

RAMAIAH Institute of Technology

# CURRICULUM

# **Outcome Based Education**

For the Academic Year 2023 - 2024

# 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. Ramajah a philanthropist, founded 'Gokula Education Foundation' in 1962 with an objective of serving the society. M S Ramajah 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 17 UG programs and 11 PG programs. All these programs are approved by AICTE. All eligible UG and PG programs are accredited by National Board of Accreditation (NBA). The institute is accredited with 'A+' grade by NAAC in March 2021 for 5 years. University Grants Commission (UGC) & Visvesvaraya Technological University (VTU) have conferred Autonomous Status to MSRIT for both UG and PG Programs since 2007. The institute has also been conferred autonomous status for Ph.D. program since 2021. The institute is a participant to the Technical Education Quality Improvement Program (TEOIP), an initiative of the Government of India. The institute has 380 competent faculty out of which 67% are doctorates. Some of the distinguished features of MSRIT are: State of the art laboratories, individual computing facility for 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, Centre for Antennas and Radio Frequency systems (CARFS), Center for Cyber Physical Systems, Schneider Centre of Excellence & Centre for Bio and Energy Materials Innovation. Ramaiah Institute of Technology has obtained "Scimago Institutions Rankings" All India Rank 107 & world ranking 600 for the year 2022.

The Entrepreneurship Development Cell (EDC) and Section 8 company "Ramaiah Evolute" have been set up on campus to incubate startups. **M S Ramaiah Institute of Technology is recognized by Atal Ranking of Institutions on Innovation Achievements (ARIIA), MoE, 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. The Institute is a member of DELNET, CMTI and VTU E-Library Consortium. The Institute has a modern auditorium, recording studio, and several hi-tech conference halls with video conferencing facilities. The institute 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 (NIRF), MoE, Government of India, Ramaiah Institute of Technology has achieved 78<sup>th</sup> rank among 1314 top Engineering Institutions & 23<sup>rd</sup> Rank among 105 School of Architecture in India for the year 2023.

# 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 socioeconomic needs.

# **MISSION OF THE INSTITUTE**

MSRIT shall meet the global socio-economic needs through -

1. Imparting quality technical education by nurturing a conducive learning environment through continuous improvement and customization.

2. Establishing research clusters in emerging areas in collaboration with globally reputed organizations.

3. 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):**

**PSO1:** Apply knowledge and skills of arts and sciences based on function, form materials, information, facilities, technology and analysis to Design and develop sustainable Architectural projects

**PSO2:** Identify, formulate and solve industrial requirements and problems with a thorough knowledge of contemporary issues in industrial and service sectors and understand the impact of Architectural design solutions in a global and societal context.

**PSO3:** Understand and respect professional and ethical responsibility and implement the concepts of project and construction management with the cutting-edge technology

# **BOARD OF STUDIES FOR THE TERM 2023 – 2024**

1	Dr. Pushpa Devanathan	Chairperson
2	Dr. Deepika Shetty	VTU Nominee
3	Ar. Vidyadhar S. Wodeyar	External Industry Expert
4	Ar. Prasad G	External Industry Expert
5	Dr. Rama RS	Academician
6	Dr. Chidambara Swamy	Academician
7	Ar. Subbiah T S	Alumni
8	Prof. Vishwas Hittalmani	Member
9	Prof. Dr. Rajshekhar Rao	Member
10	Dr. Rashmi Niranjan	Member
11	Ar. (Dr.) Meghana K Raj	Member
12	Er. (Dr.) Vijayanand M	Member

