roof

##### UNIT - V

Pile foundation

Materials – Characteristics and types of Paints, Wall finishes, Internal and External plastering.

#### References:

1. W. B. McKay, 'Building Construction – Vol 1-5'; Pearson Education India, 2013
2. Roy Chudley, 'Construction Technology'; Pearson Education, 2014
3. R. Barry, 'Construction of Buildings - Vol 1'; Wiley-Blackwell, 1999
4. Rangwala, 'Engineering Materials'; Charotar Publishing House, 2014
5. K. C. Jain, 'Design for R.C.C. Slabs'; Laxmi Publication, 2011
6. Robert Park, William Gamble, 'Reinforced Concrete Slabs'; Wiley, 200

7. Santiago Huerta, Karl–Eugen Kurrer, Werner Lorenz, ‘Arches, Vaults and Domes: Geometry and Equilibrium in the Design of Masonry Structures’; Wiley, 2020
8. R J Cope, L.A. Clarke, ‘Concrete Slabs: Analysis and Design’; CRC Press, 1990
9. Mario Salvarodi, ‘The Art of Construction’; Chicago Review Press, 3rd Edition 2000
10. David Kent Ballast , 'Architect's Handbook of Construction Detailing'; Wiley, 2009
11. P Purushothama Raj, ‘Building Construction Materials and Techniques’; Pearson India Education Services, 2016

**Course outcomes (COs):**

The students will be able to -

- a) Demonstrate the fundamental knowledge of the technology used in the construction of slabs with short spans. (PO: 2; PSO: c)
- b) Apply technicalities, details, and characteristics of RCC slab construction. (PO: 2; PSO: a)
- c) Incorporate and design slabs using indigenous materials. (PO: 4; PSO: e)
- d) Demonstrate the ability to design non-conventional roof forms. (PO: 4; PSO: k)
- e) Apply deep foundation techniques. (PO: 2; PSO: a)

**Evaluation Pattern:** Marks allocation for SEE

<b>Subject Code</b>	<b>Subject Name</b>	<b>Portfolio</b>	<b>Viva</b>
AR402	Building Materials & Construction Technology IV	40	10

## SEMESTER – IV

### THEORY OF ARCHITECTURE II

**Course Code: AR403**

**Course Credits: 3 : 0 : 0**

**Prerequisite: Nil**

**Contact Hours: 42 hours**

**Course Coordinator: Assoc. Prof. Sudha Kumari**

#### **Course Objectives:**

- A broad overview - the evolution of thought and trends, across timeline, of Western Architectural world during Renaissance, Baroque, Neo Classical and Modern periods

#### **Course Contents:**

##### **UNIT - I**

Antiquity to 17th century: Introduction - the connection between theories and application in various eras, overview of architecture concepts evolved in the 21st century. Three fundamentals prescribed by Vitruvius, identifying the three fundamentals of Vitruvius in world architecture, contributions of Vitruvius – ‘De Architectura’, significance of ‘Vitruvian man’. Medieval architecture overview. Introduction to Renaissance, Renaissance concepts – Alberti, Cartesian theory, French academic tradition, Contributions of Blondel

##### **UNIT - II**

Theories of 18th & 19th centuries: Ideas of Marc Antoine Laugier, Ideas of Etienne Louis Boullée, Gottfried Semper – ‘Four elements of Architecture’, Gottfried Semper – ‘Principle of dressing’. ‘Principle of dressing’ in the works of modern architects, Herzog and De Meuron

##### **UNIT - III**

Modern movement: Introduction to the Modern Movement, Louis Sullivan, Adolf Loos, Walter Gropius, Mies van der Rohe, Eero Saarinen, Otto Wagner, Louis Kahn. Modern movement masters – Frank Lloyd Wright, Erich Mendelson, Richard Neutra, Kenzo Tange, Le Corbusier.

