DAYANANDA SAGAR ACADEMY OF TECHNOLOGY & MANAGEMENT

CURRICULUM

Scheme and Syllabus V to VI Semester

Outcome Based Education

(Academic Year 2025-2026)

Department of Architecture

5th & 6th Semester B.Arch

ABOUT THE INSTITUTE

Dayananda Sagar Academy of Technology and Management- DSATM was established in 2011 with 5 UG Programmes and 1 PG Program, the programmes are approved by All India Council for Technical Education (AICTE) New Delhi, Affiliated to Visvesvaraya Technological University (VTU), Belagavi and DSATM is an autonomous institute from 2023-2024.

The Dayananda Sagar Institutions is one of pioneer institutions in India and abroad with six decades of excellence in Academic and Research. The newer campuses were necessary to accommodate the growing need of the technology and innovation.

DSATM nurtures the students in academic, research, sports, cultural and extracurricular activities.

- Creating an academic environment to nurture and develop competent entrepreneurs, leaders and professionals who are socially sensitive and environmentally conscious.
- Integration of Outcome Based Education and cognitive teaching and learning strategies to enhance learning effectiveness.
- Developing necessary infrastructure to cater to the changing needs of Business and Society.
- Optimum utilization of the infrastructure and resources to achieve excellence in all areas of relevance.
- Adopting learning beyond curriculum through outbound activities and creative assignments.
- Imparting contemporary and emerging techno-managerial skills to keep pace with the changing global trends.
- Facilitating greater Industry-Institute Interaction for skill development and employability enhancement.
- Establishing systems and processes to facilitate research, innovation and entrepreneurship for holistic development of students.
- Implementation of Quality Assurance System in all Institutional processes.

VISION OF THE INSTITUTE

To strive at creating the institution a center of highest caliber of learning, so as to create an overall intellectual atmosphere with each deriving strength from the other to be the best of engineers, scientists with management & design skills.

MISSION OF THE INSTITUTE

- To serve its region, state, the nation and globally by preparing students to make meaningful contributions in an increasing complex global society challenge.
- To encourage, reflection on and evaluation of emerging needs and priorities with state-of-the-art infrastructure at institution.
- To support research and services establishing enhancements in technical, economic, human and cultural development.
- To establish interdisciplinary centre of excellence, supporting/ promoting student's implementation.
- To increase the number of Doctorate holders to promote research culture on campus.
- To establish IIPC, IPR, EDC, innovation cells with functional MOU's supporting student's quality growth.

QUALITY POLICY

Dayananda Sagar Academy of Technology and Management aims at achieving academic excellence through continuous improvement in all spheres of Technical and Management education. In pursuit of excellence cutting – edge and contemporary skills are imparted to the utmost satisfaction of the students and the concerned stakeholders.

ABOUT THE DEPARTMENT

The Department of Architecture is dedicated to shaping the next generation of spatial innovators by integrating foundational design principles with cutting-edge, upcoming technologies. Our curriculum heavily emphasizes the practical applications of these advancements, preparing students to lead in a rapidly evolving industry. Students actively engage with Artificial Intelligence (AI) and Generative Design to optimize building performance, run complex environmental simulations, and rapidly prototype sustainable structural layouts. We also focus on Additive Manufacturing (3D Printing) and Construction Robotics, which are revolutionizing the field by enabling the creation of complex, custom geometries on-site while significantly reducing material waste. Furthermore, the integration of Virtual Reality (VR), Augmented Reality (AR), and Digital Twins allows our students and faculty to create immersive, real-time interactive walkthroughs of their projects and monitor the lifecycle data of a building before a single brick is laid. By leveraging these intelligent systems and smart materials, the department ensures that our graduates are not just designers, but tech-forward pioneers equipped to build the smart, eco-conscious cities of the future.

VISION OF THE DEPARTMENT

The vision of School of Architecture, DSATM is to enhance, consolidate & revitalize the thought process of architectural design, thus evolving strong knowledge base that is progressive and dynamic and which is more relevant to the evolving socioeconomic and geographical context.

MISSION OF THE DEPARTMENT

The mission of this school in continuation with the vision statement is to educate the future leaders of the architectural practice with emphasis on the relationship between intellectual development and creative activity, by facilitating the acquisition of lifelong learning skills. The school wants to position itself as one of the top institutes imparting quality education.

PROGRAM EDUCATION OBJECTIVES (PEO'S):

PEO 1:	A graduate will apply the Architectural knowledge gained during the course towards solving broad range of Architectural & Construction related problems.
PEO 2:	A Graduate will have the perspective of lifelong learning for continuous improvement of knowledge in Architecture & Engineering, Advanced Studies & Research.
PEO 3:	A Graduate will be able to respond to local, national and international issues by imparting his/her knowledge of Architecture & Engineering (Construction, Services, Structures etc) in Educational, Government, Financial and Private sectors.

PROGRAM OUTCOMES (PO's)

- PO1. Architectural knowledge: A graduate will be able to apply their creativity, skill knowledge to meet the ever-changing needs of the society.
- PO2. Problem Analysis: A graduate will demonstrate his/her knowledge in History of Architecture, Theory of Architecture & Professional Practice for architectural design problems for local as well as global community.
- PO3. Design & Development: A graduate will be able to use his skill in freehand sketching, graphics, model making and services to develop design solutions.
- PO4. Conduct Investigation of Complex Problems: A graduate will be able to investigate client & user needs of space, furniture & equipment's requirements and analyse site conditions, bye laws in relation to site, climate & design development.
- PO5. Modern Tool Usage: A graduate will be able to apply the knowledge of digital techniques & other supporting tools for the architectural and other design projects.
- PO6. An Architect & Society: A graduate will be able to apply reasoning informed by the contextual knowledge, to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to professional Architectural practices.
- PO7. Environment and Sustainability: Understand the impact of the professional Architectural solution in societal and environmental contexts, and demonstrate the knowledge of and the need for sustainable development.
- PO8. Ethics: Apply ethical principles and commit to professional ethics, responsibilities, and norms of the Architectural practice.
- PO9. Individual and Teamwork: Function effectively as an individual and as a member or leader in diverse teams and in multidisciplinary settings.
- PO10. Communication: The graduate will be able to identify and communicate effectively, the critical issues involved in the solutions of architectural design problems.
- PO11. Project Management and Finance: A graduate will be able to demonstrate the understanding of HR, Finance and Contract Management for the profession individually or as a team member.
- PO12. Life-long Learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.
- Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
- Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

PROGRAM SPECIFIC OUTCOMES (PSO's)

AR PSO1	A graduate shall be able to apply critical design thinking through hands on experience (Make 'n' Meaning, Build 'learn).
AR PSO2	A graduate shall have the knowledge of an array of creative choice of multi-disciplinary vocations that encourages excellence, diversity, and growth surpassing the traditional boundaries of different disciplines.
AR PSO3	A graduate shall have the knowledge base that meet all professional challenges in the world of ever evolving technological advancements using digital tools and innovative techniques.

PROPOSED UG CREDIT STRUCTURE IN ALIGNMENT WITH VTU

Sl.No	Semester	No. of Credits
1	1st Semester	26
2	2nd Semester	27
3	3rd Semester	28
4	4th Semester	29
5	5th Semester	30
6	6th Semester	30
7	7th Semester	30
8	8th Semester	30
9	9th Semester	18
10	10th Semester	13
	Total	**261**

PROPOSED UG SCHEME 5th SEM

Sl. No	Course Category	BOS	TD	Teaching Hours/Week					Credits
				Lecture	Tutorial	Practical	Studio	Total (Hrs/week)	
				L	T	P	S		
1	PCC	Arch	Arch	-	-	-	8	8	8
2	BSAE	Arch	Arch	1	-	-	3	4	4
3	PCC	Arch	Arch	3	-	-	-	3	3
4	HSMC	Arch	Hum.	3	-	-	-	3	3
5	BSAE	Arch	Arch	3	-	-	-	3	3
6	BSAE	Arch/Civil	Arch/Civil	1	-	-	2	3	3
7	SEC	Arch	Arch	-	-	4	-	4	4
8	PEC	Arch	Arch	2	-	-	-	2	2
9	NCMC	PE/NSS		-	-	2	-	2	0
10	AICTE Activity Points								
								Total	30

Percentage of Mapping– Theory & Practical - Scheme & Syllabus- 5th Sem

Sl. No	Course Category	Component			
		Theory	Practical	Studio	YOGA/SPORTS
1	PCC	--	--	100%	--
2	BSAE	25%	--	75%	--
3	PCC	100%	--	--	--
4	HSMC	100%	--	--	--
5	BSAE	100%	--	--	--
6	BSAE	33%	--	67%	--
7	SEC		100%		
8	PEC	100%			
9	NCMC	--	--	--	100%

PROPOSED UG SCHEME 6th SEM

Sl. No	Course Category	BOS	TD	Teaching Hours/Week					Credits
				Lecture	Tutorial	Practical	Studio	Total	
				L	T	P	S	(Hrs/week)	
1	PCC	Arch	Arch	-	-	-	8	8	8
2	BSAE	Arch	Arch	1	-	-	3	4	4
3	PCC	Arch	Arch	2	-	-	1	3	3
4	PCC	Arch	Arch	3	-	-	-	3	3
5	BSAE	Arch	Arch	3	-	-	-	3	3
6	BSAE	Arch/Civil	Arch/Civil	1	-	-	2	3	3
7	PCC	Arch	Arch	-	-	4	-	4	4
8	PEC	Arch	Arch	2	-	-	-	2	2
9	NCMC	PE/NSS		-	-	2	-	2	0
10	NCMC	PE/NSS		-	-	-	-	-	0
11	AICTE Activity Points								
								Total	**30**

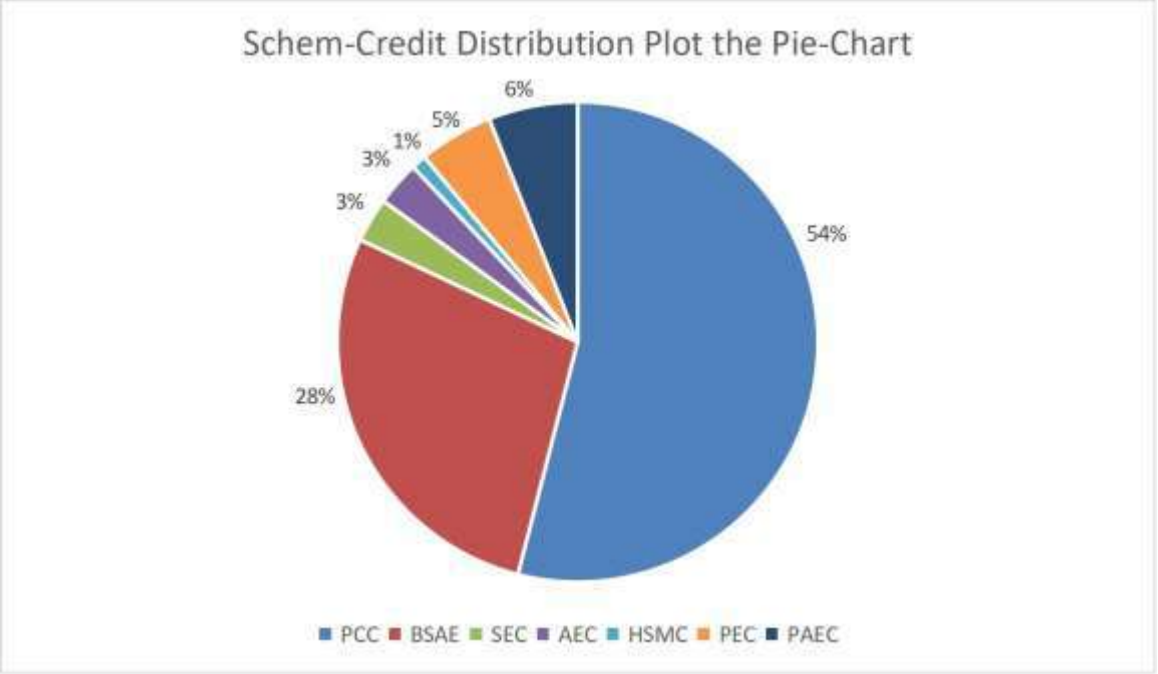
Percentage of Mapping– Theory & Practical - Scheme & Syllabus- 6th Sem

Sl. No	Course Category	Component			
		Theory	Practical	Studio	YOGA/SPORTS
1	PCC	--	--	100%	--
2	BSAE	25%	--	75%	--
3	PCC	67%	--	33%	--
4	PCC	100%	--	--	--
5	BSAE	100%	--	--	--
6	BSAE	33%	--	67%	--
7	PCC	--	100%	--	--
8	PEC	100%	--	--	--s
9	NCMC	--	--	--	100%
10	NCMC	--	--	--	100%

Scheme Distribution

School of Architecture

Course Component	Credits	% of Credits
Program core course (PCC)	141	54
Building Science & Applied Engineering (BSAE)	73	28
Skill Enhancement Course (SEC)	08	3
Humanity Sciences and Management Courses (HSMC)	08	3
Ability Enhancement Course (AEC)	03	1
Professional Elective course (PEC)	12	5
Professional Ability Enhancement course (PAEC)	16	6
No Credit mandatory Course (NCMC)	0	0
Total	261	100



SEMESTER WISE CREDIT BREAKDOWN FOR B.Arch. DEGREE

CURRICULUM BATCH 2023-2028

Course Category	Semester								Total Credits
	1st	2nd	3rd	4th	5th	6th	7th	8th	
Program core course (PCC)	17	16	11	11	11	18			
Building Science & Applied Engineering (BSAE)	7	9	13	10	10	10			
Skill Enhancement Course (SEC)	0	0	0	4	4	0			
Humanity Sciences and Management Courses (HSMC)	1	1	1	2	3	0			
Ability Enhancement Course (AEC)	1	1	1	0	0	0			
Professional Elective course (PEC)	0	0	2	2	2	2			
Professional Ability Enhancement course (PAEC)	0	0	0	0	0	0			
No Credit mandatory Course (NCMC)	0	0	0	0	0	0			
Total Credits	26	27	28	29	30	30			