# SCHOOL OF ARCHITECTURE

# **TEACHING FACULTY**

Sl No	Name	Qualification	Designation
1	Dr. Pushpa Devanathan	M.Arch (Habitat Design) P.G.D.I., Ph.D	Professor & HOD
2	Ar. Vishwas Hittalmani	M Des (Industrial Design)	Professor
3	Dr. Rajshekhar Rao	M.Arch (Landscape architecture), PhD	Professor
4	Dr. Jotirmay Chari	M Arch, PhD	Professor
5	Ar. Prasad G	M.Arch (Landscape architecture)	Professor (Tenure)
6	Dr. Rashmi Niranjan	MFA (Fine arts), PhD	Associate Professor
7	Dr. Monalisa	M Arch, PhD	Associate Professor
8	Ar. Surekha R	M. Arch (Landscape architecture) (PhD)	Associate Professor
9	Ar. Lavanya Vikram	M. Arch (Landscape architecture) (PhD)	Associate Professor
10	Ar. Sudha Kumari	M Arch (Habitat Design ) (PhD)	Associate Professor
11	Ar. Meghana K Raj	M .Arch (Landscape architecture) (PhD)	Associate Professor
12	Ar. Tejaswini H	M. Arch (Landscape architecture) (PhD)	Associate Professor
13	Ar. Mallika P V	M. Arch (Landscape architecture)	Associate Professor (Tenure)
14	Ar. Sudhir Chougule	M. Arch (Landscape architecture)	Associate Professor (Tenure)
15	Ar. Nikhil V Wodeyar	P G Dip (Urban Design)	Associate Professor (Tenure)
16	Er. Vijayanand M	M Tech (PhD)	Assistant Professor
17	Er. Aruna Gopal	B E (MSc)	System Analyst
18	Ar. Kriti Bhalla	B Arch	Assistant Professor
19	Ar. Divya Susanna Ebin	M Arch (Urban Design), (PhD)	Assistant Professor
20	Ar. Ranjitha Govindaraj	M.Arch (Landscape architecture)	Assistant Professor
21	Ar. Theju Gowda	M Sc (Architecture)	Assistant Professor
22	Ar. Akshata Shagoti	M Arch (Architecture Design)	Assistant Professor

23	Ar. Amala Anna Jacob	M Arch (Urban Design)	Assistant Professor
24	Ar. Meghana M	M A(World Heritage Studies)	Assistant Professor
25	Ar. Megha Ann Jose	MIAD (Interior Architecture & Design)	Assistant Professor
26	Ar. Pooja M Naik	M Arch (Urban Planning & Mgmt.)	Assistant Professor
27	Ar. Tanvi Katre	M Plan (Environmental Planning)	Assistant Professor
28	Ar. Sreesha S Bhat	M Arch (Urban Design)	Assistant Professor
29	Ar. Harshita D	M Arch (Urban Design)	Assistant Professor
30	Ar. Joyce Sequeira	M Plan (Urban Planning)	Assistant Professor
31	Ar. Shwetha P E	M Arch (Urban Design)	Assistant Professor
32	Ar. Pinki Bose	M Arch (Urban Design)	Assistant Professor
33	Ar. Ashwini Mani	M Arch (Urban Design)	Assistant Professor (Tenure)
34	Ar. Sruti R	M Arch (Urban Design)	Assistant Professor
35	Ar Aparna M P	M Arch (Urban Design)	Assistant Professor
36	Ar Spoorthi C	M Arch (Urban Design)	Assistant Professor
37	Ar Babitha Mohammed	M Arch (Energy efficient & sustainable Arch)	Assistant Professor

## ADMINISTRATIVE STAFF

1	Mr. Nagesh B. L	Dip. in Mech Engg.	Instructor
2	Ms. Swathi P	B. Com	SDA

### SUPPORT STAFF

1	Mr. Ramachandra Chari	Attender
2	Mrs. Parvathi	Attender

# BREAKDOWN OF CREDITS FOR B. ARCH DEGREE CURRICULUM (Semester I to X) BATCH 2021 - 2026

(as per Council of Architecture)

SEMESTER	HUMANITIES &	ARTS &	BASIC ARCHITECTURE	PROFESSIONAL CORE	ELECTIVES	PROJECT/ INTERNSHIP	TOTAL CREDITS
	SOCIAL SCIENCES (HSS)	SCIENCE (AS)	& ENGINEERING (BAE)	SUBJECTS (PCS)			
Ι	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
Х	-	-	-	5	3	18	26
Total	11	30	67	97	9	46	260