##### **UNIT - IV**

Post modernism & De-Constructivism: Introduction to Post modernism, Postmodern theory – Robert Venturi, Charles Jencks. Introduction to Deconstructivism, fundamental beliefs and philosophies of Peter Eisenman

## UNIT - V

Research oriented: Architectural thought – Amos Rappaport & Geoffrey Broadbent, Architectural criticism overview

### References:

1. Professor Geoffrey Broadbent, 'Design in Architecture'; Spon Press, 1990
2. Francis D. K. Ching, 'Architecture: Form, Space and Order'; Wiley, 2014
3. Amos Rapoport, 'House Form and Culture', Pearson 1969
4. Charles Jencks, 'Modern Movements in Architecture'; Penguin, 1973
5. M. Fil Hearn, 'Ideas that Shaped Buildings'; MIT Press, 2003
6. Kenneth Frampton, 'Modern Architecture: A Critical History'; Thames and Hudson, 2007
7. Karen Cordes Spence, 'A Primer on Theory in Architecture'; Routledge, 2016
8. William Lidwell, Kritina Holden, Jill Butler, 'Universal Principles of Design'; Rockport Publishers, 2010
9. Rob Krier, 'Architectural Composition'; Axel Menges, 2010
10. Amos Rapoport, 'The Meaning of the Built Environment: A Nonverbal Communication Approach'; University of Arizona Press, 1990

### Course outcomes (COs):

The students will be able to -

- a) Identify the evolution of thoughts and trends across the timeline of Western Architecture. (PO: 1; PSO: h)
- b) Study the important events which affect the built forms and its transition. (PO: 6; PSO: h)
- c) Understand the concepts of various architects across the Modern movement. (PO: 3; PSO: b)
- d) Understand the concepts of various architects across Post Modernism and Deconstructivism. (PO: 3; PSO: b)
- e) Understand the various built forms through critics. (PO: 4; PSO: h)

## SEMESTER – IV

### CLIMATE RESPONSIVE ARCHITECTURE

**Course Code: AR404**

**Course Credits: 0 : 2 : 1**

**Prerequisite: Nil**

**Contact hours: 42 hours**

**Course Coordinator: Asst. Prof. Aishwarya Yoganand**

#### **Course Objectives:**

To expose to the students to -

- The knowledge required for understanding the influence of climate on architecture.

#### **UNIT - I**

Introduction: Elements of climate, Enumerating and representing climatic data. Classification of climate, major climatic zones of the world, tropical climate further classification.

#### **UNIT - II**

Thermal comfort: Effect of climatic elements on thermal comfort, heat exchange process, effective temperature.

#### **UNIT - III**

Construction Techniques: Construction techniques to improve thermal performance of walls and roofs in various climatic zones.

Natural Ventilation: Effects of openings in internal and external features, design considerations etc.

#### **UNIT - IV**

Effect of landscape elements and site topography.

#### **UNIT - V**

Design considerations: Design consideration for various climatic zones of India with respect to shading devices, day light factor, rain etc.

#### **References:**

1. Koenigsberger, 'Manual of Tropical Housing and Building'; Universities Press, 1975
2. C. P. Kukreja, 'Tropical Architecture'; McGraw-Hill, 1978
3. Arvind Krishan, Nick Baker, Simos Yannas, Steve Szokolay, 'Climate Responsive Architecture: A Design Handbook for Energy Efficient Buildings'; McGraw Hill Education, 2017

4. Matthew R Hall, 'Materials for Energy Efficiency and Thermal Comfort in Buildings'; Woodhead Publishing, 2010
5. Cath Senker, 'Tropical Climates'; Heinemann, 2017
6. Richard Hyde, 'Climate Responsive Design'; Routledge, 2000
7. E. O'Coifagh, J. A. Olley, J. O. Lewis, 'The Climatic Dwelling: An Introduction to Climate-Responsive Residential Architecture'; Earthscan Publications Ltd., 1996
8. Paul Gut, Dieter Ackerknecht, 'Climate Responsive Building: Appropriate Building Construction in Tropical and Subtropical Regions'; SKAT, Switzerland, 1993