Dayananda Sagar Academy of Technology & Management

(Autonomous Institute under VTU)

Scheme of Teaching and Examinations – 2025
Outcome Based Education (OBE) and Choice Based Credit System (CBCS)
(Effective from 2025-26)

5th SEMESTER: School of Architecture (SOA)

Sl.No	Course Category	Course Code	Course Title	BOS/ TD	Teaching Hours/Week					Credits	Examination				
					Lecture	Tutorial	Practical	Studio	Total		CIE	SEE marks			Total Marks
					L	T	P	S			Marks	Duration (Hrs.)	Theory	Viva	
1	PCC	BAT501	Architectural Design-V	Arch.	-	-	-	8	8	8	100	-	-	100	200
2	BSAE	BAT502	Materials & Methods in Building Construction V	Arch.	1	-	-	3	4	4	50	4	100	-	150
3	PCC	BAT503	History of Architecture-V	Arch.	3	-	-	-	3	3	50	3	50	-	100
4	HSMC	BAT504	Sociology & Building Economics	Hum.	3	-	-	-	3	3	50	3	50	-	100
5	BSAE	BAT505	Building Services –III	Arch.	3	-	-	-	3	3	50	3	50		100
6	BSAE	BAT506	Building structures-IV	Arch./ Civil	1	-	-	2	3	3	50	-	-	50	100
7	SEC	BAT507	Building Information Modeling	Arch.	-	-	4	-	4	4	100	-	-	-	100
8	PEC	BAT508(x)	Professional Elective	Arch.	2				2	2	50	-	-	-	50
9	NCMC	BAT509	Physical Education (**Sports & Athletics/Yoga & NSS**)	PE/NSS	-	-	2	-	2	-	100	-	-	-	100
				Total	13		6	13	32	30	600		250	150	1000

PCC- Professional Core Courses
BSAE- Building Science & Applied Engineering Courses.
SEC - Skill Enhancement Course
HSMC - Humanity Sciences and Management Courses
AEC-Ability Enhancement Course
PEC-Professional Elective Courses
OEC- Open Elective Courses
NCMC - Non-Credit Mandatory Course
PE/NSS – Physical Education / National Service Scheme

Progressive Assessment (Continuous Internal Evaluation) (CIE) to be awarded by the subject teacher.
Semester End Examination (SEE) will be conducted by DSATM.
Viva Voce examination shall be conducted jointly by one internal & one external examiner appointed by BOE-DSATM.
Minimum Marks to be Secured for Passing: In CIE for passing: 50% marks minimum
In Theory (SEE) exam, Term work/Viva Voce: 40% marks minimum
In aggregate (CIE+SEE) 50% minimum marks

PEC	BAT508(a)	Professional Elective(1): **Alternate Building Technology & Material**
PEC	BAT508(b)	Professional Elective(2): **Digital Architecture**
PEC	BAT508(c)	Professional Elective(3): **Architectural Lighting Design**

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Outcome Based Education (OBE) and Choice Based Credit System (CBCS)
(Effective from 2025-26)

6th SEMESTER: School of Architecture (SOA)

Sl.No	Course Category	Course Code	Course Title	BOS/ TD	Teaching Hours/Week					Credits	Examination				
					Lecture	Tutorial	Practical	Studio	Total		CIE Marks	SEE marks			Total Marks
					L	T	P	S				Duration (Hrs.)	Theory	Viva	
1	PCC	BAT601	Architectural Design-VI	Arch.	-	-	-	8	8	8	100	-	-	100	200
2	BSAE	BAT602	Materials & Methods in Building Construction VI	Arch.	1	-	-	3	4	4	50	4	100	-	150
3	PCC	BAT603	Landscape Architecture	Arch.	2	-	-	1	3	3	50	3	50	-	100
4	PCC	BAT604	Contemporary Architecture	Arch.	3	-	-	-	3	3	50	3	50	-	100
5	BSAE	BAT605	Building Services –IV (Acoustics & Noise Control)	Arch.	3	-	-	-	3	3	50	3	50	-	100
6	BSAE	BAT606	Building structures-V	Arch./ Civil	1	-	-	2	3	3	50	-	-	50	100
7	PCC	BAT607	Working Drawing-I	Arch.	-	-	4	-	4	4	100	-	-	-	100
8	PEC	BAT608(x)	Professional Elective:	Arch.	2	-	-	-	2	2	50	-	-	-	50
9	NCMC	BAT609	Physical Education (Sport &Athletics/Yoga & NSS)	PE/NSS	-	-	2	-	2	0	100	-	-	-	100
10	NCMC	BAT610	Study Tour	Arch	-	-	-	-	-	0	50	-	-	0	50
				Total	12		6	14	32	30	650		250	150	1050

PCC- Professional Core Courses
BSAE- Building Science & Applied Engineering Courses.
SEC - Skill Enhancement Course
HSMC - Humanity Sciences and Management Courses
AEC-Ability Enhancement Course
PEC-Professional Elective Courses
OEC- Open Elective Courses
NCMC - Non-Credit Mandatory Course

Progressive Assessment (Continuous Internal Evaluation) (CIE) to be awarded by the subject teacher.
Semester End Examination (SEE) will be conducted by DSATM.
Viva Voce examination shall be conducted jointly by one internal & one external examiner appointed by BOE-DSATM.
Minimum Marks to be Secured for Passing: In CIE for passing: 50% marks minimum
In Theory (SEE) exam, Term work/Viva Voce: 40% marks minimum
In aggregate (CIE+SEE) 50% minimum marks

PEC	BAT608(a)	Professional Elective: **Culture and Built Environment**
PEC	BAT608(b)	Professional Elective: **Geographical Information System**
PEC	BAT608(c)	Professional Elective: **Design Of High- Rise Buildings**

Percentage of Change in the Syllabus

5th Semester						
Sl.No	**Course Code**	**Course Name**	**Topics Added**	**Topics removed**	**Revised in %**	**Justification**
1	BAT501	Architectural Design-V	Nil	6th Sem Preview	2%	Focus on sustainable architecture, passive design strategies, and clearer integration of urban public building
2	BAT502	Materials & Methods in Building Construction V	Nil	Nil	0%	The core content was retained as these fundamental construction principles remain highly relevant
3	BAT503	History of Architecture-V	Antoni Gaudi, Chandigarh Capitol Complex, Hunstanton Secondary School, Leicester Engineering Building	Corporate Skyscrapers, Rockefeller Centre, Candela, IIT Campus	5%	revisions primarily focused on correcting and specifying more accurate Brutalist architectural case studies and introducing a modern pedagogical framework
4	BAT504	Sociology & Building Economics	Nil	Settlement origins, European/American slums, PRA/RRA techniques, Laws of returns	5%	The curriculum was condensed and localized to be more directly applicable to the students' immediate environment.
5	BAT505	Building Services –III	History of RAC, Computerized psychrometrics , Unit type equipment, AC Space data	Socio-environmental RAC issues, Specialized AC, Clean Rooms, Operation Theatres	20%	The curriculum was restructured to shift away from a socio-economic and environmental policy focus (like the ethics of coal mining and energy poverty) toward a more standard, technical, and calculation-based engineering approach to HVAC systems.
6	BAT506	Building structures-IV	Nill	Rigid frame selection, Steel manuals	5%	The curriculum was slightly condensed to streamline the module and reduce repetitive manual lookup tasks in favor of fundamental

						structural calculations and new interactive pedagogical activities.
7	BAT507	Building Information Modeling	Autodesk REVIT, AI Tools, Generative Design, Grasshopper 3D, 3D Printing	NURBS modelling, 3DS Max, Maya, VRay, Vector editing	30%	The curriculum underwent a major technological modernization, shifting focus away from traditional surface modelling and basic rendering toward cutting-edge, industry-standard workflows involving BIM, artificial intelligence, generative algorithms, and rapid physical prototyping.
8	BAT508(a,b,c)	Professional Electives	Nill	Nill	2%	Syllabus retained with only pedagogical enhancements and practical learning activities added without changes to core topics.
9	BAT509	Physical Education (Sports & Athletics/Yoga & NSS)	Nill	Nill	0%	Syllabus retained with only pedagogical enhancements and practical learning activities added without changes to core topics.

6th Semester

Sl.No	Course Code	Course Name	Topics Added	Topics removed	Revised in %	Justification
1	BAT601	Architectural Design-VI	Paramedical campuses, Arts and Architecture Colleges, Fashion Institutes, Masterplan detailing, Submission deliverables	Nill	5%	the minor revisions were made simply to broaden the variety of permissible institutional project typologies to include creative and healthcare-allied campuses, and to set explicit expectations for final design deliverables.
2	BAT602	Materials & Methods in Building Construction VI	Nill	Solar heat gain study, Night-time cooling, Life cycle environmental impacts, Climate	15%	The revision removes the heavy theoretical focus on environmental science and climate analysis to dedicate more academic hours strictly to the practical, technical detailing and fabrication aspects of building materials.

				stress narrative		
3	BAT603	Landscape Architecture	Taxonomy of plants, Botanical names, Classification of plants	Eastern landscape philosophies, Chinese/Japanese gardens, Mughal/Persian gardens, English/American parks	15%	The curriculum has been pivoted away from historical and regional garden philosophies to prioritize a more scientific, botanical foundation, ensuring students have the technical plant knowledge necessary for modern landscape practice.
4	BAT604	Contemporary Architecture	Nill	Pre-independence architecture, Princely States, Jaipur, Bikaner, Mysore	15%	The syllabus was revised to omit the historical study of pre-independence princely states and clock towers, allowing for a more concentrated focus on the evolution of post-independence modernism and its subsequent hyper-theories within the allotted credit hours.
5	BAT605	Building Services –IV (Acoustics & Noise Control)	Nill	Nill	0%	The core technical content and theoretical framework remain unchanged as the fundamental principles of acoustics and noise control are well-established; the revision was purely administrative, aimed at standardizing the curriculum into a modern format with clearly defined teaching hours and formalized pedagogy.
6	BAT606	Building structures-V	Nill	Airport terminal building project specification	5%	The curriculum was revised to remove the specific "Airport terminal" project constraint from Module 1 to allow for a more flexible choice of long-span building typologies while maintaining the rigorous structural analysis and design requirements across all major systems.
7	BAT607	Working Drawing-I	Nill	Nill	0%	The core technical content, project scope, and portfolio requirements remain identical as these represent the essential industry standards for architectural documentation; the revision focuses exclusively on formalizing the teaching-learning process by introducing modern pedagogical initiatives like blended learning and problem-

						solving workshops.
8	BAT608(a,b,c)	Professional Elective:	Nill	Nill	0%	Core concepts remain the same, but the new syllabus slightly expands them by adding applied aspects
9	BAT609	Physical Education (Sport &Athletics/Yoga & NSS)	Nill	Nill	0%	The syllabus was revised mainly to improve clarity, alignment with Outcome-Based Education (OBE), and structured module presentation
10	BAT610	Study Tour	Nill	Nill	0%	The syllabus was revised mainly to improve clarity, alignment with Outcome-Based Education (OBE), and structured module presentation

3rd Year

Semester	:	**5th**				
Course Title	:	**ARCHITECTURAL DESIGN - V**				
Course Code	:	**BAT501**				
Course Type (Theory/ Practical/ Integrated)	:	**Studio**				
Category	:	**PCC**				
Stream	:	**Arch**		**CIE**	:	**100 Marks**
Teaching hours/ week (L:T:P:S)	:	**0:0:0:8**		**SEE**	:	**100 Marks**
Credits	:	**8**		**SEE Duration**	:	**Viva-Voce**

Course Learning Objectives: Students will be able

Sl. No	Course Objectives
1.	To understand the need for creating architecture as an envelope to system dependent program.
2.	To understand the use of green technologies and materials developed in other fields as a precursor to creating architecture.
3.	To identify and understand the role of sustainable systems and services in the design of buildings; significance of passive/natural cooling systems, material and construction techniques; climatic factors.
4.	Introduction to development Regulations (building byelaws and rules); circulation networks (people, vehicular access), site planning.
5.	To explore Computer Aided Design techniques to generate drawings and models to better understand envelopes and systems in architecture, including the impact of envelope design on building cooling energy needs.
6	To understand the (thematic) abstract, organic character of architecture (symbolism, aesthetics, identity) in the public domain; influence of environmental, socio-cultural, economic dimensions; user perception.

Teaching-Learning Process-

Pedagogy (General Instructions):

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

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

COURSE SYLLABUS

MODE OF STUDY:

3 component approach to the Design Studio:

1. **Literature review and case studies:** Learning from detailed study and analysis of building systems and envelopes (and understanding the underlying building physics of systems and envelopes),character of public buildings through literature review and visiting buildings in varied settings (urban, contemporary, permanent and temporary).
2. **Seminars**: Seminars are intended to review parallel academic studies completed up to and during 5th semester studies in Building Construction/ Structures/ history/ computer graphics, climatology/services and its importance and integration with the studio.
3. **Design Projects:** Studio projects shall emphasize the non-linear interdisciplinary design process encountered in Architectural design and the importance of other fields of knowledge in Architectural Design. The Design Studio will give prominence to bridging the gap between innovations in materials and techniques of construction. An essential part of the studio process should be peer reviews and reviews by consultants in the field of Structures, Utilities and Services.
4. The Design studio will also give importance to include and encourage the use of passive design features, natural cooling systems, sustainable active cooling system using natural and low global warming potential refrigerants, vernacular, local, and low embodied energy/carbon materials and sustainable water, waste management systems.