# SCHEME OF TEACHING & EXAMINATION - III SEMESTER B. ARCH ACADEMIC YEAR 2023 - 2024

2022 Batch		Т	Teaching scheme per week				Exa	mination s	cheme	
SI. No	Code	Subject	Lecture / Studio	Tutorial	Practical (Study Tour/ Case Study)	Total	Contact hours	Exam	CIE Marks	SEE Marks
								SEE (viva		
1	AR 301	Architectural Design II	6	0	1	7	8	voce)	50	50
2	AR 302	Building Materials & Construction Technology III	3	0	1	4	5	SEE (viva	50	50
	1110 502			Ŭ	1			SEE		
3	AR 303	Theory of Architecture I	3	0	0	3	3		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	3	0	0	3	3	SEE	50	50
7	AR 307	Computers in Architecture II	1	0	1	2	3	CIE	10	00
8	AR 308	Study Tour	0	0	1	1	2	SEE (viva	50	50
0	7110 500	TOTAL	22	0	4	26	30	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	50	50

**CIE** = CONTINUOUS INTERNAL EVALUATION

**SEE =** SEMESTER END EXAMINATION

# **EVALUATION PATTERN: Marks allocation for SEE**

Subject Code	Subject Name	Design	Drawing	Viva voce	Elective/ BookReview/ Model	Total
AR301	Architectural Design II (SEE Viva-voce)	20	20	05	05	50

Subject	Subject Name	Portfolio	Viva voce	Total
Code				
AR302	<b>Building Materials &amp; Construction Technology III</b> (SEE Viva-voce)	40	10	50
AR308	Study Tour (SEE Viva-voce)	30	20	50

# Note:

- Literature survey will be a requirement for Architectural Design study. Periodic review will be conducted by external juror for subjects going for viva voce.
- National / international tours may be arranged during vacation to study examples of 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 the viva voce subjects.
- All students have to register on the first day at the beginning of the Viva voce exam.

# SCHEME OF TEACHING & EXAMINATION - IV SEMESTER B. ARCH ACADEMIC YEAR 2023 - 2024

2022 Batch		Teaching scheme per week				Exa	mination s	cheme		
Sl. No	Code	Subject	Lecture / Studio	Tutorial	Practical (Study Tour/ Case Study)	Total	Contact hours	Exam	CIE Marks	SEE Marks
								SEE		
1	AR 401	Architectural Design III	6	0	1	7	8	(viva voce)	50	50
2	AD 402	Building Materials &	2	0	1	4	5	SEE (viva	50	50
2	AK 402	Construction Technology IV	3	0	1	4	5	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	4	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	10	00
8	AR 408	Constitutional Law	1	0	0	1	1	SEE	50	50
		TOTAL	22	0	4	26	30			

**CIE** = CONTINUOUS INTERNAL EVALUATION

**SEE = SEMESTER END EXAMINATION** 

# **EVALUATION PATTERN: Marks allocation for SEE**

Subject Code	Subject Name	Design	Drawing	Viva voce	Elective / Book Review/Model	Total
AR401	Architectural Design – III	20	20	05	05	50

Subject Code	Subject Name	Portfolio	Viva	Total
AR402	Building Materials & Construction Technology IV	40	10	50

### Note:

- Literature survey will be a requirement for Architectural Design study. Periodic review will be conducted by external juror for subjects going for viva voce.
- National / international tours may be arranged during vacation, to study examples of 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 viva voce subjects.
- All students have to register on the first day at the beginning of the Viva voce exam.

# **III SEMESTER**

# **ARCHITECTURAL DESIGN - II**

Course Code: AR301	Credits: 6:0:1
Pre – requisites: Nil	Contact Hours: 8 hours/week
Course Coordinator: Dr. Pushpa Devanathan	

# **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 to medium size scale public buildings, with simple circulation, passive energy techniques and single use buildings. Some suggestive projects are small buildings involving civic/ cultural use, related to children such as schools, facilities for people with special requirements, market space, health care clinic, art gallery, bank, Post Office, Guest House and Restaurant.

### Unit II

Case studies of projects (including literature study), Explore the relationship between spaces and architectural forms, observe aspects of design like lighting, circulation, privacy, convenience, comfort, furniture arrangement, texture, colour, 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 III

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 IV

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 V

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

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

NOTE: The design shall be sensitive to the needs of the disabled, aged people and children.