**Course outcomes (COs):**

The students will be able to -

- a) Understand the basic principles of various climatic systems. (PO: 4; PSO: a)
- b) Apply thermal comfort techniques in designing built spaces. (PO: 3; PSO: b)
- c) Provide natural ventilation and daylighting for built spaces. (PO: 3; PSO: b)
- d) Understand the impact of landscape elements in the site context and design accordingly. (PO: 7; PSO: c)
- e) Apply various climatic responsive strategies to create design solutions for different climatic zones. (PO: 3; PSO: b)

**Evaluation Pattern:** Marks allocation for SEE

Subject Code	Subject Name	Theory	Project
AR404	Climate Responsive Architecture	30	20

## SEMESTER – IV

### ARCHITECTURAL STRUCTURES – IV

**Course Code: AR405**

**Course Credits: 3 : 0 : 0**

**Prerequisite: NIL**

**Contact hours: 42 hours**

**Course Coordinator: Asst. Prof. M. Vijayanand**

#### **Course Objectives:**

- The students are exposed to the Design of Reinforced Concrete Structures with emphasis on Limit State Method.
- The student should be able to analyze and design of basic structural elements

#### **Course Contents:**

##### **UNIT - I**

Design Philosophy – Concept of Elastic method, ultimate load method and limit state method –Limit State philosophy - IS code provisions – load and load combinations – Stress and strain relationship of reinforcing steel and concrete

##### **UNIT - II**

Limit state design of Beams – Analysis and design of singly and doubly reinforced beams and analysis of T- beam

##### **UNIT - III**

Limit state design of Slabs – Design of one way simply supported and continuous slab. Design of two-way rectangular slab subjected to uniformly distributed load for various boundary conditions, Design of staircase (dog- legged).

##### **UNIT - IV**

Limit state design of column – Design of short axially loaded RC columns, RC Columns with uniaxial moment

##### **UNIT - V**

Limit state design of Footing – Loads on foundation, types of footing, Design of axially loaded square footing

#### **References:**

1. S. Unnikrishna Pillai, Devdas Menon, ‘Reinforced Concrete Design’; McGraw Hill Education, 2017
2. P. C. Varghese, ‘Limit State Design of Reinforced Concrete’; Prentice Hall India

- Learning Pvt. Ltd., 2008
3. N. Krishna Raju, 'Design of Reinforced Concrete Structures'; CBS, 2019
  4. M.L. Gambhir, 'Fundamentals of Reinforced Concrete Design'; PHI 2010
  5. Swami Saran, 'Analysis and Design of Substructures'; Oxford & IBH Publishing Co Pvt. Ltd., 2018
  6. P. Dayaratnam, P. Sarah, 'Design of Reinforced Concrete Structure'; Medtech, 2017

**Course outcomes (COs):**

The students will be able to -

- a) Describe and apply limit state design concept in Reinforced concrete elements. (PO: 4; PSO: c)
- b) Analyse, design and detailing of varieties of beams. (PO: 4; PSO: c)
- c) Analyse, design and detailing of slabs and stairs. (PO: 4; PSO: c)
- d) Analyse, design and detailing of columns. (PO: 4; PSO: c)
- e) Analyse, design and detailing of footings. (PO: 4; PSO: c)

## SEMESTER – IV

### BUILDING SERVICES II

**Course Code: AR406**

**Course Credits: 3 : 0 : 0**

**Prerequisite: Nil**

**Contact Hours: 42 hours**

**Course Coordinators: Prof. Vishwas Hittalmani**

#### **Course objectives:**

To enable the students to -

- Achieve proficiency in application of electrical services in design & construction.
- Study the materials used in electrical services for buildings.
- Gain practical knowledge of electricity and illumination applications used in current architectural practice.
- Comprehensively plan and design the electrical and illumination scheme of a building.

#### **Course contents:**

##### **UNIT - I**

Study of supply and distribution of electricity to buildings from generating stations to load centers; overhead versus underground distribution systems, line supports, panel boards, etc. Service connections, Substations, transformers, panel boards, distribution boards, fuses, MCB.

##### **UNIT - II**

Wires and cables-Conductor materials used in cables, insulating materials, Types of cables used in internal wiring. Internal supply and distribution electrical energy; Types of Earthing.

