RAMAIAH
Institute of Technology

CURRICULUM

Outcome Based Education

(Effective from the Academic Year 2026- 2027)

SCHOOL OF ARCHITECTURE

V & VI SEMESTER B.ARCH

Batch -2024

RAMAIAH INSTITUTE OF TECHNOLOGY
(Autonomous Institute, Affiliated to VTU)
Bangalore- 560054

CURRICULUM

About the Institute:

In 1962, Dr. M. S. Ramaiah, a visionary philanthropist, established the Gokula Education Foundation with a noble mission to uplift society through education. The same year marked a pivotal moment in technical education in India with the founding of the M S Ramaiah Institute of Technology (MSRIT).

MSRIT offers an impressive array of 18 undergraduate and 15 postgraduate programs, all approved by the All India Council for Technical Education (AICTE). The National Board of Accreditation (NBA) has accredited all eligible programs at the undergraduate (UG) and postgraduate (PG) levels. In March 2021, MSRIT earned an 'A^+' grade from the National Assessment and Accreditation Council (NAAC), underscoring its unwavering commitment to academic excellence. Since 2007, the institute has proudly held Autonomous Status for its UG and PG programs, a prestigious recognition granted by the University Grants Commission (UGC) and Visvesvaraya Technological University (VTU). According to the Ministry of Education, Government of India's NIRF Ranking Framework, MSRIT ranks 75th among 1,584 leading engineering institutions and 31st among 131 architecture schools in India for 2025, highlighting its remarkable impact and leadership in education.

The institute participated in the Technical Education Quality Improvement Program (TEQIP), an initiative of the Government of India. To foster a research culture, the institute has established several specialized centres, including the Centre for Imaging Technologies, the Centre for Advanced Materials Technology, the Centre for Antennas and Radio Frequency Systems (CARFS), the Centre for Cyber Physical Systems, the Schneider Centre of Excellence, the Centre for Bio and Energy Materials Innovation, JSW Centre of Excellence in Power Systems and more. MSRIT boasts a faculty of 380 highly qualified members, 70% of whom hold doctoral degrees, and over 300 scholars currently pursuing Ph.D. degrees.

The Entrepreneurship Development Cell (EDC) and "Ramaiah Evolute" have been established on campus to support startup incubation. MSRIT features a dedicated Placement and Training department, a strong mentoring and proctorial system, a fully equipped sports department, and a spacious, air-conditioned library with a wide range of books and subscriptions to both international and national journals. The Digital Library provides access to online e-journals from renowned publishers, including Elsevier ScienceDirect, IEEE, Taylor & Francis, Springer Nature and Emerald. Additionally, the Institute is a member of DELNET, JRD Tata Memorial library, IISc, and the VTU Consortium for E-Resources.

The institute features a state-of-the-art auditorium, a well-equipped recording studio, and multiple advanced conference halls with videoconferencing capabilities. Additionally, MSRIT provides excellent hostel accommodations for both boys and girls, ensuring a comfortable living environment. MSRIT alumni have achieved remarkable success, holding prominent positions in India and internationally. They maintain strong connections with the institute through an engaged and active Alumni Association.

Founded on Dr. Ramaiah's unwavering commitment to knowledge and innovation, this remarkable institution continues to inspire generations of students and shape the future of engineering and technology in the country.

SCHOOL OF ARCHITECTURE

Established in 1992, the School of Architecture at Ramaiah Institute of Technology (RIT), Bengaluru, is committed to excellence in architectural education, design and research. The School provides a contemporary, interdisciplinary learning environment that integrates architectural design, building technology, sustainability, digital tools and professional exposure, preparing students to respond creatively and responsibly to the evolving built environment.

The School functions under Ramaiah Institute of Technology, an autonomous institution affiliated to Visvesvaraya Technological University (VTU), Belagavi. Its programmes are approved by the Council of Architecture (CoA), New Delhi, the statutory regulator for architectural education under the Architects Act, 1972. Teaching is design-led and is supported by site studies, workshops, industry interaction, research and experiential learning that develop critical thinking in architecture and allied disciplines.

Ramaiah Institute of Technology is accredited by the National Assessment and Accreditation Council (NAAC) with an A+ grade and is ranked 31st in the NIRF 2025 Architecture and Planning category.

The School offers a five-year Bachelor of Architecture (B.Arch.) programme with a sanctioned intake of 80, and two postgraduate programmes of two years' duration, Master of Architecture (Landscape Architecture) and Master of Architecture (Advanced Architecture), each with a sanctioned intake of 20. The School also offers a Ph.D. programme to support advanced research and scholarly inquiry in architecture. Together, the programmes engage with architectural design, sustainable practice, landscape and ecological systems, advanced and digital technologies, and contemporary architectural research.

The School's faculty comprises academicians, practising architects and specialists from allied disciplines. Their combined teaching, research and professional experience links theory, design and practice. Faculty support student development through mentoring, studio-based and innovative pedagogy, research projects and professional collaborations.

Students build a foundation in design thinking, technical knowledge, digital tools, sustainability, research and professional practice through studio work, hands-on learning, site exposure and interaction with practising professionals. The curriculum develops creativity, critical thinking, problem-solving and communication skills. Graduates pursue careers in architectural practice, urban design, landscape architecture, interior design, conservation, sustainable and computational design, project management, academia, research and consultancy, as well as entrepreneurship and advanced studies in India and abroad.

Through its combination of design, research and professional engagement, the School aims to develop architects and design professionals equipped to shape a responsive, resilient and future-ready built environment.

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 -

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 stakeholders concerned.

VISION OF THE DEPARTMENT

To be a leading centre of architectural education that nurtures creative and critical thinkers committed to shaping sustainable, inclusive and innovative built environments.

MISSION OF THE DEPARTMENT

MSRIT shall meet the global socio-economic needs through -

1. To impart design excellence by fostering creativity and critical thinking through studio-based learning supported by contemporary technology.
2. To inculcate sustainability, social responsibility, ethical values and a global outlook in the design and practice of architecture.
3. To develop professionally competent and entrepreneurial architects through interdisciplinary learning and real-world industry exposure.

PROGRAM EDUCATIONAL OBJECTIVES (PEOs):

PEO1 Graduates will be able to create architecture of design excellence that is critically informed, applying emerging digital and computational technologies.

PEO2 Graduates will be able to deliver sustainable, socially responsible and ethically grounded built environments, with a global outlook rooted in the climatic and cultural context.

PEO3 Graduates will practice as competent professionals and collaborate effectively with architects and allied professionals.

PEO4 Graduates will pursue lifelong learning, research or higher studies and lead innovation and entrepreneurial ventures responsive to emerging societal needs.

KNOWLEDGE AND ATTITUDE PROFILE (WK)

WK1: A systematic, theory-based understanding of the natural sciences applicable to the discipline and awareness of relevant social sciences.

WK2: Conceptually-based mathematics, numerical analysis, data analysis, statistics and formal aspects of computer and information science to support detailed analysis and modelling applicable to the discipline.

WK3: A systematic, theory-based formulation of engineering fundamentals required in the engineering discipline.

WK4: Engineering specialist knowledge that provides theoretical frameworks and bodies of knowledge for the accepted practice areas in the engineering discipline; much is at the forefront of the discipline.

WK5: Knowledge, including efficient resource use, environmental impacts, whole-life cost, reuse of resources, net zero carbon, and similar concepts, that supports engineering design and operations in a practice area.

WK6: Knowledge of engineering practice (technology) in the practice areas in the engineering discipline.

WK7: Knowledge of the role of engineering in society and identified issues in engineering practice in the discipline, such as the professional responsibility of an engineer to public safety and sustainable development.

WK8: Engagement with selected knowledge in the current research literature of the discipline, awareness of the power of critical thinking and creative approaches to evaluate emerging issues.

WK9: Ethics, inclusive behavior and conduct. Knowledge of professional ethics, responsibilities, and norms of engineering practice. Awareness of the need for diversity by reason of ethnicity, gender, age, physical ability etc. with mutual understanding and respect, and of inclusive attitudes.

PROGRAM OUTCOMES (POs):

On completion of 5year B.Arch. Degree program, Bachelor of Architecture graduates will be able to:

PO1: Ability to create architectural designs that satisfy both aesthetic and technical requirements.

PO2: Adequate knowledge of the histories and theories of architecture and the related arts, technologies and human sciences.

PO3: Knowledge of the fine arts as an influence on the quality of architectural design.

PO4: Adequate knowledge of urban design, planning and the skills involved in the planning process.

PO5: Understanding of the relationship between people and buildings, and between buildings and their environment, and the need to relate buildings and the spaces between them to human needs and scale

PO6: Understanding of the profession of architecture and the role of the architect in society, in particular in preparing briefs that take account of social factors.

PO7: Understanding of the methods of investigation and preparation of the brief for a design project.

PO8: Understanding of the structural design, constructional and engineering problems associated with building design.

PO9: Adequate knowledge of physical problems and technologies and the function of buildings so as to provide them with internal conditions of comfort and protection against the climate

PO10: The necessary design skills to meet building users' requirements within the constraints imposed by cost factors and building regulations.

PO11: Adequate knowledge of the industries, organizations, regulations and procedures involved in translating design concepts into buildings and integrating plans into overall planning.

PROGRAM SPECIFIC OUTCOMES (PSOs):

PSO1: Graduates will be able to design creative, climate-responsive architectural solutions, using critical inquiry and digital, computational tools to resolve spatial, technical and contextual requirements.

PSO2: Graduates will be able to apply principles of sustainability, inclusivity and ethics to develop socially responsible built environments that respond to the climatic and cultural context with awareness of global practices.

PSO3: Graduates will be able to demonstrate professional readiness in building technology, practice management and regulations, and collaborate with allied disciplines.

Semester-wise Credit Breakdown for B.ARCH. Degree Curriculum Batch 2026-31
(as per Council of Architecture)

Semester / Course category	First	Second	Third	Fourth	Fifth	Sixth	Seventh	Eight	Ninth	Tenth	Total
PROFESSIONAL CORE COURSE (PC)	13	13	13	10	10	12	10	11	20	-	112
BUILDING SCIENCE & APPLIED ENGINEERING (BS & AE)	7	7	10	13	10	10	4	4	-	-	65
PROFESSIONAL ELECTIVES (PE)	2	4	1	-	4	2	6	3	3	-	25
OPEN ELECTIVES (OE)	1	-	-	1	2	-	-	2	-	-	6
PROJECT/SEMINAR/ INTERNSHIP (PAECC)	-	-	-	-	-	2	6	6	3	26	43
SKILL ENHANCEMENT COURSE (SEC)	3	2	2	2	-	-	-	-	-	-	9
TOTAL	26	26	26	26	26	26	26	26	26	26	260

Note: The Bachelor of Architecture (B.Arch) programme comprises a total of 260 credits and is structured in accordance with the curriculum framework prescribed by the Council of Architecture (CoA) under the *Minimum Standards of Architectural Education Regulations, 2020*. Each on-campus semester shall be of 15 weeks' duration, during which the prescribed course content shall be completed. The total credits shall be distributed across the prescribed course categories to ensure a balanced, comprehensive, and progressive architectural education.

The course categories prescribed by the Council of Architecture, along with their respective aims, are as follows:

1. **Professional Core Courses**: These courses establish the essential knowledge base and competencies required for architectural education and practice. They develop students' abilities in design thinking, spatial planning, architectural representation, historical and theoretical understanding, and the integration of functional, aesthetic, and contextual considerations. These include Architectural Design, Basic Design, Architectural Graphics, History of Architecture, and Theory of Architecture.
2. **Building Sciences and Applied Engineering (BS & AE)**: These courses provide the scientific, technical, and engineering knowledge that informs and supports architectural design. They develop students' understanding of building materials and construction, structural systems, building services, environmental conditions, building performance, and construction technologies, enabling the integration of technical, functional, and environmental considerations into architectural practice.
3. **Elective Courses (PE / OE):** These courses provide opportunities for students to broaden their knowledge, explore specialised areas, and pursue individual interests beyond the prescribed core curriculum.Elective courses are classified into two :

- **Professional Electives (PE):** courses which offer specialised, advanced, or supportive knowledge within the discipline of architecture.
- **Open Electives (OE):** courses that facilitate interdisciplinary learning and the development of additional knowledge, proficiencies, and skills from other disciplines or domains.