# **References:**

- 1. Bryan Lawson, 'How Designers Think'; Architectural Press; 4th Edition, 2005
- 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.
- 5. Peter Zumthor, "Thinking Architecture", Lars Muller, 1998

# Course Outcomes (COs):

The students will be able to -

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

Subject Code	Subject Name	Design	Draw ing	Viva voce	Elective/ BookRevi ew/Model	Total
AR301	Architectural Design II(Viva-voce)	20	20	05	05	50

# **Evaluation Pattern:** Marks allocation for (SEE):

### **BUILDING MATERIALS & CONSTRUCTION TECHNOLOGY – III Course Code: AR302** Credits: 3:0:1 **Contact Hours: 5 hours/week** Pre - requisites: Nil

# **Course Coordinator: 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. Formwork for slabs, columns and beams, staircases

### Unit II

RCC Foundation and Columns: RCC footings, raft foundation, grilled foundation, and columns, with all technical information.

# Unit III

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

### Unit IV

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

# Unit V

Material study: Different types of floor finishes and applications.

# **References:**

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

# Course Outcomes (COs):

Students will be able to -

- 1. Understand scaffolding methods used in building construction. (PO: 2; PSO: 1)
- 2. Describe the different types of foundations and columns used for RCC construction. (PO: 3; PSO: 1)
- 3. Demonstrate the construction of timber trusses. (PO: 3; PSO: 1)
- 4. Use innovative materials and details in construction. (PO: 3; PSO: 2)
- 5. Understand application of different floor finishes (PO: 1; PSO: 2)

# Evaluation Pattern: Marks allocation for SEE (Viva Voce)

Subject Code	Subject Name	Portfolio	Viva voce	Total
AR302	Building Materials & Construction Technology III (SEE Viva Voce)	40	10	50

# **THEORY OF ARCHITECTURE - I**

Course Code: AR303 Pre – requisites: Nil

Credits: 3:0:0 Contact Hours: 3 hours/week

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 -

- 1. Assess spatial programming and organizing principles possible for a given site. (PO: 1; PSO: 1)
- 2. Critique architectural projects for principles of composition. (PO: 1; PSO: 2)
- 3. Understand how variations in architectural compositions affect the form and aesthetics of a building. (PO: 3; PSO: 1)
- 4. Understand and analyse concepts of spatial organization for their influence on function and aesthetics of the building and site. (PO: 4; PSO: 2)
- 5. Understand and analyse the influence of materials on aesthetics, function, and character of buildings. (PO: 3; PSO: 2)

# HISTORY OF ARCHITECTURE - III Course Code: AR304 Credits: 3:0:0 Pre – requisites: Nil Contact Hours: 3 hours/week Course Coordinator: Asst. Prof. Pooja Naik

### **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 RanakpurGupta Architecture with Study of Dasavatara temple at Deogarh

Orissa- Influences & Architectural Character, Study of LingRaja temple at Bhuvaneswar 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- uddin 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 -

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

ARCHITECTURAL STRUCTURES – III		
Course Code: AR305	Credits: 3:0:0	
Pre – requisites: Nil Contact Hours: 3 hours/week		
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. Introduction to RCC, PSC, Steel (only theory).

# **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 -

- 1. Describe different forms of structures and evaluate their indeterminacy. (PO:2; PSO:1)
- 2. Analyze the slope and deflection by different methods. (PO:4; PSO:2)
- 3. Analyze the indeterminate structures using the method of consistent deformation method. (PO:2; PSO:2)
- 4. Analyze the continuous beams with moment distribution method. (PO:4; PSO:2)
- 5. Analyze the frames with moment distribution method. (PO:2; PSO:2)

# **BUILDING SERVICES – I**

Course Code: AR306	Credits: 3:0:0
Pre – requisites: Nil	Contact Hours: 3 hours/week
Course Coordinator: Prof. Vishwas Hittalmani	

### **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, selfcleansing 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
- 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 -

- 1. Explain the sources of water supply and then requirements with quality and quantity in the distribution system. (PO: 1; PSO: 1)
- 2. Understand the various water treatment methods for water supply system. (PO: 1; PSO: 1)
- 3. Suggest the water supply scheme for any building. (PO: 3; PSO: 2)
- 4. Provide the sanitation scheme for any building. (PO: 3; PSO: 2)
- 5. Suggest various fixtures available in the market to suit the context. (PO: 3; PSO: 2)

# **COMPUTERS IN ARCHITECTURE - II**

Course Code: AR307 Pre – requisites: Nil Credits: 1:0:1 Contact Hours: 3 hours/week