Assignment-1: Case Study

1. Detailed review of each of the building types: retail/hospitality/transport/traditional informal market. Students are split into four groups; each group assigned to perform a case study of one building type. Short study trips to observe, discuss and document building types: retail/hospitality/transport/markets, building projects in the vicinity of their colleges.
2. The emphasis should be on conceptual understanding and accurate measured drawing.
3. Attention should be given to Structures, Utilities and Services and Sustainable and Passive energy systems.
4. Sketches and documentation should show observations and inferences from the studies.

Assignment-2: Seminars

1. Overview by a PHE, MECH/Elec., HVAC (including sustainable HVAC technologies including radiant cooling, direct evaporative and indirect evaporative cooling, structure cooling, vapor absorption cooling and natural refrigerant air conditioning), firefighting, storm water, water recycling, waste and solar consultant on what to expect and practical rules of thumb to help students plan.
2. Overview by a Structural consultant on large span structural systems in parallel academic studies of 5th semester in Materials and Methods in Building Construction – V
3. Discussion on innovations in green sustainable materials and techniques of construction and passive energy systems.

Assignment-3: Projects

- One major project and one minor/time problem to be tackled in the semester.
- Projects shall be of urban scale with multiple functions and a need for imagery as one of the architectural goals. It encompasses response to the local context, locally adapted passive design features and cooling systems, natural cooling systems, materials and sustainable architectural design
- Museums, art galleries, theme-based hotels, transport interchanges terminals and shopping, Industrial structures areas can be chosen.
- Project work could be done in 3 stages of activity interspersed with seminars.
    1. Introduction to the initial design parameters which include choice of;
        a. Geography/situation (context),
        b. User Group/development model,
        c. Development guidelines (byelaws).
    2. The design shall be sensitive to the needs of disabled, aged people and children.
    3. The Approaches and strategies to address issues of community, public and private realms, edge conditions, communication, and connectivity. This could result in the generation of diagrams/models exploring attitudes to site, allocation of built and unbuilt volumes and communication and connectivity.
    4. The design shall also be sensitive to existing social and economic systems at the site for e.g. existing informal settlements, markets, land usage patterns, etc. The design should consider the existing site complexes and issues and inclusive of the same.
    5. The student shall consider appropriate application of passive design principles (ventilation, insulation, shading, thermal mass etc.), passive, natural and sustainable cooling systems along with sustainable active cooling systems.
    6. It is recommended that site sizes should not be larger than 3 acres to allow for intensive study. However the Design studio faculty shall determine the extent of the site size.
    7. Projects shall be of urban scale with multiple functions; identity of public building (aesthetics, symbolic character, meaning, and environmental response) will be one of the architectural goals.
    8. Recommended design projects are: Museums, art galleries, theme- based hotels, transport interchanges terminals, shopping areas, informal markets etc. Design emphasis shall be on the use of innovations in green materials and techniques of construction.
    9. Project shall be attempted with utilities and service dominant buildings with a focus on sustainable systems like pharmaceutical manufacturing units or medical facilities or traditional skill-based workshops or communities e.g., weaving potter community, waste picker community, etc.. Consultants in the field of utilities and services shall be called as part of studio review.
    10. Alternatively, projects involving large span structures like industrial structures may be attempted. Design emphasis shall be on the skins and support of structural systems and resulting architectural form, space, and experience.

NOTE:

- One major project and one minor/ time problem to be tackled in the semester.
- Detailing of architectural features of the major project like entrance lobby, skylights and staircases has to be attempted.
- Submission shall comprise duly drawn/drafted site plans, elevations, section views, models etc.

List of Programs:

Sl. No.	Experiments/Programs	COs
1	Exercise/Field Study	CO1, CO3, CO4
2	Seminar/Workshop	CO1, CO2, CO4
3	Group/Studio Exercise	CO1, CO3, CO4
4	Minor Design Project	CO2, CO3
5	Major Design Excercise	CO1, CO2, CO4
Value Added Programs		
1	Integrated Sustainable Building Systems" – Certificate Workshop Series	

Reference Books	
S.No.	**Books (Title of the Book/Name of the author/Name of the publisher/Edition and Year)**
1	Richard Patrick Parlour (200); "Building services: A Guide to Integrated Design: Engineering for Architects"; 3rd Edition - Integral Publishing.
2	Paul Tymkow; Building Services Design for Energy Efficient Buildings.
3	Russell Fortmeyer, Charles Linn; Kinetic Architecture: Designs for Active Envelopes.
4	Michael Fox; Interactive Architecture: Adaptive World (Architecture Briefs).
5	Prof. A.K.Bansal ; Solar Passive Design.

Weblinks and Video Lectures (e-Resources)	
1	https://ndl.iitkgp.ac.in
2	https://www.youtube.com/watch?v=rRtFCvzf-Ow
3	https://www.youtube.com/watch?v=5DsP-qH_PBM
4	https://www.youtube.com/watch?v=c2FYFuML71Y
5	https://www.youtube.com/watch?v=26QcRDAGWLY

Course Outcomes: At the end of the course, the student will be able to:

CO	Course Outcomes	RBT Level	Level Indicator
CO1	**Understand** the key principles and concepts of building architecture, including the significance of architectural envelopes for system-dependent programs, and recognize the use of green technologies and materials from other fields as precursors to architectural design.	L1, L2	Remember, understand
CO2	**Apply** the principles of development regulations, building bylaws, and rules in the context of architectural design and the knowledge of circulation networks for both people and vehicular access to site planning.	L3	Apply
CO3	**Analyze** the impact of envelope design on a building's cooling energy requirements and the influence of environmental, socio-cultural, and economic dimensions on architectural design and user perception.	L4	Analyse

CO4	**Evaluate** the significance of incorporating passive/natural cooling systems and the effectiveness of sustainable systems and services in the design of buildings, thus the impact of architectural design on user perception and the public domain.	**L5**	**Evaluate**
CO5	**Create** innovative and contextually relevant architectural designs that integrate green technologies and materials, using Computer-Aided Design techniques that reflect thematic, abstract, and organic characteristics while considering environmental, socio-cultural, and economic dimensions.	**L6**	**Create**

Mapping of Course Outcome to Program Outcome: *(75%-100%=3 ; 50%-74% = 2 ; Below 50 = 1)*

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1						3									
CO2	3				2				2					1	
CO3		3				3	3								
CO4				3		2				2					
CO5			3			3	3						2		

Assessment Pattern (Both CIE and SEE)

6 Credit Course PCC

Assessment Method	Component	Type of Assessment	Assessment Type used	Max. Marks	Evaluation Details	Reduced Marks	Min. Marks	Total
CIE	Studio Assessment	AAT	Progressive Work- (Sheets)	50	Regular on time discussion + Incorporation of changes in design + Presentation skills, Accuracy, Details, Architectural Drawings.	25		25
			Group Work	20	Case study + Site analysis Presentation skill and coordination	15		15
			Site Visits	10				
			Progressive Models	20	Presession, Materials and Scale.	10		10
			Intermediate reviews	20	Completion of work, Presentation skills, Communication of ideas, Design	10		10
					Total CIE Studio			**60**
	Panel Review	Viva Voce	Review	50	Presentation skills, Communication of ideas, Design	25		40
			Final Portfolio + Models	30	She Presentation, Accuracy, Details, Architectural Drawings. etc, presentation	15		
					Total CIE Review			**40**

					CIE	**50**	**100**
SEE	**External Viva Voce**	**100**	Portfolio + Model + Review		**40**	**100**
				CIE+SEE	**100 + 100**	**200**

NOTE: The Minimum Marks to be secured in CIE to appear for SEE shall be 50 (50% of Maximum marks – 100) in the Studio Assessment and Internal Review and 40 (40% of Maximum Marks -100) in the External Viva Voca. The total of CIE + SEE shall be a minimum of 100 (50% of Maximum Marks -200).

CIE- Continuous Internal Evaluation (100 Marks)

Bloom's Category	**STUDIO**	
	Studio Assessment	**Panel Review**
	60 Marks	**40 Marks**
Remember	10	
Understand	10	
Apply	10	10
Analyse	10	10
Evaluate	10	10
Create	10	10

Course Contents and Lecture Schedule:

Module No.	**Topics**	**No. of Lectures**
1	Introductory assignment/holiday assignment	8 Hrs
2	Minor Project	30 Hrs.
3	Review- Minor project	8 Hrs.
4	Study Model	8 Hrs
5	Major Project (including case study & literature study)	54 Hrs.
6	Final external Review	8 Hrs.
	Total	**120 Hrs.**

Semester	:	**5th**			
Course Title	:	**MATERIALS AND METHODS IN BUILDING CONSTRUCTION-V**			
Course Code	:	**BAT502**			
Course Type (Theory/ Practical/ Integrated)	:	**Integrated**			
Category	:	**BSAE** (Building Science & Applied Engineering Courses)			
Stream	:	**Architecture**	**CIE**	:	**50 Marks**
Teaching hours/ week (L:T:P:S)	:	**1:0:0:3**	**SEE**	:	**100 Marks**
Credits	:	**04**	**SEE Duration**	:	**4 Hrs.**

Course Learning Objectives: Students will be able to:

Sl.No	Course Objectives
1	To acquaint the students with construction practices pertaining to RCC framing systems, and other building elements such as metal doors and windows (In Steel and Aluminium)

Teaching-Learning Process

Pedagogy (General Instructions):

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

1. **Integration of Theory and Practice:** Emphasize the practical application of theoretical knowledge by incorporating hands-on activities, case studies, and site visits to enhance understanding of building materials and construction methods.
2. **Demonstration and Visual Aids:** Utilize visual aids, such as diagrams, illustrations, and multimedia presentations, to enhance the understanding of different building materials, construction techniques, and structural elements.
3. **Active Learning and Collaborative Discussions:** Encourage active learning through group discussions, brainstorming sessions, and problem-solving activities to foster critical thinking and deeper understanding of the subject matter.
4. **Real-life Examples and Case Studies:** Incorporate real-life examples and case studies to demonstrate the relevance and practicality of the concepts covered in the modules. This can include showcasing, contemporary architectural projects, and sustainable construction practices.
5. **Assessment through Projects and Presentations:** Assign projects and presentations that require students to apply their knowledge and skills acquired during the modules.
6. **Continuous Feedback and Assessment:** Provide regular feedback and assessment to students throughout the learning process to monitor their progress and address any misconceptions or gaps in understanding.
7. **Encouraging Research and Exploration:** Encourage students to explore additional resources, conduct research, and stay updated with the latest advancements in building materials and construction methods, fostering a sense of curiosity and lifelong learning.

DSATM

Scheme of Teaching and Examinations for B Arch Programme -2024-25
Outcome Based Education and Choice Based Credit System (CBCS)
(Effective from the Academic Year 2024-25)

COURSE SYLLABUS

Module No.	Contents of the Module	Hours
1	1) Introduction to Steel plane Trusses: Construction of Steel trusses for various spans, ridged truss, saw tooth truss with lattice girders, roof lighting, aluminum sheet and profiled MS sheet cladding and roof fixing details. Energy intensiveness and recyclability of steel as a material can be studied. 2) Detailing of Steel trusses: Tubular and L-angle trusses with 8-16m spans.	10
Pedagogy	Minimum one plate on each construction topic. Site visits to be arranged by studio teachers. Study of material application in the form of portfolio.	
2	3) Introduction to pre-engineering metal buildings - its manufacturing and assembly process, details, market study and most importantly the materials energy intensiveness and its impact on the environment. 4) Detailing of a Pre-engineered building: Including Roof fixing details with aluminum sheet and profiled MS sheet cladding. 5) Introduction to large span roofs: Shell roof, vaults folded plate, geodesic domes, space frame, tensile structures, pneumatic structures, etc.	10
Pedagogy	Minimum one plate on each construction topic. Site visits to be arranged by studio teachers. Study of material application in the form of portfolio.	
3	6) Detailing of hyperbolic paraboloid shell roof: Principles and methods of construction including form-work techniques and reinforcement details. 7) Detailing of folded plate and cylindrical shell roof: Principles and methods of construction including form-work techniques and reinforcement details. 8) Detailing of a geodesic dome: Principles and methods of construction with explorations using physical models.	10
Pedagogy	Minimum one plate on each construction topic. Site visits to be arranged by studio teachers. Study of material application in the form of portfolio.	
4	9) Detailing of a space frame; Principles and methods of construction with explorations using physical models. 10) Tensile structures and pneumatic structures: Principles and methods of construction with explorations using physical models.	10
Pedagogy	Minimum one plate on each construction topic. Site visits to be arranged by studio teachers. Study of material application in the form of portfolio.	
5	11) Plastics as a building material: types, properties, use, energy intensiveness, environmental impact assessment and recycling and up cycling of plastics such as polycarbonates, acrylics, PVC polymer films, and fibre reinforced plastic. Application and details. 12) Waterproof components: Water Proofing elements, construction chemicals and additives, adhesives, Polystyrenes, sealants. Detailing of waterproofing of basement, toilets, terrace garden, plaster of Paris, gypsum, French drains etc.	10

	13) Environment friendly materials: Bamboo, Adobe, Stabilised Mud Block, Green innovations and materials developed out of waste, sustainable materials available in the current market, study of case studies of sustainable institutional/public buildings. Designing and detailing utilising above materials.	
Pedagogy	Minimum one plate on each construction topic. Site visits to be arranged by studio teachers. Study of material application in the form of portfolio.	