4. **Employability Enhancement Courses (EEC)**: These courses develop the professional competencies, practical skills, and additional capabilities required for career readiness and lifelong learning. They are classified into:

- **Professional Ability Enhancement Compulsory Courses (PAECC):** which develop essential competencies considered necessary for professional and career development.
- **Skill Enhancement Courses (SEC):** which focus on developing specific technical, professional, digital, communication, or other relevant skills that enhance employability and professional effectiveness

Course Evaluation and Assessment Pattern

The course categories define the intended learning focus and competencies of the B.Arch. programme. The assessment of individual courses shall be determined by the nature of the course, its prescribed Course Outcomes (COs), learning activities, and requirements specified in the curriculum.

Accordingly, courses across the prescribed categories shall be evaluated through Continuous Internal Evaluation (CIE), Semester End Examination (SEE), Term Work, or Viva Voce, as applicable to the respective course structure.

Internal assessment may comprise tests, assignments, seminar presentations, reports, discussions, sketches, models, documentation, and other assessment components, as applicable to the course and in accordance with the requirements prescribed by the Council of Architecture (CoA). Courses involving substantial practical, design, or application-oriented work may be assessed through Term Work or Viva Voce, while theory-oriented courses may be assessed through CIE and SEE. The applicable assessment components, maximum marks, and weightages shall be specified for each course.

The evaluation pattern shall be as follows:

1. Continuous Internal Evaluation (CIE): CIE shall be evaluated for 50 marks, comprising internal tests (30 marks) and other assessment components (20 marks).Two internal tests shall be conducted during the semester. Each internal test shall consist of three questions, of which students shall answer any two full questions. Each question shall address the Course Outcomes (COs) prescribed for the respective test. The average of the two internal tests shall be considered for awarding 30 marks. The remaining 20 marks shall be assessed through other components as decided by the course instructor.

2. Semester End Examination (SEE): The SEE shall be conducted for 100 marks and scaled down to 50 marks. The question paper shall consist of ten questions with internal choice, comprising two questions per unit. Students shall answer any five full questions, selecting at least one question from each unit.

3. Term Work: Term Work shall be evaluated for 50 marks by a panel of one external examiner and one internal examiner in the absence of

students. The assessment shall be based on the quality, completeness, technical accuracy, and overall standard of the submitted work. Depending on the course requirements, the evaluation may include assignments, drawings, reports, models and other prescribed deliverables as applicable to the course.

4. Viva Voce: Viva Voce shall be conducted for 50 marks by a panel of one external examiner and one internal examiner except for Architectural Design Project and Practical Training for which the panel will constitute two external examiners and one internal examiners. Students shall individually present and explain their work, demonstrate their understanding of the concepts and techniques applied, and respond to questions related to their submissions and course content. The assessment shall consider conceptual understanding, practical application, achievement of the prescribed Course Outcomes (COs), and the ability to communicate and justify design decisions and technical solutions.

SCHEME OF TEACHING & EXAMINATION
V SEMESTER B. ARCH
Batch 2024

Sl. No	Course Code	Course Title	Category	Credits				Total Contact hours per week			
				L	T	P	Total	L	T	P	S
1	AR501	Architectural Design IV	PC	0	0	7	7	0	0	7	7
2	AR502	Building Materials & Construction Technology V	BS & AE	0	0	4	4	0	0	4	4
3	AR503	Contemporary Architecture	PE	3	0	0	3	3	0	0	3
4	AR504	Sociology & Economics	OE	2	0	0	2	2	0	0	2
5	AR505	Architectural Structures V	BS & AE	3	0	0	3	3	0	0	3
6	AR506	Building Services III	BS & AE	2	0	0	2	2	0	0	2
7	AR507	Landscape Design	PC	3	0	0	3	3	0	0	3
8	AR508	Study Tour	PE	0	0	2	2	0	0	2	2
TOTAL				**13**	**0**	**13**	**26**	**13**	**0**	**13**	**26**

Nomenclature: PC: Professional core, BS &AE: Building science and applied engineering, SEC: Skill enhancement course, PE: Professional elective.

Credit Definition:

- **1 credit = 1 hour/week of lecture (L)**
- **1 credit = 1 hour/week of tutorial (T)**
- **1 credit = 1 hours/week of practical(P)**
- **Self Learning Hours (S)**

SCHEME OF TEACHING & EXAMINATION
VI SEMESTER B. ARCH
Batch 2024

Sl. No	Course Code	Course Title	Category	Credits				Total Contact hours per week			
				L	T	P	Total	L	T	P	S
1	AR601	Architectural Design V	PC	0	0	7	7	0	0	7	7
2	AR602	Building Materials & Construction Technology VI	BS & AE	0	0	4	4	0	0	4	4
3	AR603	Research Methodology	PAECC	2	0	0	2	2	0	0	2
4	AR604	Estimation & Costing	PC	3	0	0	3	3	0	0	3
5	AR605	Architectural Structures VI	BS & AE	0	0	3	3	0	0	3	3
6	AR606	Building Services IV	BS & AE	3	0	0	3	3	0	0	3
7	AR607	Disaster Management	PE	2	0	0	2	2	0	0	2
8	AR608	Working Drawing I	PC	0	0	2	2	0	0	2	2
TOTAL				**10**	**0**	**16**	**26**	**10**	**0**	**16**	**26**

PC: Professional core, BS &AE: Building science and applied engineering, PAECC: Professional ability enhancement compulsory courses , PE: Professional elective.

Credit Definition:

- **1 credit = 1 hour/week of lecture (L)**
- **1 credit = 1 hour/week of tutorial (T)**
- **1 credit = 1 hours/week of practical(P)**
- **Self Learning Hours (S)**

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SEMESTER – V

ARCHITECTURAL DESIGN -IV	
Course Code: AR501	**Course Credits: 0 : 0 : 7**
Prerequisite: Nil	**Contact Hours:7x15P**
Course Coordinator: Assoc. Prof. Surekha R	

Course Guidelines

Design of a multi-functional public building in an urban setting. Suggested project typologies: Museums, art galleries, hotels, shopping arcades/ malls. Multi-use buildings such as Schools, nursing homes, Office complexes, Performing arts Centre.
NOTE: The design shall be sensitive to the needs of the disabled, aged people and children.

Course contents:

UNIT - I

Design parameters for multi-functional public buildings in urban contexts; functional and spatial requirements of public buildings; behavioural considerations in public building design; principles of barrier-free and inclusive design; architectural criticism and theoretical approaches to public building design. Analysis of live and documented case studies with reference to planning, spatial organisation, circulation, structural systems, and climatic response. Programme formulation and development of space requirements and schedules based on case studies and relevant literature.

- Pedagogy / Course delivery tools-: Chalk and talk, Power Point Presentation,Discussion.

UNIT - II

Site analysis and documentation; site modelling and urban context; influence of surrounding built form, movement patterns, open spaces, and urban conditions on architectural design. User and activity analysis in relation to public building design. Introduction to climate-responsive design using Climate Consultant, SunCalc/Andrew Marsh Sun-Path Tool. Basic climate analysis including solar exposure, daylight, wind and environmental conditions. Introduction to digital and BIM-based site modelling. Relevant building codes, bye-laws, and planning regulations applicable to the project.

- Pedagogy / Course delivery tools-: Power Point Presentation, Discussion

UNIT - III

Design intent and concept formulation; relationship between programme, site, context and architectural expression; zoning, spatial organisation, circulation and massing strategies.

Application of selected architectural precedents and theoretical positions in design development. AI-assisted and parametric approaches to design exploration and environmental analysis. Comparative evaluation and selection of alternative massing strategies based on functional, accessibility, aesthetic, climatic, technical, cost and area-efficiency considerations.

- Pedagogy / Course delivery tools-:Power Point Presentation, Discussion.

UNIT - IV

Site planning, building planning and development of built form in response to programme, site conditions and urban context. Application of building bye-laws and barrier-free design principles. Integration of spatial planning, circulation, structural systems, building services, landscape, and environmental strategies into architectural design. Development and coordination of architectural drawings and representation appropriate to the stage of design development.

- Pedagogy / Course delivery tools-: Power Point Presentation, Discussion.

UNIT - V

Architectural detailing and development of sections, elevations and façade systems. Principles of detailed design and integration of accessibility requirements within architectural components. Accessibility assessment and compliance with NBC and relevant building codes and standards. Application of behavioural science principles in public building design and evaluation of their influence on user experience and spatial outcomes. Critical evaluation and refinement of the developed architectural design based on accessibility, regulatory, behavioural, technical and environmental considerations.

- Pedagogy / Course delivery tools-: Power Point Presentation, Discussion.

Reference Books:

1. Site Analysis - Edward T. White
2. Commercial Building Design: Integrating Climate, Comfort - Burt Hill Kosar Rittelmann Associates
3. The Architect's Studio Companion: Rules of Thumb for Preliminary Design by Edward Allen and Joseph Iano
4. John Callender, ‘Time-saver Standards for Architectural Design Data’; McGraw-Hill, 1982
5. Ernst Neufert, ‘Architects’ Data’; Wiley Blackwell, 2019
6. Richard Patrick Parlour, ‘Building Services: A Guide to Integrated Design: Engineering for Architects’; Integral Publishing, 1997
7. Paul Tymkov, Savvas Tassou, Maria Kolokotroni, Hussam Jourhara, ‘Building Services Design for Energy Efficient Buildings’; Routledge, 2013
8. Russell Fortmeyer, Charles F Linn, ‘Kinetic Architecture: Designs for Active

Envelopes'; Images Publishing Group, 2013
9. Michael Fox, 'Interactive Architecture: Adaptive World'; Princeton Architectural Press, 2016
10. Christopher Alexander, 'A Pattern Language: Towns, Buildings, Construction'; Oxford University Press, 2018
11. Grant W. Reid, 'Landscape Graphics: Plan, Section, and Perspective Drawing of Landscape Spaces'; Watson-Guptill, 2002
12. Jan Gehl, 'Life between Buildings'; Island Press, 2011
13. Margaret Huffadine, 'Resort Design: Planning, Architecture and Interiors'; McGraw-Hill Education, 1999
14. Edward. D., Mills, "Planning the Architects Hand Book - Butterworth, London, 1985.
15. Prof. A.K. Bansal; Solar Passive Design.