Course Coordinator: System Analyst. 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 Jeyapoovan
- 2. AutoCAD 2020: A project-based Tutorial AutoCAD official website
- 3. Books Tutorial, 'AutoCAD 2020 A Project-Based Tutorial'; Kishore Publishers, 2020
- 4. T. Jeyapoovan, '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
- 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: 1)
- b) Organise and create standards for CAD drawings. (PO: 5; PSO: 2)
- c) Detail the drawings created with annotations. (PO: 5; PSO: 1)
- d) Present design drawings and learn to plot at different scales. (PO: 10; PSO: 2)
- e) Apply CAD to their varied drawing requirements. (PO: 5; PSO: 2)

STUDY TOUR			
Course Code: AR308	Credits: 0:0:1		
Pre – requisites: Nil Contact Hours: 2 hours/week			
Course Coordinator: Assoc. Prof. Meghana Raj			

# **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**

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

The Study and portfolio to include Building Construction Technology, Materials and detail analysis

# Course Outcomes (COs):

The students will be able to -

- a) Measure and complete the measured drawing of simple buildings. (PO: 2; PSO: 1)
- b) Represent different elements of architecture. (PO: 10; PSO: 1)
- c) Translate their ideas in the form of drawings. (PO: 10; PSO: 2)

# **Evaluation Pattern:** Marks allocation for SEE:

Subject	Subject Name	Portfolio	Viva	Total
Code				
AR308	Study Tour (SEE Viva Voce)	30	20	50

# **IV SEMESTER**

# **ARCHITECTURAL DESIGN – III**

Course Code: AR401	Credits: 6:0:1
Pre – requisites: Nil	Contact Hours: 8 hours/week
Course Coordinator: Dr. Pushpa Devanathan	

### **Course Objectives:**

The students will be introduced to -

- The concept of community living and interactive spaces
- Design of group dwellings and understand concept of sharing amenities
- The need for privacy, circulation, socio-economic determinants
- Regulatory controls.

### **Course Contents**

# Unit I

Introduction of issues related to design of the human habitat, its components and space standard, in both the urban and rural environments. Housing projects can be attempted with added complexities, example, dense context, occupation based, traditional urban fabric, social status and prevalent social strata. Socio cultural layer of the occupants shall form a strong fabric in the ultimate weave of the design. Projects shall aim at developing a very sensitive attitude towards micro level human habitation and the role of architecture in enhancing the quality of living.

### Unit II

Data collection, Literature survey, Behavioral study, Case study of neighborhoods, Services study. Ability to interpret site information as a decision-making aid for architectural choices, particularly in respect of groups of buildings and to understand the needs of sharing land, spaces inside and outside dwellings, common places, common interests like security, economy, services, belonging and identity.

### Unit III

Site-study, Analysis, Zoning and Concept. Concepts of varying types of needs for privacy in the dwelling, and the transitions from the public realm to it. Scale of the project shall be limited to allow for intensive study rather than repetitive typical configuration. Display of competence in the application of knowledge gained from the following will be an essential requirement for all the design projects: Materials & Structures and Theory of Architecture. The context for the design problems could be both rural and urban.Projects shall aim at developing a very sensitive attitude towards micro level human habitation and role of Architecture in enhancing or curbing the quality of living

### Unit IV

Development of Master Plan with footprints of building, road network and open spaces. Preparation of detailed Floor plans, sections, elevations, views, and model.

### Unit V

Drafting, rendering using different medium; Views and sketches and enable the students towards presentation techniques and understanding the form by 3D manual study models. Preparation of final sheets with all the requirements with final models. NOTE: The design shall be sensitive to the needs of the disabled, aged people and children.

### **References:**

- 1. Amos Rapoport, "House Form and Culture", Prentice-Hall, 1969
- 2. Christopher Alexander, "Pattern Language", Oxford University Press, 1977
- 3. Christopher Alexander, "A Timeless Way of Building", Oxford Uni. Press, 1979
- 4. Gautam Bhatia, "Laurie Baker, Life, Work, Writings", Viking, 1991
- Dick Van Gameren & Rohan Verma, "Designs for Housing: Charles Correa", 2018
- 6. Atul Deulgaonkar, "Laurie Baker, Truth in Architecture", Jyotsna Prakashan, 2015
- 7. Otto Koenig Berger, "Manual of Tropical Housing and Building", 1975
- 8. Geoffrey Bawa, The Complete Works, 2002
- 9. Atmospheres Peter Zumthor
- 10. Experiencing Architecture Eiler Rasmussen
- 11. The Poetics of Space Gaston Bachelard
- 12. Universal Principles of Design- William Lidwell, Kritina Holden, Jill Butler
- 13. Pattern Language Christopher Alexander et al