List of Sheet work for portfolio:

Sl.No	Sheet Work with miniature models	COs
1	Sheet: **Introduction to Steel Trusses:** Principles and methods of construction including detailing of joints	**CO1**
2	Sheet: **Detailing of L Angle Truss:** Principles and methods of construction including detailing of joints	**CO1, CO2**
3	Sheet: **Detailing of Tubular Truss:** Principles and methods of construction.	**CO1, CO2**
4	Sheet**: Pre Engineered Building** : Principles and methods of construction Including Roof fixing details with aluminum sheet and profiled MS sheet cladding.	**CO1, CO2**
5	Sheet: **Hyperbolic Paraboloid Shell Roof:** Principles and methods of construction including form-work techniques and reinforcement details.	**CO2**
6	Sheet: **Cylindrical Shell Roof:** Principles and methods of construction including form-work techniques and reinforcement details.	**CO2, CO3**
7	Sheet: **Folded Plate:** Principles and methods of construction including form-work techniques and reinforcement details	**CO2, CO3**
8	Sheet: **Geodesic Dome**: Principles and methods of construction with explorations using physical models.	**CO2, CO3**
9	Sheet: **Space Frame:** Principles and methods of construction with explorations using physical models.	**CO3, CO4**
10	Sheet: **Pneumatic Structures**: Principles and methods of construction with explorations using physical models.	**CO3, CO4**
11	Sheet: **Tensile Structures:** Principles and methods of construction with explorations using physical models.	**CO1, CO2, CO3**

Reference Books	
S.No.	**Books (Title of the Book/Name of the author/Name of the publisher/Edition and Year)**
1	Chudley , Construction Technology, ELBS, 1993
2	Barry, Construction of Buildings, East West Press, 1999

Weblinks and Video Lectures (e-Resources)	
1	https://ndl.iitkgp.ac.in
2	https://www.youtube.com/watch?v=m3WsWcObNJo
3	https://www.youtube.com/watch?v=kFjhz9aEvdo
4	https://www.youtube.com/watch?v=nukB3qDckaE

Course Outcomes: At the end of the course, the student will be able to:

CO	Course Outcomes	RBT Level	Level Indicator
CO1	Remember & understanding the advanced RCC roofing systems, aspect of structural system and their uses in building industry, Steel as building material and their uses like L Angle Trusses and Tubular Trusses	L1,L2	Remember, understand
CO2	Applications of different RCC roofing systems, in building industry, Cylindrical Roof Shells, Hyperbolic Paraboloid, Folded Plate	L3	Apply
CO3	How to Analyse and detail the advanced RCC roofing systems in building industry, Geodesic and Space Frame.	L4	Analyze
CO4	To evaluate the appropriate system, design and detail the structural elements of Pneumatic and Tensile Structures.	L5	Evaluate

Mapping of Course Outcomes to Program Outcomes: *(75%-100%=3 ; 50%-74% = 2 ; Below 50 = 1)*

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1						1						2		2	
CO2	2		3						1						
CO3		3		3			2						2		
CO4					3			2							3

Assessment Pattern (both CIE and SEE)

4 Credit Course – BSAE

Assessment Method	Component	Type of Assessment	Assessment Type used	Max. Marks	Evaluation Details	Reduced Marks	Min. Marks	Total
CIE	Studio	Continuous Assessment Tool	Sheet work/ Portfolio and Models	40	Accuracy and Completeness of Construction Drawing Sheets **(20 marks)** Documentation and Portfolio **(10 marks)** Quality and Presentation of Construction Models **(10 marks)**	20		20
		Internal Assessment test	IAT 1	50	Internals paper	20		20
			IAT 2	50	Internals paper			
	Theory	AAT	Seminar/ Case Study Presentations	10	Knowledge and understanding **(6 marks)** Presentation Skills **(3 marks)** Engagement and Interaction **(1 mark)**	5		5
		AAT	MCQ/Quiz	10	--	5		5
					Total CIE Marks		**25**	**50**
SEE				**100**	SEE Exam is theory exam, conducted for 100 marks.	**100**	**40**	**100**

				CIE+SEE	75	150
	NOTE: The Minimum Marks to be secured in CIE to appear for SEE shall be 25 (50% of Maximum marks – 50). The Minimum Marks to be secured in SEE shall be 40 (40% of Maximum marks – 100). The activities/experiments/assignments/Portfolios will be assessed through only CIE. The passing percentage shall not be less than the 50% in aggregate for a course (i.e. CIE and SEE (put together). Based on the marks scored in CIE+SEE grading will be awarded for this course.					

CIE- Continuous Internal Evaluation (50 Marks)

Bloom's Category	Studio		Theory	
	Continuous Assessment Tool	Internal Assessment Tool (IAT)	Alternative Assessment Tool (AAT)	
	Sheet Work and portfolio	Internal Papers	Seminar/ Case Study Presentations	MCQ/Quiz
	20 Marks	20 Marks	5 Marks	5 Marks
Remember	6	4	1	2
Understand	6	4	1	2
Apply	3	4	1	1
Analyse	3	4	2	-
Evaluate	2	4	-	-

CIE Internal Assessment Test Plan

CO's	Marks Distribution					Total Marks	Weightage
	IAT-1			IAT-2			
	Module-1	Module-2	Module-3	Module-4	Module-5		
CO1	2	2	2	2	2	10	20%
CO2	4	4	4	4	4	20	40%
CO3	2	2	2	2	2	10	20%
CO4	2	2	2	2	2	10	20%
Total	10	10	10	10	10	50	100 %

SEE- Semester End Examination (100 Marks)

Bloom's Category	SEE Marks
Remember & understand	30
Apply	30
Analyse	20
Evaluate	20

SEE Course Plan

CO's	Marks Distribution					Total Marks	Weightage
	Module-1	Module-2	Module-3	Module-4	Module-5		
CO1	6	6	6	6	6	30	25 %
CO2	6	6	6	6	6	30	25 %
CO3	4	4	4	4	4	20	25 %
CO4	4	4	4	4	4	20	25 %
Total	20	20	20	20	20	100	100 %

Course Contents and Lecture Schedule

Module No.	Topics	No. of Lecture Hrs.
1	1. Introduction to Steel Trusses: 2. L Angle Truss 3. Tubular Truss	10
2	4. Pre-Engineered Building 5. Hyperbolic Paraboloid Shell Roof	10
3	6. Cylindrical Shell Roof 7. Folded Plate	10
4	8. Geodesic Dome 9. Space Frame	10
5	10. Tensile Structures 11. Pneumatic Structures	10
6	Recapitulation of key concepts and topics covered in the previous modules. Practice exercises and discussions to reinforce learning. • Assessment of students' understanding through quizzes, assignments, or presentations. • Project work and presentations related to the topics covered throughout the course. Evaluation and feedback.	10
	Total	**60 Hrs.**

Semester	:	**5th**			
Course Title	:	**History Of Architecture V**			
Course Code	:	**BAT503**			
Course Type (Theory/ Practical/ Integrated)	:	**Theory**			
Category	:	**PCC**			
Stream	:	**Architecture**	**CIE**	:	**50 Marks**
Teaching hours/ week (L:T:P:S)	:	**3:0:0:0**	**SEE**	:	**100 Marks (Reduced to 50 Marks)**
Credits	:	**03**	**SEE Duration**	:	**3 Hrs.**

Course Learning Objectives: Students will be taught

S.No	Course Objectives
1	**Developing a critical understanding of Western architectural traditions:** Through analyzing and comparing Architecture Styles from the Renaissance to the Modern Movement.
2	**Learning ethical and sustainable Practices:** Learning from historical practices that prioritized local materials and sustainable methods and applying these lessons to modern sustainable design practices, and an understanding of the ethical implications of architectural design and the responsibility of architects to preserve cultural heritage.
3	**Building a visual vocabulary of Western architectural styles:** By studying representative buildings and typologies from each period, students will develop a strong visual vocabulary of Western architecture.

Teaching-Learning Process

Pedagogy (General Instructions):

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

1. Lecture method (L) does not mean only the traditional lecture method, but a different type of teaching method may be adopted to develop the outcomes.
2. Show Video/animation films to explain the infrastructures and the mechanism involved in the principle.
3. Encourage collaborative (Group) Learning in the class.
4. Ask at least three HOT (Higher-order Thinking) questions in the class, which promotes critical thinking.
5. Adopt Problem Based Learning (PBL), which fosters students' Analytical skills, develop thinking skills such as the ability to evaluate, generalize, and analyse information rather than simply recall it.
6. Topics will be introduced in multiple representations.
7. Show the different ways to solve the same problem and encourage the students to come up with their own creative ways to solve them.

DSATM

Scheme of Teaching and Examinations for BE Programme -2025-26
Outcome Based Education and Choice Based Credit System (CBCS)
(Effective from the Academic Year 2025-26)

COURSE SYLLABUS

Module No.	Contents of the Module	Hours
1	1. **Introduction to Renaissance Architecture:** Background and influences on Renaissance Architecture. Characteristics of Renaissance Architecture in general. Monumental, public and residential spaces. 2. **Renaissance Architecture Examples:** St Andrea, Mantua and Palazzo Rucellai by Leon Alberti, Villa Rotunda (Capra) by Palladio, (New) St Peter's Rome by Michelangelo, St Paul s London by Sir Christopher Wren. Baroque Architecture: General characteristics of Baroque. Eg: St Piazza by Bernini. Monumental, public and residential spaces. 3. **1750-1900 Transitional Period Architecture:** A brief account of the situation before the changeover to Modern architecture in Europe. Palladian Revival in Britain, Greek revival and Gothic Revival. Transitional Period Examples: Chiswick House, London, Mere worth castle, Kent, St Pancras Church, London, West Minister Palace, London, Arc de Triomphe, Paris. Monumental, public and residential spaces.	12
Pedagogy	• Case studies by analyzing iconic buildings from each period and engage students in design exercises where they create structures inspired by these periods, translating historical principles into contemporary solutions. • Compare examples quoted to known structures, focusing on spatial organization, light, engineering, climate and material usage. • Utilize 3D modelling software to explore historical structures virtually. • Explore online resources like historical building databases and virtual tours of archaeological sites.	
2	4. **Impact of Industrial Revolution in Europe:** The Social, economic and political changes effected, new requirements, functions, new materials and technological developments. New prototypes- Ex. Bridges, Expositions, Factories and Railway Stations-Use of metal and glass palace. 5. **Early Modern Architecture I:** Modern Movement-Arts and crafts, Art-Nouveau, Italian Futurism, The Chicago School and rise of early skyscrapers -Ex Monadnock building, Carson Pierre Scott, Antoni Gaudi.	12
Pedagogy	• Case studies by analysing iconic buildings from each period and engage students in design exercises where they create structures inspired by these periods, translating historical principles into contemporary solutions. • Compare examples quoted to known structures, focusing on spatial organization, light, engineering, climate and material usage. • Utilize 3D modelling software to explore historical structures virtually. • Explore online resources like historical building databases and virtual tours of archaeological sites.	
3	6. **Early Modern Architecture II:** Destijl movement, Bahaus School of Thought- Examples for the above movements for Public and private spaces and monumental approach. 7. **Modern Architecture III:** Influence of concepts and ideas generated by FL Wright – (Robie House, Falling Waters, Guggenheim Museum, Johnson	14

	Wax Tower). Le Corbusier (Villa Savoy, Domino House, five points of Architecture), Mies Van der Rohe (Less is more, minimalism, Glass and steel tower – Seagram). 8. **Modern Architecture IV:** Walter Gropius (Bahaus building, Fagus shoe Factory, Harward campus), Louis Sullivan (Chicago Auditorium, Wain Wright Building), Alvar Aalto and his works.	
Pedagogy	• Case studies by analysing iconic buildings from each period and engage students in design exercises where they create structures inspired by these periods, translating historical principles into contemporary solutions. • Compare examples quoted to known structures, focusing on spatial organization, light, engineering, climate and material usage. • Utilize 3D modelling software to explore historical structures virtually. • Explore online resources like historical building databases and virtual tours of archaeological sites.	
4	9. **Modern Architecture V:** International style- Works of Eero Sarinen (TWA and Kennedy Airports), Richard Neutra (Lovell Beach House), Phillip Johnson (Glass House, Museum Building), Oscar Niemeyar (Work in Brazilia- Legislature building and Church). 10. **Modern Movement-VI:** New Ideas Archigram (Walking City, Floating City etc), Kenzo Tange (Japan-Floating City and Shimbon Office Building), Moshe Safdie (Housing in Isreal), Sir Buck Minster Fuller (US Pavilion in Expo-67, Dymaxion Car, Bucki Dome).	**12**
Pedagogy	• Case studies by analysing iconic buildings from each period and engage students in design exercises where they create structures inspired by these periods, translating historical principles into contemporary solutions. • Compare examples quoted to known structures, focusing on spatial organization, light, engineering, climate and material usage. • Utilize 3D modelling software to explore historical structures virtually. • Explore online resources like historical building databases and virtual tours of archaeological sites.	
5	11. **Modern Movement-VII:** Brutalism- Works of Le Corbusier (Unité d'habitation, Chandigarh Capitol Complex, Church of Notre Dame du Haut in Ronchamp), Peter and Allison Smith (Hunstanton Secondary Modern School, Norfolk and The Economist Cluster, London), James Sterling (The Leicester Engineering Building, The Bookshop Pavilion in Venice). 12. **Modern Movement-VIII:** Constructivist movement, Modernism and works of Vladimir Tatlin, Contributions of Engineers like Pierre Luigi Nervi (Rome Olympic Buildings, Pirelli Tower in Italy), Gustave Eiffel (Eiffel Tower, bridges, Statue of Liberty base).	**10**
Pedagogy	• Case studies by analysing iconic buildings from each period and engage students in design exercises where they create structures inspired by these periods, translating historical principles into contemporary solutions. • Compare examples quoted to known structures, focusing on spatial organization, light, engineering, climate and material usage. • Utilize 3D modelling software to explore historical structures virtually. • Explore online resources like historical building databases and virtual tours of archaeological sites.	