Course outcomes (COs):

The students will be able to -

1. Explain the basic design parameters, behavioural aspects, accessibility principles, and planning requirements of multi-functional public buildings. (PO1, PO5, PSO2).
2. Apply site, user, climate, urban context, and regulatory analysis to develop design requirements. (PO1, PO4, PO5, PO3, PO9, PO10, PSO1, PSO2, PSO3).
3. Analyse site conditions, zoning, circulation, massing, and design alternatives to develop an appropriate design concept. (PO1, PSO1)
4. Create an integrated architectural design incorporating planning, built form, accessibility, structure, services, landscape, and building regulations. (PO1, PO5, PO8, PO10, PSO1, PSO2, PSO3)
5. Evaluate the developed design for accessibility, code compliance, environmental response, and user experience, and refine the design accordingly. (PO1, PO5, PO6, PO9, PO10, PSO1, PSO2, PSO3)

Course Assessment and Evaluation:

<table>
<tr><td colspan="4">Continuous Internal Evaluation (CIE): 50 Marks</td></tr>
<tr><td colspan="2">Assessment Tool</td><td>Marks</td><td>Course outcomes addressed</td></tr>
<tr><td colspan="2">Review-I</td><td>30</td><td>CO1, CO2, CO3</td></tr>
<tr><td colspan="2">Review-II</td><td>20</td><td>CO3, CO4, CO5</td></tr>
<tr><td colspan="4"></td></tr>
<tr><td colspan="2">Semester End Examination (SEE):VIVA-VOCE</td><td rowspan="3">50</td><td rowspan="3">CO1, CO2, CO3, CO4, CO5</td></tr>
<tr><td>Design/ Drawing</td><td>Viva-voce</td></tr>
<tr><td>40</td><td>10</td></tr>
</table>

NOTE:

- For all viva voce examinations, one internal faculty and one external faculty will conduct the exam.
- Portfolios must be submitted on the prescribed date announced by the department for all subjects.
- All students must register on the first day at the beginning of the **Viva voce exam.**

SEMESTER – V

BUILDING MATERIALS & CONSTRUCTION TECHNOLOGY –V	
Course Code: AR502	**Course Credits: 0 : 0 : 4**
Prerequisite: Nil	**Contact hours: 4x15P**
Course Coordinators: Assoc. Prof. Tejaswini H	

Course Contents:

UNIT - I

Doors and windows: various building components like aluminum doors &windows and partitions, frameless glass doors and partitions, rolling shutter and collapsible shutter, Steel windows. Methods of fabrication with joinery details.

- Pedagogy / Course delivery tools-: Chalk and talk, Power Point Presentation, Videos

UNIT - II

Curtain wall systems: cladding, glazing, structural glazing, composite panels with specifications of materials with joinery details.

- Pedagogy / Course delivery tools-: Chalk and talk, Power Point Presentation, Videos

UNIT - III

Foundations and medium span roof systems: Medium span steel roof truss, north light truss etc.

- Pedagogy / Course delivery tools-: Chalk and talk, Power Point Presentation, Videos

UNIT - IV

Material study: Anti-termite treatment to foundation, Masonry walls and woodwork, Water proofing materials and weather proofing materials like chemical admixtures and surface applications.

- Pedagogy / Course delivery tools-: Chalk and talk, Power Point Presentation, Videos

UNIT - V

Glass: Manufacture and various types such as plate, tinted, decorative, reinforced, laminate glass block and fiber glass, etching etc. fiber reinforced composite products and their applications. Introduction to AI-assisted material selection, visualization, comparative analysis, and specification development for glass and composite materials in architecture**.**

- Pedagogy / Course delivery tools-: Chalk and talk, Power Point Presentation, Videos

Reference Books:

1. Glenn M. Hardie, ‘Building Construction Principles, Practices and Materials’;
2. Pearson, 1995
3. Abit Metin, ‘Window in Progress...50 Ideas for Your Shop Windows’
4. John Birchard, ‘Make Your Own Handcrafted Doors & Windows’; Echo Point Books & Media, 2014
5. Designer Railings and Grills: For Balconies, Boundaries etc.; Goodwill Publishing House, 2019
6. Victorian Architectural Details: Designs for Over 700 Stairs, Mantels, Doors,
7. Windows, Cornices, Porches, and Other Decorative Elements; A. J. Bicknell & Co., 2010
8. Alan J. Brookes and Maarten Meijs, ‘Cladding of Buildings’; Taylor & Francis,
9. 2008
10. Francis D. K. Ching, ‘Building Construction Illustrated’; John Wiley & Sons, 2014
11. W. B. McKay, ‘Building Construction – Vol 1-5’; Pearson Education India, 2013,
12. Roy Chudley, ‘Construction Technology’; Pearson Education, 2014
13. R. Barry, ‘Construction of Buildings - Vol 1’; Wiley-Blackwell, 1999
14. Arthur Lyons, ‘Materials for Architects and Builders’; Routledge, 2019
15. P. C. Varghese, ‘Building Materials’; Prentice Hall India Learning Pvt. Ltd., 2015

Course Outcomes (COs):

The students will be able to -

1.Identify the basic components of special doors, windows and their construction methods. (PO1, PO8, PO10, PSO1, PSO2, PSO3).

2. Explain the specifications, materials, and joinery details of curtain wall systems. (PO1, PO8, PO10, PSO1, PSO2, PSO3).

3. Analyze and draw details of a truss. (PO1, PO8, PO10, PSO1, PSO2, PSO3).

4. Understand different materials and their applications in building. (PO2, PO8, PO10, PSO1, PSO2, PSO3).

5. Compare and organize innovative details and materials in construction with AI assistance (PO1, PO8, PO10, PSO1, PSO2, PSO3)

Course Assessment and Evaluation:

<table>
<tr><td colspan="4">Continuous Internal Evaluation (CIE): 50 Marks</td></tr>
<tr><td colspan="2">Assessment Tool</td><td>Marks</td><td>Course outcomes addressed</td></tr>
<tr><td colspan="2">Internal Test-I</td><td>30</td><td>CO1, CO2, CO3</td></tr>
<tr><td colspan="2">Internal Test-II</td><td>30</td><td>CO3, CO4, CO5</td></tr>
<tr><td colspan="4">Average of the two internal tests shall be taken for 30 marks.</td></tr>
<tr><td colspan="2">Other Components</td><td></td><td></td></tr>
<tr><td colspan="2">Assignment-1</td><td>10</td><td>CO1, CO2, CO3</td></tr>
<tr><td colspan="2">Assignment-2</td><td>10</td><td>CO3, CO4, CO5</td></tr>
<tr><td colspan="4"></td></tr>
<tr><td colspan="2">Semester End Examination (SEE):VIVA-VOCE</td><td rowspan="3">50</td><td rowspan="3">CO1, CO2, CO3, CO4, CO5</td></tr>
<tr><td>Portfolio</td><td>Viva-voce</td></tr>
<tr><td>40</td><td>10</td></tr>
</table>

NOTE:

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- All students have to register on the first day at the beginning of the **Viva voce exam.**
- Portfolios have to be submitted on the 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.**

SEMESTER – V

CONTEMPORARY ARCHITECTURE	
Course Code: AR503	**Course Credits: 3 : 0 : 0**
Prerequisite: Nil	**Contact Hours: 45L+45S**
Course coordinator: Asst. Prof. Sreesha Bhat	

Course Contents:

UNIT - I

Trends in contemporary architecture – Introduction and brief understanding, appreciation and comparison of general contemporary trends in India – Pre independence: British Colonial- Victoria memorial hall, Calcutta, Post-independence: Le Corbusier – High court Chandigarh, Charles Correa – The Kovalam resort, Trivandrum, Jawahar kala Kendra, B V Doshi IIM, Bangalore. Contemporary western architecture focusing on understanding, appreciation, ideas and directions through the works of notable architects.

- Pedagogy / Course delivery tools-: Power Point Presentation, Chalk and talk.

UNIT - II

Ideology and philosophy of Santiago Calatrava: Zoomorphism. Study works of Santiago Calatrava and Daniel Libeskind: Commemorative Architecture, deconstruction. Study works - ideology and philosophy of: Zaha Hadid, Rem Koolhaas, Frank O Gehry – Blobitecture. Ar. Norman foster, Ar. Tadao Ando, Ar. I M Pei.

- Pedagogy / Course delivery tools-: Power Point Presentation, Chalk and talk.

UNIT - III

Ideology, Philosophy & Study works of Greg Lynn, Diller & Scofidio: Digital Architecture. Genetic Algorithm, Cybertecture and digital architecture and examples.

- Pedagogy / Course delivery tools-: Power Point Presentation, Chalk and talk.

UNIT - IV

Post-independence architecture in India- ideology and philosophy of: Louis I Kahn. Laurie Baker: eco-friendly & vernacular architecture, ideology and philosophy & study works of Le Corbusier.

- Pedagogy / Course delivery tools-: Power Point Presentation, Chalk and talk.

UNIT - V

Ideology and philosophy of Charles Correa: architecture of changing time and philosophy. Study works of Hafeez Contractor, ideology and philosophy of B.V. Doshi. Symbolism and Nationalism Ar. Raj Rewal & works of regional architects. Introduction to AI-assisted interpretation of architectural philosophy through case study.

- Pedagogy / Course delivery tools-: Power Point Presentation, Chalk and talk.

Reference Books:

1. Colin Naylor, Ann Lee Morgan, 'Contemporary architects'; St. James Press, 1987
2. Christine Kilroy, Rene Davids, 'Details in Contemporary Architecture: As Built';
3. Princeton Architectural Press, 2007
4. Juhani Pallasmaa, 'The Eyes of the Skin: Architecture and the Senses'; Wiley,
5. 2012
6. 4. Lawrence Cahoone, 'From Modernism to Postmodernism'; Wiley-Blackwell, 2003
7. Jennifer Ashton, 'From Modernism to Postmodernism: American Poetry and
8. Theory in the Twentieth Century'; Cambridge University Press, 2008
9. Kenneth Frampton, 'Modern Architecture: A Critical History'; Thames and
10. Hudson, 2007
11. Sigfried Giedion, 'Space Time and Architecture – The Growth of a New
12. Tradition'; Harvard University Press, 2008

Course outcomes (COs):

The students will be able to -

1. Understand the evolution of contemporary architecture and analyse various contemporary architecture trends in Indian and World architecture.(PO1, PO2, PO3, PO4, PO5, PO6, PSO1, PSO2)
2. Analyse the philosophies of zoomorphism, deconstruction, commemorative architecture and blobitecture through examples and identify works based on philosophies.(PO1, PO2, PO3, PO5, PO6, PSO1, PSO2)
3. Validate the need and ideologies of digital architecture.(PO1, PO2, PO8, PO9, PO10, PO11, PSO1, PSO2, PSO3)
4. Compute conclusions through insight into the post-independence architecture in India and its recognition of eco-friendly and vernacular designs.(PO1, PO2, PO4, PO5, PO6, PO8, PO9, PSO1, PSO2, PSO3)
5. Interpret the influences and the changes in Indian architecture through time.(PO1, PO2, PO4, PO5, PO6, PO11, PSO1, PSO2, PSO3)

Course Assessment and Evaluation:

Continuous Internal Evaluation (CIE): 50 Marks		
Assessment tool	**Marks**	**Course outcomes attained**
Internal Test-I	30	CO1, CO2, CO3
Internal Test-II	30	CO3, CO4, CO5
Average of the two internal tests shall be taken for 30 marks.		
Other Components		
Assignment-1	10	CO1, CO2, CO3
Assignment-2	10	CO3, CO4, CO5
Semester-End Examination (SEE) (Scaled to 50 Marks)	100	CO1, CO2, CO3, CO4, CO5

SEMESTER – V

SOCIOLOGY AND ECONOMICS	
Course Code: AR504	**Course Credits: 2 : 0 : 0**
Prerequisite: Nil	**Contact Hours: 30L+30S**
Course coordinator: Assoc. Prof. Divya Susanna Ebin	

Course contents:

UNIT - I

Introduction to Sociology: Nature, Scope, Utility of Sociology, Branches of Sociology, Relevance of Sociology to Architecture and the built environment.

Elements of Society: Definitions of Sociological terms - society, community, family, culture; difference between society and community; relation between culture and built form.

- Pedagogy / Course delivery tools-: Power Point Presentation, Chalk and talk.

UNIT - II

Communities: Origin, growth and nature of settlements and communities; their characteristics and spatial patterns. Urban and Rural Communities: Definitions of the terms 'urban' and 'rural'. The social, economic, and spatial characteristics associated with urban and rural settlements. Cities & Society: Urbanization – definition, causes of urbanization, impact of urbanization on urban life, viz. health, housing, transportation, different types of migration, Official definition of slums as per Census of India, characteristics of slums in India.