- 14. Thoughts on Design Paul Rand
- 15. Concept Development and the Design Process Sandra Reicis
- 16. Community by Design: New Urbanism for Suburbs and Small communities-Kenneth B Wall

# **Course Outcomes (COs):**

The students will be able to -

- 1. Evaluate the collected data and behavioral studies. (PO: 2; PSO: 2)
- 2. Describe the socio-economic determinants and apply concepts of community living to their design. (PO: 6; PSO: 1)
- 3. Outline the conditions of a site and derive their concept. (PO: 2; PSO: 2)
- 4. Strategise design at the overall scale of the site. (PO: 3; PSO: 2)
- 5. Render and present their design effectively. (PO: 10; PSO: 2)

Subject Code	Subject Name	Design	Drawin g	Viva voce	Model / Book Review	Total
AR401	Architectural Design – III (SEE Viva voce)	20	20	05	05	50

# **Evaluation Pattern:** Marks allocation for SEE:

# BUILDING MATERIALS & CONSTRUCTION<br/>TECHNOLOGY - IVCourse Code: AR402Credits: 3:0:1Pre – requisites: NilContact Hours: 5 hours/weekCourse 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

Principles and methods of construction with reinforcement details of :Flat Slab, Ribbed Slab, Waffle slab

### Unit III

Principles and methods of construction with reinforcement details of Filler Slab, Coffered Slab, Precast Slab

### Unit IV

Principles and methods of construction with reinforcement details of :Dome, Vaults, Pitched Roof and Lean-to-roof

### Unit V

Principles and methods of construction with reinforcement details of Pile foundation Materials – Characteristics and types of Paints, Wall finishes, Internal and External plastering. Properties and Architectural applications of the same.

# **References:**

- 1. "Building Construction" by Mackay-Vol-1 to 4.
- 2. "Construction Technology" by Chudley
- 3. "Construction of Buildings" by Barry
- 4. "Building Materials" by Rangwala
- 5. Design for R.C.C. Slabs K C Jain
- 6. Reinforced concrete slabs R Park
- 7. Arches, Vaults and Domes: Geometry and Equilibrium in the Design of Masonry Structures Santiago Huerta
- 8. Pile foundations in engineering practice- Shamsher Prakash
- 9. Building Construction materials and Techniques P Purushothama Raj
- 10. Architect's Handbook of Construction Detailing David Kent Ballast
- 11. The art of construction Mario Salvarodi
- 12. Concrete Slabs: Analysis and Design- L.A. Clarke and R J Cope

# Course Outcomes (COs):

The students will be able to -

- 1. Demonstrate the fundamental knowledge of the technology used in the construction of slabs with short spans. (PO: 2; PSO: 1)
- Apply technicalities, details and characteristics of RCC slab construction. (PO: 2; PSO: 1)
- 3. Incorporate and design slabs using indigenous materials. (PO: 4; PSO: 2)
- 4. Demonstrate the ability to design non-conventional roof forms. (PO: 4; PSO: 2)
- 5. Apply deep foundation techniques. (PO: 2; PSO: 1)

# **Evaluation Pattern:** Marks allocation for (SEE):

Subject Code	Subject Name	Portfolio	Viva	Total
AR402	Building Materials & Construction Technology IV (SEE Viva voce)	40	10	50

<b>THEORY OF ARCHITECTURE - II</b>		
Course Code: AR403	Credits: 3:0:0	
Pre – requisites: Nil Contact Hours: 3 hours/week		
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 Boullee, 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. Form, space and order Francis D K Ching
- 2. Design in Architecture Geoffrey Broadbent
- 3. House, Form and Culture Amos Rappaport
- 4. Modern movements in Architecture Charles Jencks
- 5. Writing Architecture Carter Wiseman
- 6. Ideas that Shaped Buildings Fil Hearn
- 7. Modern Architecture. A Critical History Kenneth Frampton
- 8. Writing About Architecture- Alexandre Lange
- 9. A Primer on Theory in Architecture Karen Codes
- 10. Universal Principles of Design William Lidwell
- 11. Architectural Composition Rob Krier
- 12. Meaning in the Built environment Amos Rappaport