List of Exercises

Sl.No	Exercises	COs
1	Sketching and Study models	CO2, CO4
2	Digital Presentation	CO1, CO5
3	Indian status during similar time frame – Case Study	CO3, CO4

Reference Books	
S.No.	**Books (Title of the Book/Name of the author/Name of the publisher/Edition and Year)**
1	Fletcher, Bannister; "A History of Architecture"
2	Frampton Kenneth; "Modern Architecture – A Critical History
3	Siegfried Gideon; "Time, Space and Architecture"

Weblinks and Video Lectures (e-Resources)	
1	https://ndl.iitkgp.ac.in
2	https://www.youtube.com/watch?v=1ek1SI1oAwU
3	https://www.youtube.com/watch?v=sY7ZpGriNZA
4	https://www.youtube.com/watch?v=8iGx5Z6CW9w
5	https://www.youtube.com/watch?v=h-MXnqqNfOY

Course Outcomes: At the end of the course, the student will be able to:

CO	Course Outcomes	RBT Level	Level Indicator
CO1	**Identify and describe** the key architectural characteristics, figures, and movements in the history of architecture from architectural currents of Western Architecture during Renaissance, Baroque, Neo Classical and Modern periods.	L1, L2	Remember and Understand
CO2	**Apply** the principles of design and architectural features of buildings through the historical and cultural contexts that shaped the development of different architectural styles and movements.	L3	Apply
CO3	**Analyze** the significance of architectural works from architectural currents of Western Architecture during Renaissance, Baroque, Neo Classical and Modern periods, providing well-supported critiques of their design principles, aesthetic qualities, and cultural impacts.	L4	Analyze
CO4	Critically **evaluate** the evolution and influence of architectural styles from architectural currents of Western Architecture during Renaissance, Baroque, Neo Classical and Modern periods, identifying the social, cultural, and technological factors that shaped these styles.	L5	Evaluate
CO5	Integrate knowledge of historical architectural principles and typologies to **create** innovative design solutions that respect and reflect historical contexts.	L6	Design

Mapping of Course Outcomes to Program Outcomes: *(75%-100%=3 ; 50%-74% = 2 ; Below 50 = 1)*

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1															
CO2	2														
CO3															
CO4						1									2
CO5			3		1							2	3		

Assessment Pattern (both CIE and SEE)

3 Credit Course – PCC

Assessment Method	Component	Type of Assessment	Assessment Type used	Max. Marks	Evaluation Details	Reduced Marks	Min. Marks	Total
CIE	Studio Assessment	AAT	Exercises	50	Presentation, Analysis, Design, Communication	25		25
	Internal Assessment Test	IAT	IAT 1	50	Internals paper	25		25
			IAT 2	50	Internals paper			
						Total CIE Review	25	50
SEE			Exam	100	Question Paper	50	20	50
						CIE+SEE	50	100

NOTE: The Minimum Marks to be secured in CIE to appear for SEE shall be 25 (50% of Maximum marks – 50). The Minimum Marks to be secured in SEE shall be 20 (40% of Maximum marks – 50). The activities/experiments/assignments/Portfolios will be assessed through only CIE. The passing percentage shall not be less than the 50% in aggregate for a course (i.e. CIE and SEE (put together). Based on the marks scored in CIE+SEE grading will be awarded for this course.

CIE- Continuous Internal Evaluation (50 Marks)

Bloom's Category	Theory		
	Studio Assessment	Internal Assessment Test	
		IA-1	IA-2
	25 Marks	25 Marks	
Remember		5	
Understand	5	5	
Apply	5	7	
Analyse	5	8	
Evaluate	5		
Create	5		

CIE Internal Assessment Test Plan

CO's	Marks Distribution					Total Marks	Weightage
	Test-1		Test-2				
	Module-1	Module-2	Module-3	Module-4	Module-5		
CO1	5					5	20%
CO2		5				5	20%
CO3			5			5	20%
CO4				5		5	20%
CO5					5	5	20%
Total	5	5	5	5	5	25	100%

SEE- Semester End Examination (50 Marks)

Bloom's Category	SEE Marks
Remember	8
Understand	7
Apply	5
Analyse	5
Evaluate	
Create	

SEE Course Plan

CO's	Marks Distribution					Total Marks	Weightage
	Module-1	Module-2	Module-3	Module-4	Module-5		
CO1	5					5	20%
CO2		5				5	20%
CO3			5			5	20%
CO4				5		5	20%
CO5					5	5	20%
Total	5	5	5	5	5	25	100%

Course Contents and Lecture Schedule

Module No.	Topics	No. of Lectures
1	Introduction to Renaissance Architecture	3
1	Renaissance Architecture	3
1	1750-1900 Transitional Period Architecture	3
2	Impact of Industrial Revolution in Europe	4
2	Early Modern Architecture I	4
3	Early Modern Architecture II	4
3	Modern Architecture III	6
3	Modern Architecture IV	6
4	Modern Architecture V	3
4	Modern Architecture VI	3
5	Modern Architecture VII	3
5	Modern Architecture VIII	3
	Total	**45 Hrs**

Semester	:	**5th**				
Course Title	:	**Sociology & Building Economics**				
Course Code	:	**BAT504**				
Course Type (Theory/ Practical/ Integrated)	:	**Theory**				
Category	:	**HSMC**				
Stream	:	**Architecture**		**CIE**	:	**50 Marks**
Teaching hours/ week (L:T:P:S)	:	**3:0:0:0**		**SEE**	:	**100 Marks (Reduced to 50 Marks)**
Credits	:	**03**		**SEE Duration**	:	**3 Hrs.**

Course Learning Objectives: Students will be able to:

Sl. No	Course Objectives
1	Develop a foundational understanding of key sociological and economic theories and how they relate to architecture and the built environment.
2	Examine how social and economic structures shape architectural practices and, in turn, how architecture influences societal and economic conditions.
3	Critically assess prevailing social and economic narratives, identifying biases and their implications for architectural decision-making.
4	Apply sociological and economic insights to propose architectural solutions that contribute to social justice, equity, and sustainable development.

Teaching-Learning Process

Pedagogy (General Instructions):

Some sample strategies to accelerate the attainment of various course outcomes are listed below:

1. Use of theory, activities, sketches, drawings, assignment and tutorial for teaching.
2. Site visits as per the topic for better understanding the distribution systems.
3. Making physical models and doing role play of the topics helps in good visualization.
4. Evaluation by quiz, tests, classroom activities.
5. Devise innovative pedagogy to improve **Teaching-Learning Process (TLP)**.

DSATM

Scheme of Teaching and Examinations for BE Programme -2025-26

Outcome Based Education and Choice Based Credit System (CBCS)

(Effective from the Academic Year 2025-26)

COURSE CURRICULUM

Module No.	Topics	Hours
1	1. **Introduction to Sociology:** Definition of Sociology; Nature, Scope and Utility of Sociology; Branches of Sociology; Relation of Sociology and its branches to architecture and the built environment. 2. **Elements of Society:** Biosocial and Socio-cultural associations; Difference between society and community; Different family structures and architectural responses to different family types in and outside India (examination of different housing typologies responding to different family types – traditional and contemporary); Relation between culture and built form (exploration of architectural examples.	9
Pedagogy	1) The teacher can use PPTs, Videos to discuss the concepts in sociology. 2) The students need to do assignments for better understanding of the concepts. 3) Quizzes, debates, seminars from students can be encouraged.	
2	3. **Urban and Rural Communities:** Definitions of the terms "urban" and "rural". The social, economic, ecological and spatial characteristics associated with urban and rural settlements Social, ecological and economic relations and interdependencies between urban and rural settlements. 4. **Cities and Society:** Urbanization: Definition, causes, and effects on rural and urban areas, including health, housing, and transportation. Migration: its types, their impact on city growth. Origin and the development of slums in different regions of India. Understanding cities as socio-ecological systems and study Governmental and non-governmental approaches to engaging with issues regarding slums in Indian cities. 5. **Social Research:** The need for research and its process. Methodology and methods of research, Types of research methods (qualitative, quantitative, and mixed), primary and secondary data sources, and key techniques like surveys, interviews, and case studies.	9
Pedagogy	1) The teacher can use PPTs, Videos to discuss the concepts in sociology. 2) The students need to do assignments for better understanding of the concepts. 3) Quizzes, debates, seminars from students can be encouraged.	
3	6. **Economics:** Definition of economics; Definitions of terms: Goods; Utility, Value, Price and Wealth. The relationship of economics with the built environment and land use. 7. **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	9

	service sectors. Factors of production: land, labour, capital and entrepreneurship. Relevance of factors of production to architecture and construction practice.	
Pedagogy	1) The teacher can use PPTs, Videos to discuss the concepts in sociology. 2) The students need to do assignments for better understanding of the concepts. 3) Quizzes, debates, seminars from students can be encouraged.	
4	8. **Economics and the market:** Production and Consumption, wants and needs and their characteristics. Concepts of economics: Opportunity cost; Laws of supply and demand, Standard of living. Analysis of the housing market in Indian cities to understand the dynamics of urban housing supply and demand in formal and informal settlements. Analysis of affordable housing.	**9**
Pedagogy	1) The teacher can use PPTs, Videos to discuss the concepts in sociology. 2) The students need to do assignments for better understanding of the concepts. 3) Quizzes, debates, seminars from students can be encouraged.	
5	9. **Urban land values:** Various social, ecological, and economic factors affecting the value of urban land in formal and informal spaces. Difference between land use and land cover. Studying the characteristics of developed land in the city and real estate development vision prevailing in cities (Activity 2). The Bid Rent theory that defines the relationship between location and land value. Theoretical city models based on land use and land value. 10. **Building Costs:** Cost and cost indices. Total cost of construction. Time value of money. Different sources of financing for buildings.	**9**
Pedagogy	1) The teacher can use PPTs, Videos to discuss the concepts in sociology. 2) The students need to do assignments for better understanding of the concepts. 3) Quizzes, debates, seminars from students can be encouraged.	
	Pedagogical Initiatives (Not limited to): • **Think Pair and Share (Blended Learning):** provides an opportunity for students to learn from one another. • Problem Solving: encourages cognitive thinking and enables creative problem solving. • **Poster Presentation:** allows students to represent the concepts visually in order to understand the topics easily. • **Case studies:** maps different domains in real time applications. • **Demonstration:** exhibits the implementation process.	

List of Activities:

Sl. No.	Activities	COs
1	**Introduction to life cycle costs of a building:** This aims to broaden the idea of costs beyond just money. It encourages thinking about the environmental impact of buildings along with their financial costs.	**CO1 & CO3**
2	**Initiating understanding towards economy driven development:** Students will read articles that challenge traditional ideas of city development and highlight the importance of focusing on people and the environment.	**CO1 & CO3**

Reference Books	
Sl. No.	**Title of the Book/Name of the author/Name of the publisher/Edition and Year**
1	Openstax College (2012) Introduction to Sociology. Openstax College.
2	Samuelson, P. and Nordhaus, W. (2010) Economics. Mcgraw-Hill Education.
3	Yin, Robert K. (2014) Case Study Research Design and Methods (5th Ed.). Thousand Oaks, CA:Sage.
4	Groat, Linda N. and David Wang (2013) Architectural Research Methods (2nd Ed.). John Wiley & Sons.
5	Jones, Paul (2011). The Sociology of Architecture: Constructing Identities. Liverpool, University Press.
6	Niva, V., Taka, M., &Varis, O. (2019). Rural-urban migration and the growth of informal settlements: A socio-ecological system conceptualization with insights through a "water lens". Sustainability, 11(12), 3487.
7	DePaul, M. (2012). Climate change, migration, and megacities: addressing the dual stresses of mass urbanization and climate vulnerability. Paterson Review of International Affairs, 12, 145-162.
8	Shah, A., &Lerche, J. (2020). Migration and the invisible economies of care: Production, social reproduction and seasonal migrant labour in India. Transactions of the Institute of British Geographers, 45(4), 719-734.
9	Marschall, S. (1998). Architecture as empowerment: The participatory approach in contemporary architecture in South Africa. Transformation, (35).
10	Mann, Thorbjoern (1992) Building Economics for Architects. Wiley.
11	Du Plessis, C. (2008). Understanding cities as social-ecological systems.
12	McHale, M. R., Pickett, S. T., Barbosa, O., Bunn, D. N., Cadenasso, M. L., Childers, D. L., ...& Zhou, W. (2015). The new global urban realm: complex, connected, diffuse, and diverse social-ecological systems. Sustainability, 7(5), 5211-5240.
13	Douthwaite, R. (1993). The Growth Illusion: How Economic Growth Has Enriched the Few, Impoverished the Many, and Endangered the Planet. Council Oak Books, 1350 East 15th Street, Tulsa, OK 74120. (Chp 14)
14	Gibson-Graham, J. K., Hill, A., & Law, L. (2016). Re-embedding economies in ecologies: resilience building in more than human communities. Building Research & Information, 44(7), 703-716.
15	Nagendra, H., Sudhira, H. S., Katti, M., &Schewenius, M. (2013). Sub-regional assessment of India: effects of urbanization on land use, biodiversity and ecosystem services. In Urbanization, biodiversity and ecosystem services: Challenges and opportunities (pp. 65-74). Springer, Dordrecht.
Web links and Video Lectures (e-Resources):	
1	https://ndl.iitkgp.ac.in
2	https://www.youtube.com/watch?v=azZ7cEa-V7A
3	https://www.youtube.com/watch?v=IUUgIE9HZLE&list=PLVLoWQFkZbhXhD4Aj5QnT1IBvPleHOM8e
4	https://www.youtube.com/watch?v=DQq-zJPSf4U

Course Outcomes: At the end of the course, the student will be able to:

CO	Course Outcomes	RBT Level	RBT Level Indicator
CO1	Understand the key sociological elements such as society, community, family, and culture, and their impact on architectural responses and housing typologies & grasp the economic principles including definitions of economics, goods, utility, and their relationship with the built environment.	Remember & understand	L1, L2
CO2	Apply sociological concepts to assess the architectural implications of different family structures and cultural influences on built forms and utilize economic theories such as supply and demand, opportunity cost, and land value theories to evaluate urban land use and real estate development.	Apply	L3
CO3	Critically analyze the growth and spatial patterns of settlements and communities, comparing urban and rural characteristics and their socio-economic implications and the dynamics of urban housing markets in Indian cities, considering factors like supply, demand, and affordability.	Analyse	L4
CO4	Evaluate the effectiveness of different economic systems (capitalism, socialism, communism) and their influence on architectural practices and land use in various contexts. Assess the social, ecological, and economic factors influencing urban land values and propose informed decisions regarding real estate development in cities.	Evaluate	L5

Mapping of Course Outcomes to Program Outcomes: *(75%-100%=3 ; 50%-74% = 2 ; Below 50 = 1)*

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1															
CO2	3														
CO3		3													
CO4				3											

Credits Course – Theory

Assessment Method	Component	Type of Assessments	Syllabus Coverage	Maximum Marks	Evaluation Details	Reduced Marks	Minimum Passing Marks	Total
CIE	Theory	Internal Assessment Test (IAT) - I	Module – 1, 2 & 3	50	Average of best 2 Internal test each of 50 Marks scale down the marks to 25 Marks	25		25
		Internal Assessment Test (IAT) - II	Module – 3, 4 & 5	50				
	Continuous Comprehensive	CCA-1- (group		50	Two CCA methods to be	25		25

	Assessment (CCA)	**presentations)** CCA-1- **(group presentations)**	Considering all the Modules	50	adopted as suggested by VTU.			
	Total CIE Theory					**50**	**25**	**50**
SEE		Theory exam	Entire theory syllabus in respective Modules	100	SEE Exam is theory Exam conducted for 100 Marks, scored Marks are scaled down to 50 Marks	50	20	**50**
CIE + SEE				100	----	----	50	100

NOTE: The Minimum Marks to be secured in CIE to appear for SEE shall be 25 (50% of Maximum marks – 50). The Minimum Marks to be secured in SEE shall be 20 (40% of Maximum marks – 50). The activities/experiments/assignments/portfolio will be assessed through only CIE. The passing percentage shall not be less than the 50% in aggregate for a course (i.e. CIE and SEE (put together). Based on the marks scored in CIE+SEE grading will be awarded for this course.