- Pedagogy / Course delivery tools-: Power Point Presentation, Chalk and talk.

UNIT - III

Social research: The need for research, the research process. Sources of research data: Primary and secondary sources: Primary data sources methods such as surveys, fieldwork, experiment, and case study approach. Secondary data sources include literature review, official and unofficial documents.

- Pedagogy / Course delivery tools-: Power Point Presentation, Chalk and talk.

UNIT - IV

Economics: Definition of Economics; Definition of terms – Goods, Utility, Value, Price and Wealth. Economic Organization of society: Different economic systems – capitalism, socialism, communism, mixed economies. Primary, secondary, and tertiary sectors of economy – agriculture, mining, manufacturing, banking, marketing, transport and service sectors. Factors of production – land, labor, capital, and entrepreneurship. Relevance of factors of production to architecture and construction practice.

- Pedagogy / Course delivery tools-: Power Point Presentation, Chalk and talk.

UNIT - V

Economics and the market: Consumption, wants and needs and their characteristics. Concepts of economics – Opportunity cost; Laws of supply and demand; Laws of increasing, diminishing and constant returns; Standard of living.

Urban land values: Characteristics of developed land in the city. The Bid Rent theory that defines relationship between location and land value.

Building Costs: Life cycle costs, Total cost of construction, Time value of money. Different sources of financing buildings**.** AI-based market analysis,using a case study**.**

- Pedagogy / Course delivery tools-: Power Point Presentation, Chalk and talk.

Reference Books:

1. Neil Joseph Smelser, 'Handbook of Sociology'; SAGE Publications, 1988
2. Jan Lin, Christopher Mele, 'The Urban Sociology Reader'; Rouledge 2012
3. Veena Das, 'Handbook of Indian Sociology'; Oxford, 2006
4. Open Stax, 'Introduction to Sociology'; XanEdu Publishing Inc, 2015
5. Neil J. Smelser, R. Stephen Warner, 'Sociological Theory: Historical and Formal; General Learning Press, 1976
6. Linda Groat, David Wang, 'Architectural Research Methods', Wilet India Exclusive, 2018
7. Paul Samuelson William Nordhaus, 'Economics'; McGraw Hill Education, 2010

Course Outcomes (COs):

The students will be able to -

1. Define the social behavior of a society. (PO2, PO5, PO6, PSO1)
2. Explain the relationship between Sociology, architecture & the urban context (PO4, PO5, PO6, PSO2)
3. Describe social research (PO4, PO6, PO9, PSO2)
4. Examine the different economic considerations in a society. (PO10, PO11, PSO3)
5. Outline the relationship between Economics and building costs (PO10, PO11, PSO3)

Course Assessment and Evaluation:

Continuous Internal Evaluation (CIE): 50 Marks		
Assessment tool	**Marks**	**Course outcomes attained**
Internal Test-I	30	CO1, CO2, CO3
Internal Test-II	30	CO3, CO4, CO5
Average of the two internal tests shall be taken for 30 marks.		
Other Components		
Assignment-1	10	CO1, CO2, CO3
Assignment-2	10	CO3, CO4, CO5
Semester-End Examination (SEE) (Scaled to 50 Marks)	100	CO1, CO2, CO3, CO4, CO5

SEMESTER – V

ARCHITECTURAL STRUCTURE –V	
Course Code: AR505	**Course Credits: 3 : 0 : 0**
Prerequisite: Nil	**Contact Hours: 45L+45S**
Course coordinator: Asst. Prof. M. Vijayanand	

Course Contents:

UNIT - I

Principle of Prestressing: Introduction- Materials for Prestressed concrete, System and method of prestressing, analysis of sections, stress and strength concept, load balancing concept, effect of loading on tensile stresses in the tendons.

- Pedagogy / Course delivery tools-: Power Point Presentation, Chalk and talk.

UNIT - II

Losses of PSC members: Analysis method of losses, elastic shortening, shrinkage of concrete, creep of concrete, relaxation, anchorage slip, friction. Use of IS1343:1980 Code

- Pedagogy / Course delivery tools-: Power Point Presentation, Chalk and talk.

UNIT - III

Connections: Bolted connection, Introduction- code of practice- bearing and friction type of bolts- joints subjected to moment and direct load and Welded connections, Introduction- code of practice – butt and fillet welds- weld symbols- joints subjected to shear and bending - joints subjected to shear and torsion. Use of IS800 & SP6 Code.

- Pedagogy / Course delivery tools-: Power Point Presentation, Chalk and talk.

UNIT - IV

Tension Member: Introduction- types of tension member- design consideration – design of tension members. Use of IS800 & SP6 Code.

- Pedagogy / Course delivery tools-: Power Point Presentation, Chalk and talk.

UNIT - V

Masonry Structures, Special Structural forms, and Tall buildings: Introduction to Masonry structure, design concepts, concept of Shell, folded plate, domes, grid structure, flat slab, tensile and pneumatic structure, and tall building concept. AI-assisted roof form exploration through case studies.

Pedagogy / Course delivery tools-: Power Point Presentation, Chalk and talk.

Reference books:

1. S. K. Duggal, 'Limit State Design of Steel Structures'; McGraw Hill Education, 2017
2. N. Krishna Raju, 'Prestressed Concrete'; McGraw Hill Education, 2012
3. K. U. Muthu, Ibrahim Azmi, Janardhana Maganti, M. Vijayanand, 'Prestressed Concrete'; PHI Learning, 2016
4. 4. Alfredo Boracchini, 'Design and Analysis of Connections in Steel Structures: Fundamentals and Examples'; Ernst & Sohn, 2018

Course Outcomes (COs):

The students will be able to:

1. Describe and Analyze the principle of PSC and role of HSC and steel and design methods of PSC elements by the principles and requirements for prestressed concrete design and code of practice.(PO1, PO4, PO8, PSO1, PSO2, PSO3)
2. Evaluate the initial and time dependent losses. (PO2, PO8, PSO1, PSO2 , PSO3)
3. Demonstrate and analyze the connection subjected to moment and also to describe the concept of butt and fillet weld connections, design the welded joints subjected to shear and bending. (PO1, PO3, PO10, PSO1,PSO2, PSO3)
4. Analyze the design of tension member and identify the friction type and bearing type of bolts (PO1, PO8, PSO1, PSO2, PSO3)
5. Understand the concept of the working of masonry structures and classify walls, shells, domes, flat slab, pneumatic structures, grid structures, tensile structure along with AI tools. (PO3, PO7, PO11, PSO1, PSO2, PSO3)

Course Assessment and Evaluation:

Continuous Internal Evaluation (CIE): 50 Marks		
Assessment tool	**Marks**	**Course outcomes attained**
Internal Test-I	30	CO1, CO2, CO3
Internal Test-II	30	CO3, CO4, CO5
Average of the two internal tests shall be taken for 30 marks.		
Other Components		
Assignment-1	10	CO1, CO2, CO3
Assignment-2	10	CO3, CO4, CO5
Semester-End Examination (SEE) (Scaled to 50 Marks)	100	CO1, CO2, CO3, CO4, CO5

SEMESTER – V

BUILDING SERVICES –III	
Course Code: AR506	**Course Credits: 2 : 0 : 0**
Prerequisite: Nil	**Contact Hours: 30L+30S**
Course coordinator: Asst. Prof. Shwetha P E	

Course Contents:

UNIT - I

Mechanical ventilation, ventilation for a cinema hall, Air-conditioning for human comfort & definitions, dust control and filters.

- Pedagogy / Course delivery tools-: Power Point Presentation, Chalk and talk.

UNIT - II

Air cycle, refrigeration cycle, components, air distribution - ducts, grilles etc., classification and application air-conditioning, heat load estimation & thumb rules.

- Pedagogy / Course delivery tools-: Power Point Presentation, Chalk and talk.

UNIT - III

Window unit, split units without ducts, split unit with duct, package unit with ducts, direct Expansion system, Chilled Water System, humidifiers & dehumidifiers.

- Pedagogy / Course delivery tools-: Power Point Presentation, Chalk and talk.

UNIT - IV

Introduction to vertical circulation, lift well, pit, doors, car, machine room etc. Typical section through lift, quality & quantity of service, types of lifts, lift bank, lobby and lift interiors, hydraulic & traction lift, escalator & travelator.

- Pedagogy / Course delivery tools-: Power Point Presentation, Chalk and talk.

UNIT - V

Lift act, architect's role, double-decker lift, sky lobby, current scenario.

- Pedagogy / Course delivery tools-: Power Point Presentation, Chalk and talk.

Reference Books:

1. David V. Chadderton, ‘Building Services Engineering’; Routledge, 2012
2. Ashfaq Hasan, ‘Understanding Mechanical Ventilation’; Springer, 2010
3. Roy J. Dossat, ‘Principals of Refrigeration’; Pearson Education India, 2002
4. Aly S. Dadras, ‘Mechanical Systems for Architects’; McGraw-Hill Inc., 1994
5. Rex Miller, Mark R. Miller, ‘Air Conditioning and Refrigeration’; McGraw-Hill Education, 2011
6. Theodore Lee Jarboe and John J. O'Donoghue, ‘Elevator & Escalator Rescue: A

Comprehensive Guide'; PennWell Books, 2007
7. George R. Strakosch , 'Vertical Transportation: Elevators and Escalators'; John Wiley & Sons, 1983
8. Manohar Prasad, 'Refrigeration and Airconditioning Data Book'; New Age International Pvt. Ltd., 2010
9. Arora, Domkundwar, 'A Course in Refrigeration and Air- Conditioning'; Dhanpat Rai & Co
10. Walter T. Grondzik, Alison G. Kwok, Benjamin Stein, John S. Reynolds, Mechanical and Electrical Equipment for Buildings'; John Wiley & Sons, 2009
11. Shan K Wang, 'Handbook of Air Conditioning and Refrigeration', McGraw-Hill Education, 2000
12. "National Building Code of India (NBC) 2016"; Part 8 Section 3 and 5 & Part 3 & 4; Bureau of Standards,
13. IS Codes –

- 1391 (Part 1 & 2): 1992 - Specification for room air conditioners
- 8148: 2003 - Specification for packaged air conditioners
- 4591: 1968 - Code of practice for installation and maintenance of escalators
- 14671: 1999 - Hydraulic lifts
- 14665: 2000 - Traction lift
- 15259: 2002 - Home Lifts15330: 2003 - Lifts for handicapped persons

Course Outcomes (COs):

The students will be able to -

1. Explain and apply mechanical ventilation and air-quality principles to incorporate mechanical services in a building. (PO1, PO5, PO8, PO9, PO10, PSO1, PSO2, PSO3)
2. Explain the fundamentals of air conditioning, including cycles and components, and calculate heat loads. (PO1, PO5, PO8, PO9, PO10, PO11, PSO1, PSO2, PSO3)
3. Differentiate air-conditioning system types and analyse their integration into architectural design. (PO1, PO5, PO8, PO9, PO10, PO11, PSO1, PSO2, PSO3)
4. Analyse requirements and context to model vertical circulation systems in a building. (PO1, PO5, PO6, PO8, PO9, PO10, PO11, PSO1, PSO2, PSO3)
5. Describe and apply prevailing acts and norms while designing mechanical lifts for any building. (PO1, PO5, PO6, PO7, PO8, PO9, PO10, PO11, PSO1, PSO2, PSO3)

Course Assessment and Evaluation:

Continuous Internal Evaluation (CIE): 50 Marks		
Assessment tool	**Marks**	**Course outcomes attained**
Internal Test-I	30	CO1, CO2, CO3
Internal Test-II	30	CO3, CO4, CO5
Average of the two internal tests shall be taken for 30 marks.		
Other Components		
Assignment-1	10	CO1, CO2, CO3
Assignment-2	10	CO3, CO4, CO5
Semester-End Examination (SEE) (Scaled to 50 Marks)	100	CO1, CO2, CO3, CO4, CO5

SEMESTER – V

LANDSCAPE DESIGN	
Course Code: AR507	**Course Credits: 3 : 0 : 0**
Prerequisite: Nil	**Contact Hours: 45L+45S**
Course coordinator: Assoc. Prof. Dr. Lavanya Vikram	

Course Contents:

UNIT - I

Introduction of Landscape Design: Historical overview of garden design; types of gardens. Fundamental principles of landscape design.