# **Course Outcomes (COs):**

The students will be able to -

- 1. Identify the evolution of thoughts and trends across the timeline of Western Architecture. (PO: 1; PSO: 1)
- Study the important events which affect the built forms and its transition. (PO: 6; PSO: 1)
- 3. Understand the concepts of carious architects across modern movement. (PO: 3; PSO: 1)
- 4. Identify the evolution of thoughts and trends across timeline of western architecture. (PO: 3; PSO: 1)
- 5. Understand the various built forms through critics. (PO: 4; PSO: 1)

# **CLIMATE RESPONSIVE ARCHITECTURE**

Course Code: AR404	Credits: 2:0:1	
Pre – requisites: Nil	Contact Hours: 4 hours/week	
Course Coordinator: Asst. Prof. Sreesha S Bhat		

### **Course Objectives:**

To expose to the students to -

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

### **Course Contents**

### 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:**

- Koenigsberger, Manual of Tropical Housing & Buildings (Part-II), Orient Longman, Bombay, 1996
- 2. Tropical Architecture, C P Kukreja
- 3. Climate Responsive Architecture: A design Handbook for Energy Efficient Building Arvind Krishnan
- 4. Thermal Comfort: Analysis and Applications in Environmental Engineering -Povl Ole Fanger
- 5. Materials for Energy Efficiency and Thermal Comfort in Buildings Matthew R Hall
- 6. Tropical Climates- Cath Senker
- 7. Climate Responsive Design Richard Hyde
- 8. The Climatic Dwelling An Introduction to Climate-Responsive Residential Architecture E. O'Cofaigh, A. Olley, O. Lewis
- 9. Climate Responsive Building- Paul Gut and Dieter Ackerknecht

# **Course Outcomes (COs):**

The students will be able to -

- 1. Understand the basic principles of various climatic systems. (PO: 4; PSO: 1)
- 2. Apply thermal comfort techniques in designing built spaces. (PO: 3; PSO: 2)
- 3. Provide natural ventilation and daylighting for built spaces. (PO: 3; PSO: 1)
- 4. Understand the impact of landscape elements in the site context and design accordingly. (PO: 7; PSO: 2)
- 5. Apply various climatic responsive strategies to create design solutions for different climatic zones. (PO: 3; PSO: 2)

ARCHITECTURAL STRUCTURES – IV	
Course Code: AR405	Credits: 3:0:0
Pre – requisites: Nil	Contact Hours: 3 hours/week
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. Use of IS456 Code

### Unit II

Limit state design of Beams – Analysis and design of singly and doubly reinforced beams and analysis of T- beam. Use of IS456 Code

### 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). Use of IS456 Code & SP16 Code

### Unit IV

Limit state design of column – Design of short axially loaded RC columns, RC Columns with uniaxial moment. Use of IS456 Code & SP16 Code

### Unit V

Limit state design of Footing – Loads on foundation, types of footing, Design of axially loaded square footing. Use of IS456 Code & SP16 Code

# Textbooks:

- 1. Unnikrishna Pillai, S., Devadas Menon, "Reinforced Concrete Design", Tata McGraw-Hill Publishing Company Ltd., New Delhi. 2006
- 2. Varghese, P.C., "Limit State Design of Reinforced Concrete" (Second Edition), Prentice Hall of India, Pvt. Ltd., New Delhi. 2006
- Krishna Raju, N., "Design of Reinforced Concrete Structures", CBS Publishers & Distributors, New Delhi 2010
- 4. Gambhir M.L., "Fundamentals of Reinforced concrete design", Prentice Hall of India, Pvt. Ltd., New Delhi 2006.