CIE- Continuous Internal Evaluation (50 Marks)

Bloom's Category	**Theory**			
	Continuous Assessment Tests		**Continuous Comprehensive Assessment (CCA)**	
	IAT-1	**IAT-2**	**CCA-1**	**CCA-2**
	50 Marks	**50 Marks**	**50 Marks**	**50 Marks**
Remember & understand	20	20	**-**	**-**
Apply	30	20	**20**	**-**
Analyse	-	10	30	20
Evaluate	-	-	-	30

CIE Course Assessment Plan

CO's	**Marks Distribution**						**Total Marks**	**Weightage**
	Test-1			**Test-2**				
	Module-1	**Module-2**	**Module-3**	**Module-3**	**Module-4**	**Module-5**		
CO1	**10**	**10**	**10**	**-**	**10**	**10**	**50**	**50%**
CO2	**10**	**10**	**-**	**10**	**-**	**-**	**30**	**30%**
CO3	**-**	**-**	**-**	**-**	**10**	**-**	**10**	**10%**
CO4	**-**	**-**	**-**	**-**	**-**	**10**	**10**	**10%**
Total	**20**	**20**	**10**	**10**	**20**	**20**	**100**	**100%**

SEE- Semester End Examination (50 Marks)

Bloom's Category	SEE Marks
Remember & understand	50%
Apply	20%
Analyse	20%
Evaluate	10%

SEE Course Plan

CO's	Marks Distribution					Total Marks	Weightage
	Module-1	Module-2	Module-3	Module-4	Module-5		
CO1	10	10	10	10	10	50	50%
CO2	10	10	10	-	-	30	30%
CO3	-	-	-	10	-	10	10%
CO4	-	-	-	-	10	10	10%
Total	20	20	20	20	20	100	100%

Course Contents and Lecture Schedule

Module No.	Topics	No. of Lecture hrs.
	Introduction to Sociology and Society	9
	Urban & Rural Sociology + Social Research	9
	Economic Systems and Built Environment	9
	Housing Economics and Urban Market Dynamics	9
	Land Economics and Construction Finance	9
	Total	**45**

Semester	**:**	**5th**				
Course Title	**:**	**Building Services –III (AIR-CONDITIONING, MECHANICAL TRANSPORTATION and FIRE PROTECTION)**				
Course Code	**:**	**BAT505**				
Course Type (Theory/ Practical/ Integrated)	**:**	**Theory**				
Category	**:**	**BSAE** (Building Science & Applied Engineering Courses)				
Stream	**:**	**Architecture**		**CIE**	**:**	**50 Marks**
Teaching hours/ week (L:T:P:S)	**:**	**3:0:0:0**		**SEE**	**:**	**100 marks (Reduced to 50 marks)**
				SEE Duration	**:**	**3 Hrs**
Credits	**:**	**3**				

Course Learning Objectives: Students will be able to:

Sl. No	Course Objectives
1	To provide a comprehensive understanding of the principles and applications of mechanical ventilation and air-conditioning systems in various built environments.
2	To develop the ability to apply thermodynamic and psychrometric concepts for designing effective thermal comfort systems in residential, commercial, and industrial spaces.
3	To analyze and evaluate different air-conditioning systems, including direct expansion (DX) systems, chilled water plants, and packaged units, for optimal performance and energy efficiency.
4	To design passive cooling systems and mechanical transportation systems (elevators, escalators, travelators) considering energy efficiency, sustainability, and safety standards.
5	To understand and apply fire safety principles for passive and active fire protection in buildings, following the National Building Code (NBC) and other relevant safety guidelines.

Teaching-Learning Process

Pedagogy (General Instructions):

Some sample strategies to accelerate the attainment of various course outcomes are listed below:

1. Adopt different teaching methods to attain the course outcomes.
2. Include videos to demonstrate various concepts in C.

3. Encourage collaborative (Group) Learning to encourage team building.
4. Ask at least three **HOTS (Higher-order Thinking Skills)** module-wise questions to promote critical thinking.
5. Adopt **Problem-Based Learning (PBL),** which fosters students' analytical skills, and develops thinking skills such as evaluating, generalizing, and analyzing information rather than simply recalling it.
6. Show different ways to solve a problem and encourage the students to come up with creative and optimal solutions.
7. Discuss various case studies to map with real-world scenarios and improve the understanding.
8. Devise innovative pedagogy to improve **Teaching-Learning Process (TLP)**.

DSATM

Scheme of Teaching and Examinations for BE Programme -2025-26

Outcome Based Education and Choice Based Credit System (CBCS)

(Effective from the Academic Year 2025-26)

COURSE CURRICULUM

Module No.	Topics	Hours
1	**MECHANICAL VENTILATION AND AIR-CONDITIONING - Introduction: Thermodynamics & History of RAC** **1) Introduction to Mechanical Ventilation:** Need for mechanical ventilation for spaces like Basements, Kitchen, Toilets, etc. Guidelines as per NBC / ISHRAE: Types of ventilation systems. **2) Introduction to Systems for Thermal Comfort:** Psychrometric properties, psychrometric chart, simple and computerized psychometrics, psychrometric processes; Appreciation of indoor and outdoor conditions for a space in summer and winter. Direct and Indirect Evaporative Cooling (Sensible Cooling), Air-conditioning (Cooling and Dehumidification), Air & Refrigeration cycles, Basics of Load Calculations, Zoning and Air Distribution, Heating system.	9
Pedagogy	1) The subject teacher can use PPTs & Videos to teach basics of the topics 2) The students need to work on the assignments given by the teacher. 3) Quizzes, models, seminars from students can be encouraged.	
2	**COOLING SYSTEMS** **3) Air conditioning -** Introduction. Comfort conditions within built environment. Basic refrigeration systems. Refrigeration system components. Vapour compression cycle. Concept of cooling load. Introduction to calculation of cooling load. Concept of passive cooling design and selection. **Unit type equipment:** (i) room A.C. & (ii) split A.C.: Package Units: (i) fully self-contained (factory made) & (ii) split type units: Central DX Plants and Central Chilled Water Plants. Schematic details of various systems. Comparison of various systems. Space data of A.C. equipment rooms. **4) Passive Cooling Systems: a) Direct and Indirect Evaporative Cooling Systems:** Design of evaporative (direct & Indirect cooling system). Estimating air handling unit requirements, water demand, air flowrate and fan power requirements for evaporative cooling systems, estimating energy	9

	and climate impact benefits, understanding hybrid evaporative + vapour compression air conditioning systems, **b) Structure and Radiant Cooling Systems:** estimating thermal comfort conditions and operative temperature achieved, calculating radiant surface area or structure cooling coil length requirements, calculating cooling effect ('equivalent tonnage'), estimating air handling unit requirements for dedicated outdoor air system (DOAS), understanding spatial design implications and civil-work requirements for various radiant/structure cooling variants, estimating energy and climate impact benefits, understanding hybrid structure/radiant cooling + vapour compression air conditioning systems.	
Pedagogy	1) The subject teacher can use PPTs & Videos to teach basics of the topics 2) The students need to work on the assignments given by the teacher. 3) Quizzes, models, seminars from students can be encouraged.	
3	**MECHANICAL TRANSPORTATION SYSTEMS IN BUILDINGS** **8) Elevators:** Types of Elevator systems, design considerations like Peak Handling capacity, Average Waiting Time, Lift speed etc., Architectural Requirements & Details for Elevator shaft - Elevator pit - Elevator Machine Rooms, Automatic Rescue Device for Elevators , Elevator car interiors, Possible Location and arrangements of Elevators in a building. Lift Acts and National Building Code. **9) Escalators &Travelators:** Applications, Calculation of Traffic capacity, Location and arrangements of escalators and travelators, inclination factor.	**9**
Pedagogy	1) The subject teacher can use PPTs & Videos to teach basics of the topics 2) The students need to work on the assignments given by the teacher. 3) Quizzes, models, seminars from students can be encouraged.	
4	**FIRE SAFETY IN BUILDINGS & PASSIVE FIRE PROTECTION** **10) Introduction:** Classification of fire, causes & hazards; Grading of structural elements for its fire resistance as per NBC. Classification of building types as per NBC and brief description of characteristics of combustible and non-combustible materials. **11) Concepts in passive fire protection in buildings:** Escape routes, fire driveways, fire refuge area, fire assembly areas, pressurization, travel distance, fire tower and compartmentation, fire signage's etc.	**9**
Pedagogy	1) The subject teacher can use PPTs & Videos to teach basics of the topics 2) The students need to work on the assignments given by the teacher. 3) Quizzes, models, seminars from students can be encouraged.	
5	**12) Active fire control:** Basic concepts in fixed fire fighting installations, Fire sprinklers, Fire Hydrants, Automatic fire detection and alarm systems. **13) National Building Code Requirements for Fire Safety:** Rules for Fire Protection and Fire Fighting Requirements for High Rise Buildings in India.	**9**

Pedagogy	1) The subject teacher can use PPTs & Videos to teach basics of the topics 2) The students need to work on the assignments given by the teacher. 3) Quizzes, models, seminars from students can be encouraged.

List of Programs:

Sl. No.	Experiments/Programs	COs
1	**Psychrometric Chart Analysis and Experiment:** This activity helps students understand air properties and psychrometric processes crucial for HVAC system design. Students will analyze psychrometric charts to study parameters like dry bulb temperature, wet bulb temperature, and humidity ratio. They will then conduct an experiment to measure temperature, humidity, and dew point in a controlled environment, plotting the data on a psychrometric chart to interpret air conditions effectively.	**CO2**
2	**Cooling Load Calculation Workshop:** Students will learn to calculate cooling loads for different building types through case studies. They will determine sensible and latent cooling loads based on factors like occupancy, insulation, and ventilation. To reinforce learning, students will use software tools like HAP or Carrier to perform actual cooling load calculations, understanding how these affect HVAC system design.	**CO3**
3	**Air-Conditioning System Demonstration (DX & Chilled Water Systems):** This experiment involves observing the operation of Direct Expansion (DX) systems and Chilled Water Plants. Students will study the functioning of key components like compressors, evaporators, and condensers. They will measure parameters such as refrigerant pressure, temperature differences, and energy consumption to understand system performance under varying load conditions.	**CO3**
4	**Passive Cooling System Model Construction:** Students will design and build small-scale models of passive cooling systems, such as ventilated facades or evaporative coolers. They will test these models in controlled conditions to compare temperature and humidity changes with different ventilation rates. This activity highlights the energy efficiency and sustainability benefits of passive cooling techniques.	**CO4**
5	**Fire Safety System Simulation:** This activity focuses on active and passive fire protection systems. Students will participate in fire safety drills, using fire extinguishers, sprinklers, and practicing emergency evacuation procedures. Additionally, they will test different fire alarm and smoke detection systems, observing their response in controlled environments to understand fire safety protocols.	**CO5**
6	**Elevator and Escalator Design and Traffic Flow Analysis:** Students will analyse the design and efficiency of elevators and escalators using simulation software to model traffic flow in multi-story buildings. They will measure performance metrics like peak handling capacity and average waiting times. This experiment helps students understand how to optimize mechanical transportation systems for efficiency and safety in building designs.	**CO4**

Open ended Programs		
1	**Project-Based Learning: Design of an Integrated HVAC System** Students will work in groups to design a comprehensive HVAC system for a hypothetical building (residential, commercial, or industrial). They will integrate mechanical ventilation, air-conditioning, passive cooling techniques, and fire safety systems. The project will require students to conduct load calculations, choose appropriate systems, and justify their design decisions based on energy efficiency, sustainability, and cost-effectiveness.	
2	**5. Case Study Analysis: Real-World HVAC and Fire Safety Systems** Students will select real-world case studies of HVAC and fire safety system implementations in large-scale buildings (like airports, hospitals, or high-rise offices). They will analyze the design, performance, and safety aspects, identifying challenges and solutions. This activity enhances problem-solving skills through real-world applications and critical evaluation.	