Introduction to primary landscape elements: landform, water, and vegetation.

- Pedagogy / Course delivery tools-: Power Point Presentation, Chalk and talk.

UNIT - II

Introducing Planting Design and Plant selection: Basic classification of Plant material - Trees, shrubs, creepers, and ground covers. Taxonomy, units of taxonomy, systems of classification, Botanical names, and common names of plant materials. Site visits to identify various plants.

- Pedagogy / Course delivery tools-: Power Point Presentation, Chalk and talk.

UNIT - III

Site Analysis and Site Planning Principles: Aspects of site analysis such as topography, soil, climate, wind, site slope, natural systems, services, and vegetation.

- Pedagogy / Course delivery tools-: Power Point Presentation, Chalk and talk.

UNIT - IV

Works and Philosophies of Landscape Architects: Works of William Kent, Capability Brown, Humphry Repton, Frederick Law Olmstead

Works of Contemporary landscape architects - Martha Schwartz, Peter Walker, Pamela Burton, James Corner, Turenscape etc

Landscape architects from India – Ravindra Bahn, Mohammed Shaheer.

- Pedagogy / Course delivery tools-: Power Point Presentation, Chalk and talk.

UNIT - V

Introduction to secondary landscape elements: Street furniture, landscape walls, paving, ground covers, trellises, outdoor shading structures. Hard and soft landscape.

Demonstrate the understanding of the landscape design – suggested projects include small scale open spaces, terrace gardens, entrance/ frontage to a public building, community garden etc. AI based landscape planning with suitable case study.

- Pedagogy / Course delivery tools-: Power Point Presentation, Chalk and talk.

Reference Books:

1. John Ormsbee Simonds, Barry Starke, ‘Landscape Architecture’; McGraw-Hill Education, 2006
2. Michael Laurie, ‘Introduction to Landscape Architecture’; Elsevier Science Ltd, 1986
3. 3. Kapila D. Silva, Amita Sinha, ‘Cultural Landscapes of South Asia: Studies in Heritage Conservation and Management’; Routledge, 2016
4. Thomas Russ, ‘Site Planning and Design Handbook’; McGraw-Hill Education, 2009
5. Harvey M. Rubenstein, ‘A Guide to Site Planning and Landscape Construction’; John Wiley & Sons, 1996
6. William S. Saunders, ‘Daniel Urban Kiley: The Early Gardens’; Princeton Architectural Press, 1999
7. William H. Whyte, ‘The Social Life of Small Urban Spaces’; Project for Public Spaces Inc, 1980
8. John L. Motloch, ‘Introduction to Landscape Design’; John Wiley & Sons, 2000
9. Robert Holden, Jamie Liversedge, ‘Landscape Architecture: An Introduction’; Laurence King Publishing, 2014
10. Christophe Girot, ‘The Course of Landscape Architecture: A History of Our Designs On the Natural World: from Prehistory to the Present’; Thames and Hudson, 2016
11. James A. Lagro, ‘Site Analysis: A Contextual Approach to Sustainable Land Planning and Site Design’; John Wiley & Sons, 2007
12. Mohammad Shaheer, Geeta Wahi Dua, Adit Pal, ‘Landscape Architecture in India, A Reader’; LA,Journal of Landscape Architecture, 2013

Course outcomes (COs):

The students will be able to -

1. Understand the fundamental concepts and ideas in the field of landscape architecture. (PO1, PO2, PO3, PO5, PSO1)
2. Associate basics of planting and vegetation in Landscape Design. (PO1, PO5, PSO1)
3. Integrate Landscape Design in architecture and site planning. (PO1, PO4, PO5, PO10, PSO1, PSO2, PSO3)
4. Describe the application of various philosophies in Landscape Design. (PO2, PO3, PO5, PO6, PSO1, PSO2)
5. Demonstrate landscape designs for small scale projects. (PO1, PO3,PO5, PO9, PO10, PO11, PSO1, PSO2)

Course Assessment and Evaluation:

Continuous Internal Evaluation (CIE): 50 Marks		
Assessment tool	**Marks**	**Course outcomes attained**
Internal Test-I	30	CO1, CO2, CO3
Internal Test-II	30	CO3, CO4, CO5
Average of the two internal tests shall be taken for 30 marks.		
Other Components		
Assignment-1	10	CO1, CO2, CO3
Assignment-2	10	CO3, CO4, CO5
Semester-End Examination (SEE) (Scaled to 50 Marks)	100	CO1, CO2, CO3, CO4, CO5

SEMESTER – V

STUDY TOUR	
Course Code: AR508	**Course Credits: 0 : 0 : 2**
Prerequisite: Nil	**Contact Hours: 2x15P**
Course coordinator: Prof. Dr. Jotirmay Chari	

Note: Submission of the sketchbook and portfolio is mandatory for the final assessment and evaluation.

Course Content:

UNIT I

Introduction to documentation of modern & contemporary buildings: Study of various documentation methods like photography, analytical sketching, measured drawings, and contextual note-taking to record built form, spatial organization, and materiality.

- Pedagogy / Course delivery tools-: Power Point Presentation, Chalk and talk.

UNIT II

Site visits will focus on buildings representing modern architectural styles, with emphasis on theories manifested through built forms, along with the study of materials and construction techniques.

- Pedagogy / Course delivery tools-: Power Point Presentation, Chalk and talk.

UNIT III

Measured drawing and technical recording focused on capturing precise on-site measurements and systematically translating them into clear, legible architectural documentation.

- Pedagogy / Course delivery tools-: Power Point Presentation, Chalk and talk.

UNIT IV

Analytical interpretation of documented data- analysis and interpretation of the measured drawings. Focusing on identifying architectural intent, spatial configuration & material usage.

- Pedagogy / Course delivery tools-: Power Point Presentation, Chalk and talk.

UNIT V

Combining visual and textual information effectively. This includes instruction on presentation techniques and case studies of exemplary documentation projects. Introduction to AI-assisted documentation, visual storytelling, infographic generation, image annotation, report structuring, and presentation design

- Pedagogy / Course delivery tools-: Power Point Presentation, Chalk and talk.

Course Outcomes (COs):

The students will be able to –

1. Identify methods to document modern architectural buildings along with their contexts. (PO2, PO5, PSO1)
2. Understand the architectural styles by analysing built forms during a site visit. (PO2, PO5, PO8, PSO1)
3. Apply measured drawing and technical recording – representing different elements of architecture. (PO2, PO7,PO8,PSO1)
4. Demonstrate the architectural intent, spatial configuration & material usage. (PO2,PO8,PSO1)
5. Analyse observations and information collected on site through visual representations. (PO2, PO5, PO6, PO7, PSO3)

Course Assessment and Evaluation:

<table>
<tr><td colspan="4">Continuous Internal Evaluation (CIE): 50 Marks</td></tr>
<tr><td colspan="2">Assessment Tool</td><td>Marks</td><td>Course outcomes addressed</td></tr>
<tr><td colspan="2">Review-I</td><td>30</td><td>CO1, CO2, CO3</td></tr>
<tr><td colspan="2">Review-II</td><td>20</td><td>CO3, CO4, CO5</td></tr>
<tr><td colspan="4"></td></tr>
<tr><td colspan="2">Semester End Examination (SEE): TERM-W0RK</td><td rowspan="3">50</td><td rowspan="3">CO1, CO2, CO3, CO4, CO5</td></tr>
<tr><td>PORTFOLIO</td><td>SKETCH BOOK</td></tr>
<tr><td>30</td><td>20</td></tr>
</table>

NOTE:

- International and National study tours will be arranged during the course.
- For all Term work examinations, one internal faculty and one external faculty will conduct the exam
- Portfolios must be submitted on the prescribed date announced by the department for all subjects.
- All students must register on the first day of **Term work exams.**

SEMESTER- VI

ARCHITECTURAL DESIGN – V	
Course Code: AR601	**Course Credits: 0 : 0 : 7**
Prerequisite: Nil	**Contact Hours:7x15P**
Course Coordinator: Prof. Dr. Monalisa	

Course contents:

UNIT - I

Introduction to campus planning and Case studies of campuses. Data collection including relevant bye laws. Aspects to be addressed can be sustainable building practices, green issues, alternative energy, intelligent building techniques and service integration, advanced building practices, appropriate materials and construction, sensitive and optimal use of resources, contour site design.

- Pedagogy / Course delivery tools-: Power Point Presentation, Discussion, Chalk and talk.

UNIT - II

Site analysis including analysis of contours.

- Pedagogy / Course delivery tools-: Power Point Presentation, Discussion, Chalk and talk.

UNIT - III

Site planning and developing the campus master plan with model.

- Pedagogy / Course delivery tools-: Power Point Presentation, Discussion, Chalk and talk.

UNIT - IV

Detailing of a common major block like auditorium, library etc. (Plans, Sections, Elevations, 3D)

- Pedagogy / Course delivery tools-: Power Point Presentation, Discussion, Chalk and talk.

UNIT - V

Detailing any two academic blocks.

NOTE: The design shall be barrier free and sensitive to the needs of the aged people and children. Suggested building typologies: Institutional projects like facilities of higher learning, such as, Engineering college campus, Medical college campus, Management Institute campus, Hotel management institute, Law college campus, Dental college campus, Nursing college campus, Juvenile Correction Centre, etc. Introduction to AI-assisted campus planning, universal accessibility analysis, climate-responsive design evaluation, documentation, and digital design workflows.

- Pedagogy / Course delivery tools-: Power Point Presentation, Discussion, Chalk and talk.