##### **UNIT - III**

Quality and quantity of light; Methods of lighting – Ambient, task and accent lighting, street lighting, factory lighting. Systems of luminaries, direct, indirect, etc.

Types of electrical lamps – incandescent, fluorescent/CFL, LED, neon lamps and their lighting characteristics; Design considerations for different types of occupancies and tasks and calculation of lighting requirement

##### **UNIT - IV**

Electrical Load Estimation- Preparation of electrical scheme and the electrical load calculations for buildings

## UNIT - V

Fire prevention, precaution, Fire resisting materials, Alarm equipments, extinguishers, Sprinklers, detectors; Fire escape lift, staircase, etc; Fire stations, Systems adopted in various building types against fire, case studies; Fire – Norms and regulations as per bye-law, NBC – fire and life safety

### References:

1. S. L. Uppal, G. C. Garg, 'Electrical Wiring Estimating and Costing'; Khanna Publishers, 1987
2. Bureau of Standards, 'National Building Code'
3. Mark Karlen, Christina Spangler, James R. Benya, 'Lighting Design Basics'; Wiley, 2017
4. Admir Jukanovic, 'Architectural Lighting Design: A Practical Guide'; The Crowood Press Ltd., 2018
5. H. Wayne Beaty and Surya Santoso, 'Handbook of Electric Power Calculations'; McGraw-Hill Education, 2015
6. E. F. Curd, C. A. Howard, 'Electrical Services for Buildings'; Springer
7. Tom De Saulles, 'The Illustrated Guide to Electrical Building Services'; BSRIA, 2003
8. S. David Hughes, 'Electrical Systems in Buildings'; Delmar Cengage Learning, 1988
9. Frederic P. Hartwell and Herbert P. Richter, 'Practical Electrical Wiring: Residential, Farm, Commercial And Industrial'; Park Publishers, 2005
10. A.Bhatia, 'Electrical Conductors'; Createspace Independent Publishers, 2015

### Course outcomes (COs):

The students will be able to -

- a) Prepare, design, and estimate the electrical load required for any building. (PO: 4; PSO: e)
- b) Classify the various types of cables used in internal wiring. (PO: 1; PSO: a)
- c) Design lighting schemes required for different occupancies and tasks. (PO: 2; PSO: c)
- d) Estimate the electrical load for a building. (PO: 4; PSO: e)
- e) Apply firefighting norms while designing a building. (PO: 4; PSO: e)

## SEMESTER – IV

### COMPUTERS IN ARCHITECTURE –III

**Course Code: AR407**

**Prerequisite: Nil**

**Course Coordinator: Asst. Prof. Aruna Gopal**

**Course Credits: 1 : 0 : 1**

**Contact Hours: 28 hours**

#### **Course Objectives:**

To enable the students to -

- To develop skills required in using computers as a tool for architectural design representation
- To develop 3D modeling techniques for visualization & to create photorealistic outputs using 3dsMax.
- To learn Rendering and Presentation techniques using 3dsMax and Photoshop.

#### **Course contents:**

##### **UNIT - I**

User Interface essentials: Interface setup, Units, Navigational tools.

Basic commands: Open, Save, import from CAD, Export options.

Transform tools: Move, copy, rotate, scale, selection options

##### **UNIT - II**

Modeling: Standard & Extended primitives, 2D shapes

Editing & Modifying: Edit spline, Edit Mesh, Extrude, Sweep, loft, lathe, Twist, Taper,

Edit poly, Boolean commands

##### **UNIT - III**

Materials: Material Editor, Textures, colors, Bump, Opacity, Reflection controls

Mapping: UVW map, real world scale adjustments

Lights: Standard lights, mental ray light parameters

Shadows: Shadow types & Parameters

##### **UNIT - IV**

Rendering: Render setup parameters, Output formats.

##### **UNIT - V**

Presentation techniques: Photoshop tools & techniques, Draw tools, Filters, toning, selections, effects.