Reference Books	
Sl. No.	**Title of the Book/Name of the author/Name of the publisher/Edition and Year**
1	Roy J Dossat , "Principles of Refrigeration" 1961, John Wiley & Sons.
2	ManoharPrasad , "Refrigeration & Air Conditioning Data Hand book" 2013, New Age International, 2nd edition.
3	Don Kundwar , "Refrigeration and Air Conditioning", 2016, DhanpatRai& Co. (P) Limited.
4	"National Building Code of India (NBC)", 2016, Bureau of Indian Standards
5	Walter T. Grondzik, Alison G. Kwok, "Mechanical and Electrical Equipment for Buildings", 2010; 11th edition, Wiley Publication.
6	Shan K. Wang , "Handbook of Air Conditioning and Refrigeration", 2000, McGraw-Hill Edu.
7	"National Building Code of India (NBC) 2016"; Part 8 Section 3 and 5 & Part 3 & 4, BIS.
8	NFPA 101
9	IS Codes - ● 1391 (Part 1 & 2) : 1992 - Specification for room air conditioners ● 8148 : 2003 - Specification for packaged air conditioners ● 4591 : 1968 - Code of practice for installation and maintenance of escalators ● 14671 : 1999 - Hydraulic lifts ● 14665 : 2000 - Traction lift ● 15259 : 2002 - Home Lifts ● 15330 : 2003 - Lifts for handicapped persons; IS codes for Fire Services

Weblinks and Video Lectures (e-Resources)	
1	https://ndl.iitkgp.ac.in
2	http://fairconditioning.org/knowledge-resources/#209-active-cooling
3	https://www.youtube.com/watch?v=E1VY4s-yiQo
4	https://www.youtube.com/watch?v=4z_odywmsyM
5	https://www.youtube.com/watch?v=ofT7PLlaxIE

6	https://www.youtube.com/watch?v=1pGx6XmGEnE&t=36s

Course Outcomes: At the end of the course, the student will be able to:

CO	Course Outcomes	RBT Level	RBT Level Indicator
CO1	**Recall** the fundamental concepts of mechanical ventilation, including the need for ventilation in different spaces and the guidelines provided by NBC and ISHRAE.	R,U	L1,L2
CO2	**Apply** thermodynamic principles and psychrometric properties to design systems for thermal comfort, including air-conditioning and passive cooling solutions.	A	L3
CO3	**Evaluate** different air-conditioning systems (e.g., DX systems, chilled water plants, package units) based on performance metrics like energy efficiency, cost, and system design.	An	L4
CO4	**Evaluate** fire safety risks and design passive and active fire protection systems in compliance with NBC guidelines to ensure building safety.	E	L5
CO5	**Design** passive cooling systems and mechanical transportation systems (elevators, escalators) considering energy efficiency, architectural requirements, and safety standards.	D	L6

Mapping of Course Outcomes to Program Outcomes: *(75%-100%=3 ; 50%-74% = 2 ; Below 50 = 1)*

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1						3									
CO2		3			3								3		
CO3			3				3								
CO4							3		3					3	
CO5						3		3				3			3

B. ARCH								
3 Credits Course: BASE								
Assessment Method	**Component**	**Type of Assessments**	**Syllabus Coverage**	**Maximum Marks**	**Evaluation Details**	**Reduced Marks**	**Minimum Passing Marks**	**Total**
	Internal Assessment	Internal Assessment Test (IAT) - I	Module - 1 & 2	**50**	Internal assessment			

CIE		Internal Assessme	Module - 3 & 4	50		25		25
		Internal Assessment Test (IAT) - III	Module - 5	50				
	Assignment	AAT	Considering all the Modules	50	Accuracy and Completeness of Drawing Sheets (20 marks) Documentation and Portfolio (10 marks) Quality and Presentation of Models (20 marks)	25		25
	Total CIE Theory					50	25	**50**
SEE		Theory exam	Entire theory syllabus including questions from lab Component in respective Modules	100	----	50	20	**50**
CIE +SEE							**50**	**100**

Note: The Minimum Marks to be secured in CIE to appear for SEE shall be 25 (50% of Maximum marks – 50). The Minimum Marks to be secured in SEE shall be 20 (40% of Maximum marks – 50). The design activities will be assessed through only CIE. The passing percentage shall not be less than the 50% in aggregate for a course (i.e. CIE and SEE (put together). Based on the marks scored in CIE+SEE grading will be awarded for this course.

CIE- Continuous Internal Evaluation (50 Marks)

Bloom's Category	Theory				Practical
	Continuous Assessment Tests		Continuous Comprehensive Assessment (CCA)		Practical Test
	IAT-1	IAT-2	CCA-1	CCA-2	
	50 Marks	50 Marks	50 Marks	50 Marks	
Remember	15	15			
Understand	15	15			
Apply	10	10			
Analyse	10	10			
Evaluate			25	25	25
Create			25	25	25

CIE Internal Assessment Test Plan

CO's	Marks Distribution					Total Marks	Weightage
	Test-1		Test-2		Test-3		
	Module-1	Module-2	Module-3	Module-4	Module-5		
CO1	20	20	20	20	20		
CO2	20	20	20	20	20		
CO3	10	10	10	10	10		
CO4							
CO5							
Total	50	50	50	50	50	150	50%

SEE- Semester End Examination (50 Marks)

Bloom's Category	SEE Marks
Remember	10
Understand	10
Apply	10
Analyse	10
Evaluate	10
Create	

SEE Course Plan

CO's	Marks Distribution					Total Marks	Weightage
	Module-1	Module-2	Module-3	Module-4	Module-5		
CO1	5	5	5	5	10		
CO2	5	5	5	5	10		
CO3	5	5	5	5	10		
CO4	10	10	5	5	20		
CO5				10			
Total	25	25	20	30	50	150	50%

Course Contents and Lecture Schedule

Module No.	Topics	No. of Lecture hrs.
1	Mechanical Ventilation & Air Conditioning	9
2	Cooling Systems	9
3	Mechanical Transportation (Elevators, Escalators)	9
4	Fire Safety & Passive Fire Protection	9
5	Active Fire Control & NBC Requirements	9
	Total	**45**

Semester	:	**5th**				
Course Title	:	**Building structures-IV**				
Course Code	:	**BAT506**				
Course Type (Theory/ Practical/ Integrated)	:	**Integrated**				
Category	:	**BSAE** (Building Science & Applied Engineering Courses)				
Stream	:	**Arch./ Civil**		**CIE**	:	**50 Marks**
Teaching hours/ week (L:T:P:S)	:	**1:0:0:2**		**SEE**	:	**100 Marks (Reduced to 50 Marks)**
				SEE Duration	:	**VIVA**
Credits	:	**3**				

Course Learning Objectives: Students will be able to:

Sl. No	Course Objectives
1	To Gain understanding of Steel Structural Systems including composite construction and fundamental principles and structural behaviour of steel buildings in withstanding gravity, lateral (seismic and wind), and other environmental forces.
2	To understand the process of the design of structural steel systems and the design of simple steel structures.

Teaching-Learning Process

Pedagogy (General Instructions):

Some sample strategies to accelerate the attainment of various course outcomes are listed below:

9. Adopt different teaching methods to attain the course outcomes.
10. Include videos to demonstrate various concepts in C.
11. Encourage collaborative (Group) Learning to encourage team building.
12. Ask at least three **HOTS (Higher-order Thinking Skills)** module-wise questions to promote critical thinking.
13. Adopt **Problem-Based Learning (PBL),** which fosters students' analytical skills, and develops thinking skills such as evaluating, generalizing, and analyzing information rather than simply recalling it.
14. Show different ways to solve a problem and encourage the students to come up with creative and optimal solutions.
15. Discuss various case studies to map with real-world scenarios and improve the understanding.
16. Devise innovative pedagogy to improve **Teaching-Learning Process (TLP)**.

DSATM

Scheme of Teaching and Examinations for BE Programme -2025-26

Outcome Based Education and Choice Based Credit System (CBCS)

(Effective from the Academic Year 2025-26)

COURSE CURRICULUM

Module No.	Topics	Hours
1	**1) Structural Steel:** Different kinds of Steel, their Basic characteristics of Steel & Light Gauge Steel materials. **2) Concepts of design of Steel Structures:** Introduction to the concept of Working Stress Design and Load and Resistance Factor Design. **3) Steel Structural Systems:** Introduction to Rigid Portal Frames design of a one story industrial building 18M X 48m with two-bay mezzanine office floor. Project work to include a framing plan for both the industrial building and the mezzanine, an approximate design of structural frame elements, columns and beams. Introduction to available sections in structural steel used in the design of frame elements (Indicative).	**9**
Pedagogy	1) The teacher can use PPTs, Videos to discuss the subject/concepts 2) The students need to visit sites to understand the Concepts of Design. 3) Quizzes, models, seminars from students can be encouraged.	
2	**4) Introduction to National Building Code:** IS 800: Criteria & Design to satisfy ECBC and National Building Codes and Standards, Dead and Live load calculations as per IS875 (Part1&2). Determine the general loads to be considered in the design of the structure, based on the type of occupancy for each area specified. **5) Rigid Frames design-1:** Properties of Indian standard rolled steel section and general framing arrangement of beams and columns for the one story 18M X 48m industrial building.	9
Pedagogy	1) The teacher can use PPTs, Videos to discuss the subject/concepts 2) The students need to visit sites to understand the Concepts of Design. 3) Quizzes, models, seminars from students can be encouraged.	
3	**6) Composite Flooring Systems:** Discussion on steel-concrete composite construction using steel beams, metal decking and concrete, including the role of shear connectors' attachment to the beam for composite action. **7) Composite flooring systems design for mezzanine:** Loading and Analysis (Moment diagram to be provided) and design of composite steel decking with concrete topping.	**9**
Pedagogy	1) The teacher can use PPTs, Videos to discuss the subject/concepts 2) The students need to visit sites to understand the Concepts of Design. 3) Quizzes, models, seminars from students can be encouraged.	
4	**8) Rigid frame elements design-1:** Steel Structural Column design using IS special publication for the design of steel structures [SP-6 (1)]. **9) Rigid frame elements design-2:** Steel Structural Beams and trusses design using IS special publication for the design of steel structures [SP-6 (1)].	**9**
Pedagogy	1) The teacher can use PPTs, Videos to discuss the subject/concepts 2) The students need to visit sites to understand the Concepts of Design. 3) Quizzes, models, seminars from students can be encouraged.	

5	**11) Drawings and Specifications for the Rigid frame design:** Structural design criteria, including loads used, calculations, drawings and detailing, and steel tonnage calculation. ***12)* Field Inspection of Steel Construction Site:** ***The project work to include documentation and a report about the observations, learning and findings at Site***	**9**
Pedagogy	1) The teacher can use PPTs, Videos to discuss the subject/concepts 2) The students need to visit sites to understand the Concepts of Design. 3) Quizzes, models, seminars from students can be encouraged.	
	Pedagogical Initiatives (Not limited to): • **Think Pair and Share (Blended Learning):** provides an opportunity for students to learn from one another • **Problem Solving**: encourages cognitive thinkingand enables creative problem solving • **Poster Presentation:** allows students to represent the concepts visually in order to understand the topics easily. • **Case studies:** maps different domains in real time applications • **Demonstration:** exhibits the implementation process	

List of Programs:

Sl. No.	Experiments/Programs/Sheets/Assignments	COs
1	Framing Plan Design & Load Distribution Activity	CO1, CO2, CO3
2	Composite Slab System Model Making	CO1, CO3
3	Steel Column & Beam Design Exercise	CO2, CO4
4	Case Study & Poster Presentation of an Actual Steel Frame Site	CO1, CO5
5	Load Calculation and Section Selection Workshop	CO2, CO3, CO4
Value Added Programs		
1	Certificate Course on Structural Steel Design using STAAD.Pro & IS Codes	

Reference Books	
Sl. No.	**Title of the Book/Name of the author/Name of the publisher/Edition and Year**
1	[1] Martin Bechthold,Daniel L Schodek, “Structures”;2014,PHI Learning Private limited.

Web links and Video Lectures (e-Resources)	
1	https://ndl.iitkgp.ac.in
2	https://www.youtube.com/watch?v=GDs1HiWPZ2U https://www.youtube.com/watch?v=KWnBNf1INfs
3	https://www.youtube.com/watch?v=_JMtIkNkzbk https://www.youtube.com/watch?v=l0s9CVmusmY
4	https://www.youtube.com/watch?v=2Wamzp4TaOE

Course Outcomes: At the end of the course, the student will be able to:

CO	Course Outcomes	RBT Level	RBT Level Indicator
CO1	Students will **remember** the essential concepts related to steel materials and design principles.	L1, L2	Remember
CO2	Students will **apply** their knowledge to effectively design rigid frame solutions for industrial buildings, including framing plans and element selection.	L3	Apply
CO3	Students will **analyze** and assess compliance with building codes and standards by accurately calculating loads. Systems, and structural bracing.	L4	Analyse
CO4	Students will **synthesize** their expertise by proficiently designing structural elements like columns, beams, and trusses while maintaining precise documentation.	L5	Synthesize
CO5	Students will **evaluate** their practical skills through site inspections, resulting in accurate reporting of observations and findings, thus enhancing problem-solving abilities.	L6	Evaluate

Mapping of Course Outcomes to Program Outcomes: *(75%-100%=3 ; 50%-74% = 2 ; Below 50 = 1)*

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1															
CO2	3					3									
CO3			3							3					
CO4				3					3						
CO5			3										3		

Assessment Pattern (both CIE and SEE)

3 Credit Course – BSAE								
Assessment Method	**Component**	**Type of Assessment**	**Assessment Type used**	**Max. Marks**	**Evaluation Details**	**Reduced Marks**	**Min. Marks**	**Total**
CIE	IA exams	IAT 1	Internal Assessment exams	50	Question Paper	**20**		**20**
		IAT 2		50				
	Studio Assessment/exercise	AAT	Portfolio	50	Portfolio, Quiz Group Presentation POP Models Mock Review	10		10
			Group Presentation	10		5		5
			POP Models	10		5		5
			Quiz	10		5		5
			Mock Review	20		5		5
						30		**30**
Total CIE (IA +Practical / Activities)							**25**	**50**

SEE	SEE Exam will be Theory exam	**100**	SEE Exam will be Theory exam	**50**	**20**	**50**
				CIE+SEE	**50**	**100**

NOTE: The Minimum Marks to be secured in CIE to appear for SEE shall be 25 (50% of Maximum marks – 50). The Minimum Marks to be secured in SEE shall be 20 (40% of Maximum marks – 50). The design activities will be assessed through only CIE. The passing percentage shall not be less than the 50% in aggregate for a course (i.e. CIE and SEE (put together). Based on the marks scored in CIE+SEE grading will be awarded for this course.