Reference books:

1. Joseph De Chiara, Michael J. Crosbie, ‘Time Saver Standards for Building Types’; McGraw Hill Education, 2017
2. Donald Watson, Michael Crosbie, John Callender, ‘Time Saver Standards for Architectural Design Data’; McGraw-Hill Education, 1997
3. Ernst Neufert, ‘Architects' Data’; Wiley-Blackwell, 2019
4. Anne M. Schmid, Mary Scoviak-Lerner, ‘International Hotel and Resort Design’; PBC International 1988
5. Jan Gehl, ‘Life between Buildings’; Island Press, 2011
6. Richard P Dober, ‘Campus Architecture: Building in the Groves of Academe’;McGraw-Hill Education, 1996
7. Robert Simha, ‘MIT Campus Planning 1960–2000 – An Annotated Chronology’;MIT Press, 2003
8. Mildred F Schmertz, ‘Campus Planning and Design’; McGraw-Hill, 1972
9. Thomas A. Gaines, ‘The Campus as A Work of Art’; Praeger Publishers Inc, 1991
10. C. Carney Strange, James H. Banning, ‘Educating by Design: Creating Campus Learning Environments That Work’; Jossey Bass, 2000
11. Roger H. Clark and Michael Pause, ‘Precedents in Architecture’; Wiley, 2012
12. Geoffrey H Baker, ‘Le Corbusier - An Analysis of Form’; Taylor & Francis, 1996
13. Herman Hertzberger, ‘Lessons for Students in Architecture’; Uitgeverij, 2005
14. Charles Correa, ‘A Place in The Shade’; Penguin India, 2010
15. Rem Koolhaas, ‘Conversations with Students’; Princeton Architectural Press, 1996

Course Outcomes (COs):

The students will be able to –

1. Describe the architectural profession and its services, and differentiate firm types to justify a suitable practice model. (PO6, PO11, PSO3)
2. Interpret the Architects Act 1972, COA/IIA roles and the Code of Conduct, and apply them to professional duties, fees and competitions. (PO6, PO11, PSO2, PSO3)
3. Compare tender and contract types, and appraise bids to recommend award and manage contract issues. (PO6, PO11, PSO3)
4. Summarise zoning regulations, bye-laws and NBC fire norms, and use them to calculate FAR, setbacks and parking. (PO4, PO9, PO10, PO11, PSO2, PSO3)
5. Explain arbitration under the 1996 Act, and critique AI use in contracts and project administration on ethical and accountability grounds. (PO6, PO11, PSO2, PSO3)

Course Assessment and Evaluation:

<table>
<tr><td colspan="4">Continuous Internal Evaluation (CIE): 50 Marks</td></tr>
<tr><td colspan="2">Assessment Tool</td><td>Marks</td><td>Course outcomes addressed</td></tr>
<tr><td colspan="2">Review-I</td><td>30</td><td>CO1, CO2, CO3</td></tr>
<tr><td colspan="2">Review-II</td><td>20</td><td>CO3, CO4, CO5</td></tr>
<tr><td colspan="4"></td></tr>
<tr><td colspan="2">Semester End Examination (SEE):VIVA-VOCE</td><td rowspan="3">50</td><td rowspan="3">CO1, CO2, CO3, CO4, CO5</td></tr>
<tr><td>Design/ Drawing</td><td>Viva-voce</td></tr>
<tr><td>40</td><td>10</td></tr>
</table>

NOTE:

- For all viva voce examinations, one internal faculty and one external faculty will conduct the exam.
- Portfolios must be submitted on the prescribed date announced by the department for all subjects.
- All students must register on the first day at the beginning of the **Viva voce exam.**

SEMESTER- VI

BUILDING MATERIALS & CONSTRUCTION TECHNOLOGY – VI	
Course Code: AR602	**Course Credits: 0 : 0 : 4**
Prerequisite: Nil	**Contact hours: 4x15P**
Course Coordinators: Asst. Prof. Joyce Lobo	

Course contents:

UNIT - I

Space frames and Geodesic domes (drafting): Introduction to Space frames and Geodesic domes, components used, advantages and disadvantages, fixing details, construction details, Methods of construction, application and details of reinforcement.

- Pedagogy / Course delivery tools-: Chalk and talk, Power Point Presentation, Videos

UNIT - II

RCC Folded plate, Large Span truss / steel portal frames (drafting): Introduction to RCC Folded plate and Large span truss, advantages and disadvantages, fixing details, construction details. Methods of construction, application and details of reinforcement.

- Pedagogy / Course delivery tools-: Chalk and talk, Power Point Presentation, Videos

UNIT - III

Tensile and Pneumatic structures and materials (sketching): Introduction to Tensile and Pneumatic structures, advantages, and disadvantages, fixing details, construction details. Properties and usage of Synthetic material.

- Pedagogy / Course delivery tools-: Chalk and talk, Power Point Presentation, Videos

UNIT - IV

Shell roofs and materials (sketching): Introduction to advantages and disadvantages of Shell roofs, fixing details, construction details. Introduction to AI-assisted visualization of shell geometries, structural behaviour, construction sequencing, and 3D modelling of shell roof systems.

- Pedagogy / Course delivery tools-: Chalk and talk, Power Point Presentation, Videos

UNIT - V

Properties and usage of Insulation materials– Thermal and Sound Insulation Materials, Fire retardant materials, ethylene tetrafluoroethylene. Technical information to be discussed.

Introduction to AI-assisted material selection, performance comparison, sustainability assessment, and material documentation.

- Pedagogy / Course delivery tools-: Chalk and talk, Power Point Presentation, Videos

Reference books:

1. Roy Chudley, 'Construction Technology'; Pearson Education, 2014
2. R. Barry, 'Construction of Buildings - Vol 1'; Wiley-Blackwell, 1999
3. P. C. Varghese, 'Building Materials'; Prentice Hall India Learning Pvt. Ltd., 2015
4. S. P. Arora & S. P. Bindra, 'A Text-Book of Building Construction'; Dhanpat Rai & Co., 2010
5. G.S. Ramaswamy, 'Design and Construction of Concrete Shell Roofs'; CBS, 2005
6. Rob Whitehead, 'Structures by Design: Thinking, Making, Breaking'; Routledge, 2019
7. John Chilton, 'Space Grid Structures'; Routledge, 2007
8. Terri Meyer Boake, 'Architecturally Exposed Structural Steel: Specifications, Connections, Details'; Birkhauser, 2015
9. Robert H. Kronenburg, Todd Dalland, Nicholas Goldsmith, 'Future Tents Limited (FTL) Architects: Innovations in Tensile Structures'; John Wiley & Sons, 1997
10. Mark R. Cruvellier, Bjorn N. Sandaker, Luben Dimcheff, 'Model Perspectives: Structure, Architecture and Culture'; Routledge, 2016
11. Arthur Lyons, 'Materials for Architects and Builders'; Routledge, 2014

Course Outcomes (COs):

The students will be able to -

1. Understand the working principles and construction details of space frames and geodesic domes (PO1,PO8, PO9, PSO1, PSO2, PSO3)
2. Provide advanced roofing technologies for large span structures. (PO1, PO8, PO9, PSO1, PSO2, PSO3)
3. Formulate structural mechanics, design criteria and behaviour of tensile and pneumatic structures (PO1, PO8, PO9, PSO1, PSO2, PSO3)
4. Explain design criteria and behaviour of shell roofs (PO1, PO8, PO9, PSO1, PSO2, PSO3)
5. Use innovative materials and details in construction (PO1, PO8, PO9, PO10, PO11, PSO1, PSO2, PSO3)

Course Assessment and Evaluation:

<table>
<tr><td colspan="4">Continuous Internal Evaluation (CIE): 50 Marks</td></tr>
<tr><td colspan="2">Assessment Tool</td><td>Marks</td><td>Course outcomes addressed</td></tr>
<tr><td colspan="2">Internal Test-I</td><td>30</td><td>CO1, CO2, CO3</td></tr>
<tr><td colspan="2">Internal Test-II</td><td>30</td><td>CO3, CO4, CO5</td></tr>
<tr><td colspan="4">Average of the two internal tests shall be taken for 30 marks.</td></tr>
<tr><td colspan="2">Other Components</td><td></td><td></td></tr>
<tr><td colspan="2">Assignment-1</td><td>10</td><td>CO1, CO2, CO3</td></tr>
<tr><td colspan="2">Assignment-2</td><td>10</td><td>CO3, CO4, CO5</td></tr>
<tr><td colspan="4"></td></tr>
<tr><td colspan="2">Semester End Examination (SEE):VIVA-VOCE</td><td rowspan="3">50</td><td rowspan="3">CO1, CO2, CO3, CO4, CO5</td></tr>
<tr><td>Portfolio</td><td>Viva-voce</td></tr>
<tr><td>40</td><td>10</td></tr>
</table>

NOTE:

- For all viva voce examinations, one internal faculty and one external faculty will conduct the exam.
- Portfolios must be submitted on the prescribed date announced by the department for all subjects.
- All students must register on the first day at the beginning of the **Viva voce exam.**

SEMESTER-VI

RESEARCH METHODOLOGY	
Course Code: AR603	**Course Credits: 2 : 0 : 0**
Prerequisite: Nil	**Contact Hours: 30L+30S**
Course Coordinator: Assoc. Prof. Dr. Lavanya Vikram	

Course contents:

UNIT - I

Introduction of the subject and its relevance to architectural field and society, Introduction: Introduction to Research Methodology, Meaning of Research, Objectives, Types, Approaches, Significance, Tools.

- Pedagogy / Course delivery tools-: Power Point Presentation, Chalk and talk.

UNIT - II

Research methods and methodology, Research process, Research design, Research hypothesis. Problem Definition, Objectives, Design, Data Collection, Data Analysis, Interpretation of Results, Validation of Results.

Research Problem Identification: Identification of Research Problem, Classroom Exercise of selecting a research problem, Identification of need to define research problem, Techniques involved in defining the Research Problems. Research Hypothesis: Boundaries of Study, questions and possible hypothesis, formulation of a hypothesis Research Design: Need, Characteristics of a good Design and related concepts, Types and Basic Principles of Research Designs: Classroom Exercises.

- Pedagogy / Course delivery tools-: Power Point Presentation, Chalk and talk.

UNIT - III

Sampling fundamentals, measurement and scaling techniques, Data collection. Research Design: Selection of Research Approach, Designing of Sampling Plan, Experiments and Questionnaires, methods: Probability and Non-probability samples.

Sampling Design: need, types, methods, characteristics of a good sample design, steps in sampling design, criteria for selecting sampling procedure and random sample for an infinite universe – Urban Problems.

- Pedagogy / Course delivery tools-: Power Point Presentation, Chalk and talk.

UNIT - IV

Data analysis and interpretation of results and report writing. Data Collection: Types and Collection Methods, Primary and Secondary data, sources of data, method to select appropriate data collection method. Significance, Steps, Layout of Report, Types of Reports, Mechanics of Writing, Precautions, Guidelines for reviewing drafts, Report formats, Typing Instructions.

- Pedagogy / Course delivery tools-: Power Point Presentation, Chalk and talk.

UNIT - V

Future Research and the Role of Computers and Artificial Intelligence in Architecture: Emerging digital technologies in architectural research, AI-assisted literature review, research planning, data analysis, visualization, reference management, and ethical use of AI in academic research and AI driven research tools.

- Pedagogy / Course delivery tools-: Power Point Presentation, Chalk and talk.

Reference Books:

1. C. R. Kothari, Gaurav Gard, 'Research Methodology: Methods And Techniques'; New Age International Publishers, 2019
2. O.R. Krishnaswamy, M. Ranganatham, 'Methodology of Research In Social Sciences'; Himalaya Publishing House, 2011
3. R. Panneerselvam, 'Research Methodology'; PHI Learning, 2014
4. Ranjit Kumar, 'Research Methodology: A Step by Step Guide for Beginners'; SAGE Publications Ltd, 2010
5. Ram Ahuja, 'Research Methods'; Rawat Publications, 2001
6. Linda N. Groat, David Wang, 'Architectural Research Methods'; Wiley, 2013
7. Bill Schmalz, 'The Architect's Guide to Writing; For Design and Construction Professionals'; Images Publishing Group; 2014
8. Karl Popper, 'The Logic of Scientific Discovery'; Rouledge, 2002

Course Outcomes (COs):

The students will be able to

1. Conduct research on different aspects of the built environment. (PO4, PSO2)
2. Understand the steps involved in conducting research and their importance. (PO2, PSO1)
3. Identify the appropriate methods of sampling for the urban issues being researched. (PO6, PSO3)
4. Explore the process of research with respective data collection and data analysis. (PO2, PSO1)
5. Write reports or research papers. (PO1, PSO2)

Course Assessment and Evaluation:

Continuous Internal Evaluation (CIE): 50 Marks		
Assessment tool	**Marks**	**Course outcomes attained**
Internal Test-I	30	CO1, CO2, CO3
Internal Test-II	30	CO3, CO4, CO5
Average of the two internal tests shall be taken for 30 marks.		
Other Components		
Assignment-1	10	CO1, CO2, CO3
Assignment-2	10	CO3, CO4, CO5
Semester-End Examination (SEE) (Scaled to 50 Marks)	100	CO1, CO2, CO3, CO4, CO5

SEMESTER- VI

ESTIMATING AND COSTING	
Course Code: AR604	**Course Credits: 3 : 0 : 0**
Prerequisite: Nil	**Contact Hours: 45L+45S**
Course coordinator: Asst. Prof. Shwetha P E	

Course contents:

UNIT - I

Introduction: Importance of estimation, Types of estimates, concept of measurement and Units of measurement. Area calculation of Plinth area, floor area, circulation area and carpet area. Definitions of Bill of Quantities (BOQ) and Bill of Materials (BOM), Administrative approval, Schedule of rates, Measurement book, Work charged establishment, contingencies.