# **References:**

- 1. Analysis and Design of Substructures Limit State Design Saran S
- 2. Limit State Design of Reinforced Concrete Dayaratnam P

# Course Outcomes (COs):

The students will be able to -

- Describe and apply limit state design concept in Reinforced concrete elements. (PO: 4; PSO: 1)
- 2. Analyse, design and detailing of varieties of beams. (PO: 4; PSO:2)
- 3. Analyse, design and detailing of slabs and stairs. (PO: 4; PSO: 2)
- 4. Analyse, design and detailing of columns. (PO: 4; PSO: 2)
- 5. Analyse, design and detailing of footings. (PO: 4; PSO: 2)

# **BUILDING SERVICES - II**

Course Code: AR406

Credits: 3:0:0

Pre – requisites: Nil Contact Hours: 3 hours/week

# Course Coordinator: 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

# **Textbooks:**

- 1. "Electrical Engineering" by Anwari.
- 2. Electrical Technology by VH Cotton
- 3. "Electrical wiring, Estimation and Costing", by L Uppal.
- 4. National Building Code Bureau of Indian Standards

# **References:**

- 1. Lighting Design Basics Mark Kerlen
- 2. Architectural Lighting Design Admir Jukanovic
- 3. Handbook of Electric power calculation H Wayne Beaty
- 4. Electrical Services for Buildings E. F. Curd
- 5. Illustrated Guide to Electrical Building Services -Saulles and Tom De
- 6. Electrical Systems in Buildings- S David Hughes
- 7. Practical Electrical Wiring Herbert P Richter
- 8. Electrical Conductors- A Bhatia

# **Course Outcomes (COs):**

The students will be able to -

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

# COMPUTERS IN ARCHITECTURE – III Course Code: AR407 Credits: 1:0:1 Pre – requisites: Nil Contact Hours: 3 hours/week Course Coordinator: System Analyst. Aruna Gopal

# **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. Revit Architecture: The Family Editor- Paul F. Aubin
- 2. Mastering Autodesk Revit 2020 Robert Yori
- 3. Advanced Modeling in Revit Architecture- Paul F. Aubin

# **Course Outcomes (COs):**

The students will be able to -

- 1. Acquire the knowledge of 3D modelling tools for visualization and to generate construction drawings. (PO: 5; PSO: 1)
- 2. Apply the software tools to visualize projects in 3D space. (PO: 5; PSO: 2)
- 3. Apply the techniques for conceptual massing forms and generate views of a project. (PO: 5; PSO: 2)
- 4. Apply the software to get rendered views for design presentations. (PO: 10; PSO: 2)
- 5. Create design presentations and compositions using image editing applications. (PO: 5; PSO: 1)

# **CONSTITUTIONAL LAW**

Course Code: AR408	Credits: 1:0:0
Pre – requisites: Nil	Contact Hours: 1 hour/week
<b>Course Coordinator: Humanities Department</b>	

# **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>, 74th<sup>,</sup> 76<sup>th</sup>, 86th and, 91st Amendments.

# **References:**

- 1. Introduction to Constitution of India -Durga Das Basu; 19th/20th edition 2001
- 2. Phaneesh K.R. 'Constitution of India and Professional Ethics'; Sudha Publications; 7<sup>th</sup> Edition, 2014
- 3. Constitutional law of India Dr. J. N. Pandey, Central Law Agency 37th edition 2001
- 4. A Primer on Constitution of India & Professional ethics, VTU Publication-2002
- Merunandan K.B. and B.R. Venkatesh, 'An Introduction to Constitution of India and Professional Ethics'; Meragu Publications; 3<sup>rd</sup> Edition, 2011
- 6. Indian Constitutional Law- M.P Jain
- 7. Constitution of India- V N Shukla
- 8. The Indian constitution- Granville Austin
- 9. A Primer on Constitution of India & Professional ethics, VTU Publication-2002
- 10. Working a Democratic Constitution- Granville Austin
- 11. Balanced Constitutionalism: Courts and Legislatures in India and the United Kingdom- Chintan Chandrachud
- 12. M. V. Pylee, 'An Introduction to Constitution of India'; Vikas Publishing; 2002

# Course Outcomes (COs):

The students will be able to -

- 1. Enhance their legal literacy by understanding the fundamental principles of Indian constitutional law. (PO: 61; PSO: 3)
- 2. Identify various provisions of Directive Principles of state policies and fundamental duties. (PO: 6; PSO: 3)
- 3. Explain the powers of the executive and legislature. (PO: 6; PSO: 3)
- 4. Explain the powers of the judicial system. (PO: 6; PSO: 3)
- 5. Analyse and implement certain laws as a citizen and as a professional. (PO: 6; PSO: 3)