**References:**

1. Paul F. Aubin, 'Revit Architecture: The Family Editor'; lynda.com, inc, 2011
2. Robert Yori, Marcus Kim, Lance Kirby, 'Mastering Autodesk Revit 2020'; Sybex, 2019
3. Paul F. Aubin, 'Advanced Modeling in Revit Architecture'; lynda.com, inc, 2011

**Course outcomes (COs):**

The students will be able to -

- a) Acquire the knowledge of 3D modelling tools for visualization and to generate construction drawings. (PO: 5; PSO: k)
- b) Apply the software tools to visualize projects in 3D space. (PO: 5; PSO: k)
- c) Apply the techniques for conceptual massing forms and generate views of a project. (PO: 5; PSO: k)
- d) Apply the software to get rendered views for design presentations. (PO: 10; PSO: g)
- e) Create design presentations and compositions using image editing applications. (PO: 5; PSO: k)

**Evaluation Pattern:** Marks allocation for SEE

<b>Subject Code</b>	<b>Subject Name</b>	<b>Assignment</b>	<b>Project</b>
AR407	Computers in Architecture III	50	50

## SEMESTER – IV

### CONSTITUTIONAL LAW

**Course Code: AR408**

**Prerequisite: Nil**

**Course Coordinator: Humanities Department**

**Course Credits: 1 : 0 : 0**

**Contact Hours: 14 hours**

#### **Course Objectives:**

To enable the students to -

- provide basic information about Indian constitutional law.
- identify individual role and create legal awareness.

#### **Course Contents:**

##### **UNIT - I**

Evolution of Indian Constitution, The Preamble, fundamental rights in detail and exercise of rights under Part III, limitations & important cases.

##### **UNIT - II**

Relevance of directive principles of state policy under part-IV, Fundamental duties & their significance. Special Constitutional Provisions for SC&ST, Women & Children.

##### **UNIT - III**

Union executive-President, Prime Minister, Parliament & State Executive-Governor, Chief Minister, State Legislatures.

##### **UNIT - IV**

Union and State judiciary -Supreme Court of India & High courts of the states.

##### **UNIT - V**

Emergency provisions, electoral process, amendment procedure and major constitutional amendments.42<sup>nd</sup>, 44<sup>th</sup>, 74<sup>th</sup> 76<sup>th</sup>, 86<sup>th</sup> and, 91<sup>st</sup> Amendments.

#### **References:**

1. Durga Das Basu, 'Introduction to the Constitution of India'; Lexis Nexis, 2011
2. K. R. Phaneesh, 'Constitution of India and Professional Ethics', Sudha Publications
3. J. N. Pandey, 'Constitutional Law of India'; Central Law Agency, 2019
4. M. Raja Ram, 'Constitution of India and Professional Ethics'; New Age

- International, 2015
5. B. R. Venkatesh, K. B. Merunandan, 'Introduction To The Constitution Of India & Professional Ethics'; Meragu Publications, 2011
  6. M. P. Jain, 'Indian Constitutional Law'; LexiNexis, 2018
  7. V. N. Shukla, 'Constitution of India'; Eastern Book Company, 2019
  8. Austin Granville, 'The Indian Constitution: Cornerstone of A Nation'; Oxford, 1999
  9. Austin Granville, 'Working in a Democratic Constitution: A History of the Indian Experience'; Oxford, 2003
  10. Chintan Chandrachud, 'Balanced Constitutionalism: Courts and Legislatures in India and the United Kingdom'; OUP India, 2020
  11. M. V. Pylee, 'An Introduction to the Constitution of India'; South Asia Books, 1995

**Course outcomes (CO):**

The students will be able to -

- a) Enhance their legal literacy by understanding the fundamental principles of Indian constitutional law. (PO: 6; PSO: i)
- b) Identify various provisions of Directive Principles of state policies and fundamental duties. (PO: 6; PSO: h)
- c) Explain the powers of the executive and legislature. (PO: 6; PSO: h)
- d) Explain the powers of the judicial system. (PO: 6; PSO: h)
- e) Analyse and implement certain laws as a citizen and as a professional. (PO: 6; PSO: i)