- Pedagogy / Course delivery tools-: Power Point Presentation, Chalk and talk.

UNIT - II

Building components: Estimation of RCC framed structure components and load bearing wall structure components by long wall-short wall method or center line method.

- Pedagogy / Course delivery tools-: Power Point Presentation, Chalk and talk.

UNIT - III

Rate analysis: Deriving rates for items from labour and material costs based on CPWD Schedule of Rates, scheduled and non-scheduled items, establishing market rates.

- Pedagogy / Course delivery tools-: Power Point Presentation, Chalk and talk.

UNIT - IV

Specification: -Definition of specifications, objective of writing specifications, essentials of specifications, general and detail specifications of item of work in buildings: Earthwork excavation in foundation, DPC in cement concrete, Brickwork in CM1:6, RCC roof slab, Flooring (Mosaic/vitrified tiles), Plastering and Painting of walls.

- Pedagogy / Course delivery tools-: Power Point Presentation, Chalk and talk.

UNIT - V

Studio exercises related to Quantity Surveying for a small building project using Standard methods and compilation of a Preliminary Estimate. AI based estimation and costing techniques.

- Pedagogy / Course delivery tools-: Power Point Presentation, Chalk and talk.

Reference books:

1. B. N. Dutta, 'Estimating and Costing in Civil Engineering'; UBS Publishers' Distributors Pvt Ltd, 2016
2. S. C. Rangwala, 'Estimating Costing and Valuation'; Charotar, 2009
3. Robert Peurifoy, Garold Oberlender, 'Estimating Construction Costs'; McGraw-Hill Education, 2013
4. M Chakraborti, 'Estimating, Costing, Specification & Valuation in Civil Engineering'; Chakraborti, 2006
5. D.D. Kohli, R C Kohli, 'A Textbook of Estimating and Costing'; S. Chand, 2013
6. A.K.Upadhyay, 'Civil Estimating & Costing: Including Quality Surveying, Tendering and Valuation'; S K Kataria and Sons, 2013
7. S.P.Mahajan, Sanjay Mahajan, 'Quantity Surveying And Valuation (Estimating, Costing And Contracting)'; Satya Prakashan, 2017
8. National building and other relevant codes

Course outcomes (COs):

Students will be able to -

1. Estimate the quantity and cost of different components in a building. (PO1,PO2,PO4,PO6,P07,PO10,PO11, PSO1,PS02)
2. Estimate quantities of materials required. (PO1,PO2, P07,PO8,PO10,PO11, PSO1,PS02)
3. Provide specifications for different construction items. (PO1, P07,PO8,PO10,PO11, PSO1,PS02)
4. Analyze rate analysis from first principles for various materials required for civil work. (PO1, P07,PO8,PO10,PO11, PSO1,PS02)
5. Apply the acquired knowledge for a given building. (PO1,PO2, P04,PO6,PO7,PO8,PO10, PO11, PSO1,PS02, PS03)

Course Assessment and Evaluation:

Continuous Internal Evaluation (CIE): 50 Marks		
Assessment tool	**Marks**	**Course outcomes attained**
Internal Test-I	30	CO1, CO2, CO3
Internal Test-II	30	CO3, CO4, CO5
Average of the two internal tests shall be taken for 30 marks.		
Other Components		
Assignment-1	10	CO1, CO2, CO3
Assignment-2	10	CO3, CO4, CO5
Semester-End Examination (SEE) (Scaled to 50 Marks)	100	CO1, CO2, CO3, CO4, CO5

SEMESTER- VI

ARCHITECTURAL STRUCTURES – VI	
Course Code: AR605	**Course Credits: 0: 0 : 3**
Prerequisite: Nil	**Contact Hours: 3X15P**
Course coordinator: System. Analyst. Aruna Gopal	

Note: The portfolio and model shall be submitted at the end of the semester as mandatory components of the final assessment and evaluation.

Course Contents:

Unit I

Design of Floor Slabs for a residential or commercial building: Design of One-Way Slab, Two Way slab with corner restraints. Drawing of Slab Reinforcement details for an entire floor plan of a residential or commercial building.

- Pedagogy / Course delivery tools-: Power Point Presentation, Chalk and talk.

Unit II

Staircase: Design & Drawing of the reinforcement details of dog legged staircase for a residential building.

- Pedagogy / Course delivery tools-: Power Point Presentation, Chalk and talk.

Unit III

Lintel & Chajja: Design of the Chajjas & Lintels for a residential building. Drawing the reinforcement details for the lintel & chajja for the given plan of residential building.

UNIT - IV

Special Structures: Tensegrity structure OR Dynamic envelopes: History and case studies. Physical and digital model of tensegrity structures or dynamic envelopes.

- Pedagogy / Course delivery tools-: Power Point Presentation, Model making.

UNIT - V

Introduction to AI-assisted structural visualization of tensegrity and dynamic envelopes systems.

- Pedagogy / Course delivery tools-: AI integrated tools.

Reference Books:

1. S Unnikrishna Pillai, Devdas Menon, ‘Reinforced Concrete Design’; Tata Mc-Graw Hill, 2001
2. Varghese P.C, ‘Limit State Design of Reinforced Concrete’; Prentice Hall India Learning Pvt. Ltd, 2008

3. N. Krishna Raju, R. N. Pranesh, 'Reinforced Concrete Design: IS:456-2000 Principles and Practice'; New Age International Pvt Ltd Publishers, 2018
4. David Fanella, 'Reinforced Concrete Structures: Analysis and Design'; McGraw-Hill Education, 2015
5. Ashwani Bedi, Ramsey Dabby, 'Structure for Architects: A Case Study in Steel, Wood, and Reinforced Concrete'; Routledge, 2019

Course Outcomes (COs):

The students will be able to –

1. Analyze, design and detailing of slabs. (PO8,PO9,PO10,PO11; PSO1,PSO3)
2. Analyze, design and detailing of Staircase for a residential or commercial building (PO8, PO9,PO10,PO11; PSO1,PSO3)
3. Analyze, design and detailing of lintels and chajjas in a building (PO8, PO9, PO10,PO11; PSO1,PSO3)
4. Apply principles and concepts of High Rise buildings. (PO5, PO8,PO9,PO10,PO11; PSO1,PSO2,PSO3)
5. Apply structural principles and concepts of long span structures.(PO5,PO8,PO9,PO10,PO11; PSO1,PSO2,PSO3)

Course Assessment and Evaluation:

<table>
<tr><td colspan="4">Continuous Internal Evaluation (CIE): 50 Marks</td></tr>
<tr><td colspan="2">Assessment Tool</td><td>Marks</td><td>Course outcomes addressed</td></tr>
<tr><td colspan="2">Review-I</td><td>30</td><td>CO1, CO2, CO3</td></tr>
<tr><td colspan="2">Review-II</td><td>20</td><td>CO3, CO4, CO5</td></tr>
<tr><td colspan="4"></td></tr>
<tr><td colspan="2">Semester End Examination (SEE):TERM-WORK</td><td rowspan="3">50</td><td rowspan="3">CO1, CO2, CO3, CO4, CO5</td></tr>
<tr><td>PORTFOLIO SUBMISSION</td><td>MODEL</td></tr>
<tr><td>40</td><td>10</td></tr>
</table>

NOTE:

- For all Term work examinations, one internal faculty and one external faculty will conduct the exam
- Portfolios must be submitted on the prescribed date announced by the department for all subjects.
- All students must register on the first day of **Term work exams.**

SEMESTER- VI

BUILDING SERVICES –IV	
Course Code: AR606	**Course Credits: 3 : 0 : 0**
Prerequisite: Nil	**Contact Hours: 45L+45S**
Course coordinator: Asst. Prof. Tanvi Katre	

Course contents:

UNIT – I

Scope of acoustics, acoustical problem in contemporary architectural design, sound source, path and receiver. Properties of sound, introduction to the study of acoustics – nature of sound, basic terminology- frequency, pitch, tone, sound pressure, sound intensity, decibel scale, loudness, threshold of audibility and pain, masking, sound and distance – inverse square law.

- Pedagogy / Course delivery tools-: Power Point Presentation, Chalk and talk.

UNIT – II

Behaviour of sound in enclosed spaces – reflection of sound, nature of reflection from plane, convex and concave surfaces, sound diffraction, absorption of sound, sound absorption coefficient, reverberation, reverberation time calculation, Sabine's Formula.

- Pedagogy / Course delivery tools-: Power Point Presentation, Chalk and talk.

UNIT – III

Sound absorbents, porous materials, panel or membrane absorbers and cavity or Helmholtz resonators, role of functional absorbers. Absorption coefficients of indigenous acoustical materials.

- Pedagogy / Course delivery tools-: Power Point Presentation, Chalk and talk.

UNIT – IV

Acoustical design requirements for halls used for speech, drama and music. General purpose halls used for speech, music, cinema theatres, home theatres, recording studios and open air theatres.

- Pedagogy / Course delivery tools-: Power Point Presentation, Chalk and talk.

UNIT – V

Noise and its classification, outdoor and indoor noise, air borne and structure borne noises. Environmental noise control and AI based environmental noise mapping tools. Transmission of noise and transmission loss, STC Rating. Idea of sick-building syndrome. Means of noise control and sound insulations. Constructional measures of noise control and sound insulation. Industrial and urban noise – methods of reduction by enclosures and barriers. Traffic Planning and design against outdoor noise for air traffic, road traffic and rail traffic.

- Pedagogy / Course delivery tools-: Power Point Presentation, Chalk and talk.

Reference Books:

1. Leslie L. Doelle, 'Environmental Acoustics'; McGraw-Hill, 1972
2. Vern O. Knudsen, Cyril M. Harris, 'Acoustical Designing in Architecture'; Acoustical Society of Amer, 1980
3. Peter Hubert Parkin, H. R. Humphreys, 'Acoustics, Noise and Builings'; Faber & Faber, 1969
4. Barry Blesser, Linda-Ruth Salter, 'Spaces Speak, Are You Listening? – Experiencing Aural Architecture'; The MIT Press, 2009
5. Tyler Adams, 'Sound Materials: A Compendium of Sound Absorbing Materials for Architecture and Design'; Thames & Hudson, 2016
6. Michael Ermann , 'Architectural Acoustics Illustrated'; Wiley 2015
7. Duncan Templeton, 'Acoustics in the Built Environment'; Architectural Press, 1998
8. T. E. Vigran, 'Building Acoustics'; CRC Press, 2008
9. William J. Cavanaugh, Gregory C. Tocci, Joseph A. Wilkes, 'Architectural Acoustics: Principles and Practices'; Wiley, 2010
10. Codes and standards –

- National Building Code of India (NBC) 2016; Part 8 Section 4
- IS 1950: 1962 Code of practice for sound insulation of non-industrial buildings
- IS 3483: 1965 Code of practice for noise reduction in industrial buildings
- IS 4954: 1968 Recommendations for noise abatement in town planning
- IS 11050 (Part 1) 1984: Rating of sound insulation in buildings and of building elements: Part 1 Airborne sound insulation in buildings and of interior building elements
- IS 11050 (Part 2)1984: Rating of sound insulation in buildings and of building elements: Part 2 Impact sound insulation
- IS 2526, 1963: Code of practice for acoustical design of auditoriums and conference halls

Course outcomes (COs):

The students will be able to -

1. Explain the fundamentals of acoustics in building design. (PO1, PO5, PO8, PO9, PO10, PSO1)
2. Apply the understanding of sound behaviour in designing enclosed spaces. (PO1, PO5, PO8, PO9 , PSO1, PSO2)
3. Design the acoustics of a space for the desired function with appropriate acoustic materials.(PO1, PO5, PO8, PO9, PSO1)
4. Apply the knowledge of environmental acoustics to design acoustics of outdoor spaces.(PO1, PO5, PO6, PO7, PO8, PO9, PO10, PO11, PSO1, PSO2, PSO3)
5. Design and execute the acoustic design and detailing in buildings.(PO1, PO5, PO6, PO7, PO8, PO9, PO10, PO11, PSO1, PSO2, PSO3)

Course Assessment and Evaluation:

Continuous Internal Evaluation (CIE): 50 Marks		
Assessment tool	**Marks**	**Course outcomes attained**
Internal Test-I	30	CO1, CO2, CO3
Internal Test-II	30	CO3, CO4, CO5
Average of the two internal tests shall be taken for 30 marks.		
Other Components		
Assignment-1	10	CO1, CO2, CO3
Assignment-2	10	CO3, CO4, CO5
Semester-End Examination (SEE) (Scaled to 50 Marks)	100	CO1, CO2, CO3, CO4, CO5

SEMESTER- VI

DISASTER MANAGEMENT	
Course Code: AR607	**Course Credits: 2 : 0 : 0**
Prerequisite: Nil	**Contact Hours: 30L+30S**
Course coordinator: Dr. Prof. Jotirmay Chari	

Course contents:

UNIT - I

Overview and classification of major disasters. Overview of causes, impacts and issues of natural and manmade disasters. Occurrence of disaster in different climatic and geographical regions; Hazard (earthquake and cyclone) map of the world and India. Disaster management cycle, Disaster management plan; National crisis management committee; state management group.

- Pedagogy / Course delivery tools-: Power Point Presentation, Chalk and talk.

UNIT - II

Disaster risk mitigation and climate resilient development for wind and water related disasters- Typhoons, cyclones, floods, Tsunami, storms. Mainstreaming in the special planning process. Behaviour of structures in cyclone/floods/tsunami- case studies. Mitigation, retrofitting methods for cyclones and floods. Planning and design considerations, standards and coastal zoning regulations for storms, cyclones, and floods.

- Pedagogy / Course delivery tools-: Power Point Presentation, Chalk and talk.

UNIT - III

Causes of earthquake - plate tectonics, faults, seismic waves, magnitude, intensity, epicentre, energy release and ground motions. Earthquake effects – liquefaction and landslides. Site planning, building forms, Architectural design concepts for earthquake resistance of buildings. Case studies on ancient vernacular and traditional regional practices, modern technology, and innovative construction material techniques for earthquake resistance of buildings.

- Pedagogy / Course delivery tools-: Power Point Presentation, Chalk and talk.

UNIT - IV

Seismic retrofitting - Weakness in existing buildings, concepts in repair, restoration and seismic strengthening. Types of Dampers & base isolation methods.

- Pedagogy / Course delivery tools-: Power Point Presentation, Chalk and talk.

UNIT - V

Inter-relationships between urban development, disaster risk and climate change.
Relief shelter design requirements. Design a disaster resilient building or relief shelter for a high-risk zone.
Strategies for disaster prevention and mitigation; Post disaster recovery and rehabilitation (socioeconomic consequences) for any one of the disasters: forest fires, landslides, biological disasters- case study. Introduction to AI-assisted hazard mapping tools.

- Pedagogy / Course delivery tools-: Power Point Presentation, Chalk and talk.

Reference Books:

1. Editor: David E. Alexander, 'International Journal of Disaster Risk Reduction'; Elsevier
2. M. M. Sulphey, 'Disaster Management'; PHI Learning, 2017
3. Mentor Llunji, 'Seismic architecture: The architecture of earthquake resistant structures'; MSPROJECT, 2016
4. Belen Garcia, 'Earthquake Architecture: New Construction Techniques for Earthquake Disaster Prevention'; HarperCollins, 2000
5. Mariana R. Correia, Paulo B. Lourenco, Humberto Varum, 'Seismic Retrofitting: Learning from Vernacular Architecture'; CRC Press, 2015
6. Schodek Daniel L., Bechthold Martin, 'Structures', Prentice Hall India Learning Pvt. Ltd., 2009
7. Pankaj Agarwal, Manish Shrikhande, 'Earthquake Resistant Design of Structures';
   PHI, 2011
8. Vinod Hosur, 'Earthquake-Resistant Design of Building Structures'; Wiley, 2013
9. C. V. R. Murty, 'Learning Earthquake Design and Construction - IITK-BMTPC Earthquake Tips'; Springer, 2005
   IS: 4326- Seismic Detailing of Masonry Buildings.
   IS: 1893-2002, IS: 13920-1993, IS: 456-2000, IS: 800-2007 Seismic Design and Detailing of RC and Steel Structures

Course Outcomes (COs):

The students will be able to -

1. Explain the phenomenon of disaster.(PO1, PO2, PO3, PO5, PO6; PSO1, PSO2, PSO3)
2. Characterize the impact of disasters on buildings.(PO1, PO2, PO3, PO4, PO5, PO6; PSO1, PSO2, PSO3)
3. Execute the mitigation strategies for a disaster and its impact on buildings.(PO1, PO2, PO3, PO4, PO5; PSO1, PSO2, PSO3)
4. Design buildings implementing the principles of earthquake resistance and understand the procedure of retrofitting post calamity.(PO1, PO2, PO3, PO4, PO5; PSO1, PSO2, PSO3)

5. Design a disaster relief shelter or building based on guidelines of disaster-resistant and mitigation strategies. (PO1, PO2, PO3, PO4, PO5, PO8; PSO1, PSO2, PSO3)

Course Assessment and Evaluation:

Continuous Internal Evaluation (CIE): 50 Marks		
Assessment tool	**Marks**	**Course outcomes attained**
Internal Test-I	30	CO1, CO2, CO3
Internal Test-II	30	CO3, CO4, CO5
Average of the two internal tests shall be taken for 30 marks.		
Other Components		
Assignment-1	10	CO1, CO2, CO3
Assignment-2	10	CO3, CO4, CO5
Semester-End Examination (SEE) (Scaled to 50 Marks)	100	CO1, CO2, CO3, CO4, CO5

SEMESTER- VI

WORKING DRAWING-I	
Course Code: AR608	**Course Credits: 0 : 0 : 2**
Prerequisite: Nil	**Contact Hours: 2x15P**
Course coordinator: Assoc. Prof. Tejaswini H	

Note: The portfolio and material study shall be submitted at the end of the semester as mandatory components of the final assessment and evaluation.

Course Contents:

UNIT – I

Introduction: Overview of Working Drawings; historical perspective; consultants involved in preparation of working drawings, their role and scope; reading, error checking, problems in working drawings. Plan Approval of a mid-rise structure.

Drafting Conventions: Representation of materials, graphic symbols, line type conventions, grid lines, lettering, color codes, paper sizes, title blocks, office practices, standardization of details.

CAD Drawings: Working with layers, blocks, templates, assemblies, libraries, layouts, plot styles, error checking, and editing. Introduction to AutoCAD.

- Pedagogy / Course delivery tools-: Chalk and talk, Power Point Presentation, Videos

UNIT – II

Project work: Preparation of Architectural Working drawings and details for one of the design projects of medium rise-framed structure, from earlier semester. Drawings to include location map/site plan with setting out plan/marking plan, building and infrastructure service lines. Centerline drawing, foundation and footing drawing.

- Pedagogy / Course delivery tools-: Chalk and talk, Power Point Presentation, Videos

UNIT – III

Working drawings of plans at all levels – Basement or cellar/Ground/First/Second floor plans. Roof/terrace plan with staircase block cover – indicate ridge line, rainwater gradient, etc. for flat roof; indicate ridges, eaves, valley, hips, coping, flashing, skating etc., for pitched roof.-Preparation of Doors/windows schedule.

- Pedagogy / Course delivery tools-: Chalk and talk, Power Point Presentation, Videos

UNIT – IV

Front/ Back/ side Elevations (N/S/E/W or Orientation wise). Longitudinal & cross section through staircase & lift shaft. Detail of external/ internal wall section from foundation footing to coping/ ridge showing all necessary elements.

- Pedagogy / Course delivery tools-: Chalk and talk, Power Point Presentation, Videos

UNIT – V

Detailed drawings of staircase – Plan, sectional elevation with elements as handrail, balusters, steps & finishes etc. Other miscellaneous items such as ladder, spiral stair, ramp etc. if any.Detailed drawings of door, window, Schedule of openings.

Application of AI for automated floor plan verification, intelligent extraction of door and window schedules. Autodesk Architectural working drawing of a selected building component using Autodesk Revit.

- Pedagogy / Course delivery tools-: Chalk and talk, Power Point Presentation, Videos

Reference Books:

1. Fred A. Stitt, 'Working Drawing Manual'; McGraw-Hill Education, 1998
2. George T. Clayton, 'Site Plan in Architectural Working Drawings'; Stipes Publishing Llc., 1973
3. Donald Watson, Michael Crosbie, 'Time-Saver Standards for Architectural Design'; McGraw Hill Education, 2017
4. Keith Styles, Andrew Bichard, 'Working Drawings Handbook'; Taylor and Francis
5. Edward Muller, Philip Grau III, 'Reading Architectural Working Drawings: Residential and Light Construction'; Pearson, 2003
6. William J. O'Connell, 'Graphic Communications in Architecture: Standard Format
   for Architectural Working Drawings'; Stipes Publishing, 1985
7. Rosemary Kilmer, W. Otie Kilmer, 'Construction Drawings and Details for Interiors'; John Wiley & Sons, 2016

Course Outcomes (COs):

Students will be able to -

1. Understand procedure of plan approval for mid-rise structure; signs and conventions used in preparing working drawing (PO1, PO6, PO11; PSO1, PSO3)
2. Identify basic structural requirements of a building and provide the centerline and foundation drawings for the same (PO1, PO8, PO11; PSO1, PSO3)
3. Prepare working drawing plans of all levels and schedule of openings that are good to be issued to site for construction. (PO1, PO8, PO10, PO11; PSO1, PSO3)
4. Prepare working drawings of sections and elevations that are good to be issued to site for construction. (PO1, PO3, PO8, PO10, PO11; PSO1, PSO3)
5. Prepare working drawings of toilets, kitchen, staircase and develop innovative construction details that are good to be issued to site for construction. (PO1, PO2, PO3, PO8, PO10, PO11; PSO1, PSO2, PSO3)

Course Assessment and Evaluation:

<table>
<tr><td colspan="4">Continuous Internal Evaluation (CIE): 50 Marks</td></tr>
<tr><td colspan="2">Assessment Tool</td><td>Marks</td><td>Course outcomes addressed</td></tr>
<tr><td colspan="2">Review-I</td><td>30</td><td>CO1, CO2, CO3</td></tr>
<tr><td colspan="2">Review-II</td><td>20</td><td>CO3, CO4, CO5</td></tr>
<tr><td colspan="4"></td></tr>
<tr><td colspan="2">Semester End Examination (SEE):TERM-WORK</td><td rowspan="3">50</td><td rowspan="3">CO1, CO2, CO3, CO4, CO5</td></tr>
<tr><td>PORTFOLIO</td><td>MATERIAL STUDY</td></tr>
<tr><td>40</td><td>10</td></tr>
</table>

NOTE:

- For all Term work examinations, one internal faculty and one external faculty will conduct the exam
- Portfolios must be submitted on the prescribed date announced by the department for all subjects.
- All students must register on the first day of **Term work exams.**