CIE- Continuous Internal Evaluation (50 Marks)

Bloom's Category	Studio					
	Portfolio (A)	Group Presentation (B)	POP Models (C)	Quiz (D)	Mock review (E)	Grand Total (A+B+C+D+E)
	25 Marks	5 Marks	5 Marks	5 Marks	10 Marks	50 Marks
Remember & Understand	6	-	-	2	2	10
Apply	5	-	-	3	2	10
Analyse	3	5	-	-	2	10
Evaluate	6	-	2	-	2	10
Create	5	-	3	-	2	10
Total	25	5	5	5	10	50 Marks

CIE Course Assessment Plan

CO's	Marks Distribution					Total Marks	Weightage
	Progressive marking						
	Portfolio (A)	Group Presentation (B)	POP Models (C)	Quiz (D)	Mock review (E)		
CO1	6	-	-	2	2	10	20%
CO2	5	-	-	3	2	10	20%
CO3	3	5	-	-	2	10	20%
CO4	6	-	2	-	2	10	20%
CO5	5	-	3	-	2	10	20%
Total	25	5	5	5	10	50 Marks	100%

SEE- Semester End Examination (50 Marks)

Bloom's Category	SEE Marks
Remember	10%
Understand	10%
Apply	20%
Analyse	20%
Evaluate	20%
Create	20%

SEE Course Plan

CO's	Marks Distribution					Total marks	Weightage
	Portfolio (A)	Group Presentation (B)	POP Models (C)	Quiz (D)	Mock review (E)		
CO1	6	-	-	2	2	6	**20%**
CO2	5	-	-	3	2	5	**20%**
CO3	3	5	-	-	2	3	**20%**
CO4	6	-	2	-	2	6	**20%**
CO5	5	-	3	-	2	5	**20%**
Total	**25**	**5**	**5**	**5**	**10**	**50 Marks**	**100%**

Course Contents and Lecture Schedule

Module No.	Topics	No. of Lecture hrs.
1	Introduction to Structural Steel and Framing Concepts	9
2	Codes, Standards & Rigid Frame Concepts	9
3	Composite Flooring Systems	9
4	Design of Rigid Frame Elements	9
5	Drawings, Specifications & Site Application	9
	Total	**45**

Semester	:	**5th**				
Course Title	:	**BUILDING INFORMATION MODELING**				
Course Code	:	**BAT507**				
Course Type (Theory/ Practical/ Integrated)	:	**Practical**				
Category	:	**SEC**				
Stream	:	**Architecture**		**CIE**	:	**100 Marks**
Teaching hours/ week (L:T:P:S)	:	**0:0:4:0**		**SEE**	:	**--**
				SEE Duration	:	**--**
Credits	:	**4**				

Course Learning Objectives: Students will be able to:

Sl. No	Course Objectives
1	Develop proficiency in Autodesk REVIT for creating detailed 3D models with parametric components.
2	Understand and apply AI tools in architectural design and BIM workflows.
3	Convert 2D architectural drawings into 3D models, render visualizations, and assess environmental impacts using simulation tools.
4	Utilize generative design techniques and parametric modelling to optimize architectural solutions.
5	Integrate BIM with 3D printing technology to create physical prototypes for design validation.

Teaching-Learning Process

Pedagogy (General Instructions):

1. **Interactive Software Demonstrations –** Live walkthroughs of BIM and AI tools.
2. **Hands-on Workshops –** Practical sessions on REVIT, generative design, and 3D printing.
3. **Project-Based Learning –** Real-world exercises in 3D modeling, rendering, and simulations.
4. **Collaborative Design Tasks –** Group work on AI-driven and parametric design solutions.
5. **Case Study Analysis –** Reviewing successful applications of BIM and AI in architecture.
6. **Simulation-Based Learning –** Using tools to analyze carbon footprint and energy efficiency.
7. **Presentation & Documentation – Developing booklets, posters, and digital portfolios.**

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Scheme of Teaching and Examinations for B.Arch Programme -2025-26

Outcome Based Education and Choice Based Credit System (CBCS)

(Effective from the Academic Year 2025-26)

COURSE CURRICULUM

Module No.	Topics	Hours
1	Introduction to **Intermediate BIM Applications** using Autodesk REVIT: Creating detailed 3D models with parametric components.	**8**
Pedagogy	a. Interactive Software Demos b. Hands-on REVIT Modelling Workshop	
2	Introduction to **AI Tools in Architecture** and their various application in BIM and other stages of Desing Process	**8**
Pedagogy	a. Hands on Experimental Sessions	
3	• **Project 1** Classroom exercise to convert architecture design project 2D drawings (of semester 3 / 4 OR any simple one to three-storied building) into 3D model using relevant software. Project to be rendered using an appropriate 3D visualisation software • **Project 2** Classroom demonstration/exercise of image rendering/collage using Graphics/Image editing software (for e.g., adding context to visualisations), foreground, backgrounds etc. • Project to include presentation of final outcomes in the form of drawing panels, booklets, posters. • Usage of Various **Building Simulation software/tools** to assess the life-cycle carbon footprint of buildings including emissions from cooling systems and refrigerant use, and analyzing trade-offs between increased embodied carbon emissions for high thermal mass, high caliber insulation, glazing and other materials and reduced operational phase carbon emissions through increased energy efficiency.	**14**
Pedagogy	a. Hands on modelling process	
4	**Generative Design Techniques:** • Software tools like Grasshopper 3D to use Algorithms to explore a multitude of design alternatives based on specified parameters and constraints. • Rapid generation and evaluation of design options for optimized solutions.	**14**
Pedagogy	• Hands on exercises and case examples	

5	**3D Printing and BIM Integration:** • Creation of accurate physical models directly from digital designs for prototyping. visualizing complex structures and testing design concepts. • How to translate BIM models into 3D-printed objects to enhance understanding of the design-to-construction process.	**14**
Pedagogy	• A 3D printing Workshop and Demonstration	

List of Programs:

Sl. No.	Experiments/Programs	COs
1	**Task 1:** Understanding **detailed 3D BIM modelling techniques** of a simple one-to-three-storied building using Autodesk REVIT, incorporating parametric components.	**CO1**
2	**Task 2:** Explore and apply an **AI-based tool** (such as Midjourney, Stable Diffusion, or Autodesk Forma) to generate conceptual design variations for a small-scale architectural project.	**CO2**
3	**Task 3:** Convert a **2D architectural design** (semester 3/4 project or a simple floor plan) into a 3D model, apply materials, and render it using an appropriate visualization software.	
4	**Task 4:** Use **building simulation software** (such as Insight, Climate Studio, or Design Builder) to evaluate the **carbon footprint and energy efficiency** of a selected design.	**CO3**
5	**Task 5:** Develop a **parametric facade design** using Grasshopper 3D, **evaluating** different iterations based on given constraints (e.g., sunlight optimization or material efficiency).	**CO4**
6	**Task 6:** Convert a selected BIM model into a **3D-printable format**, prepare it for fabrication, and print a scaled-down prototype of the design.	**CO5**
	Open ended Programs	
1	**Integrated Architectural Design Studio Project:** • **Select a Real-World Design Challenge** – Choose an architectural project (e.g., housing, public building) to integrate BIM, AI, and simulation tools. • **Develop a Parametric Concept** – Use generative design tools like Grasshopper to explore multiple design alternatives. • **Create a BIM-Integrated 3D Model** – Develop a detailed BIM model in Autodesk REVIT, incorporating smart components and material properties. • **Perform Environmental Analysis** – Use building simulation tools to assess energy performance, daylighting, and carbon footprint. • **Enhance Visualization & Presentation** – Render high-quality images, create collages, and add contextual elements using image editing software. • **Prepare for Physical Prototyping** – Convert parts of the BIM model into a 3D-printable format and fabricate a scaled prototype. • **Compile a Final Design Report** – Present findings in a structured format, including digital drawings, simulations, and design justifications.	

Reference Books	
Sl. No.	**Title of the Book/Name of the author/Name of the publisher/Edition and Year**
1	**Title of the Book:** Mastering Autodesk Revit 2024 **Name of the Author:** Lance Kirby, Marcus Kim, Eddy Krygiel **Name of the Publisher:** Sybex (Wiley) **Edition and Year:** 1st Edition, 2023
2	**Title of the Book:** Artificial Intelligence in Architecture: Generative Design and Machine Learning for Buildings **Name of the Author:** Imdat As, Prithwish Basu **Name of the Publisher:** Elsevier **Edition and Year:** 1st Edition, 2021
3	**Title of the Book:** Architectural Design with SketchUp: 3D Modeling, Extensions, BIM, Rendering, Making, and Scripting **Name of the Author:** Alexander C. Schreyer **Name of the Publisher:** Wiley **Edition and Year:** 2nd Edition, 2021
4	**Title of the Book:** Parametric Design for Architecture **Name of the Author:** Wassim Jabi **Name of the Publisher:** Laurence King Publishing **Edition and Year:** 1st Edition, 2013
5	**Title of the Book:** The Art of 3D Computer Animation and Effects **Name of the Author:** Isaac V. Kerlow **Name of the Publisher:** Wiley **Edition and Year:** 5th Edition, 2019
6	**Title of the Book:** Building Information Modeling: BIM in Current and Future Practice **Name of the Author:** Karen Kensek **Name of the Publisher:** Wiley **Edition and Year:** 1st Edition, 2014

Weblinks and Video Lectures (e-Resources)	
1	**Rhino 3D Complete Course I Most Detailed I 100 % Free:** https://www.youtube.com/playlist?list=PLX50j2HV43tfhqbPOBhcYntVt9PKmcLnN
2	**3D- Printing:** https://www.youtube.com/playlist?list=PLX50j2HV43tdi3bKK9jQXt0v7HCPyU7v4
3	**Learn to use Rhino:** https://www.rhino3d.com/learn/?query=kind:%20all&modal=null
4	**Apps for Rhino and Grasshopper: Food4Rhino:** https://www.food4rhino.com/en

Course Outcomes: At the end of the course, the student will be able to:

CO	Course Outcomes	RBT Level	RBT Level Indicator
CO1	**Identify and explain** key concepts of BIM, AI tools, generative design, and 3D printing in architectural workflows.	R,U	L1,L2

CO2	**Apply** Autodesk REVIT, AI-driven design tools, and parametric modeling techniques to develop 3D architectural models.	**A**	**L3**
CO3	**Examine and compare** different design alternatives using generative design methods and building performance simulations.	**An**	**L4**
CO4	**Assess and justify** design decisions based on environmental impact, energy efficiency, and material selection using BIM-integrated tools.	**E**	**L5**
CO5	**Design and develop** innovative architectural solutions by integrating BIM, AI, generative modelling, and 3D printing technologies.	**D**	**L6**

Mapping of Course Outcomes to Program Outcomes: *(75%-100%=3 ; 50%-74% = 2 ; Below 50 = 1)*

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1															
CO2	**3**														
CO3		**3**													
CO4				**3**											
CO5			**3**												

Assessment Pattern (CIE)

4 Credit Course – SEC								
Assessment Method	**Component**	**Type of Assessment**	**Assessment Type used**	**Max. Marks**	**Evaluation Details**	**Reduced Marks**	**Min. Marks**	**Total**
CIE	**Experiments/Programs**	AAT	Considering all the Modules	100	Understanding, Presentation, Analysis, Design, Communication,	-	50	**100**
						Total CIE	**50**	**100**
NOTE: The Minimum Marks to be secured in CIE shall be 50 (50% of Maximum marks – 100). The activities/experiments/assignments will be assessed through only CIE. Based on the marks scored in CIE grading will be awarded for this course.								

CIE- Continuous Internal Evaluation (100 Marks)

Bloom's Category	Practical					
	Task-01	Task-02	Task-03	Task-04	Task-05	Task-06
Remember	5					
Understand	10					
Apply		15	15			
Analyse				15		
Evaluate					20	
Create						20
Total	15	15	15	15	20	20

CIE Course Assessment Plan

CO's	Practical							
	Module-1	Module-2	Module-3	Module-4	Module-5		Total Marks	Weightage
	Task-1	Task-2	Task-3	Task-4	Task-5	Task-6		
CO1	15						15	15%
CO2		15	15				30	30%
CO3				15			15	15%
CO4					20		20	20%
CO5						20	20	20%
Total	15	15	15	15	20		100	100%

Course Contents and Lecture Schedule

Module No.	Topics	No. of Lecture hrs.
1	Intermediate BIM Applications using Autodesk REVIT	8
2	AI Tools in Architecture & BIM Design Process	8
3	Project-Based Modelling & Simulation Applications	14
4	Generative Design Techniques using Grasshopper 3D	14
5	3D Printing and BIM Integration	14
	Total	**58**

Semester	:	**5th**				
Course Title	:	**ALTERNATE BUILDING TECHNOLOGY AND MATERIAL**				
Course Code	:	**BAT508 (a)**				
Course Type(Theory/ Practical/ Integrated)	:	**Theory**				
Category	:	**PEC** (Professional Elective Courses)				
Stream	:	**Architecture**				
Total Hours/week (L:T:P:S)		**2:0:0:0**		**CIE**	:	**50 Marks**
				SEE (Theory)	:	**-**
Credits	:	**2**		**SEE Duration**	:	**-**

Course Learning Objectives: Students will be able to:

Sl. No	Course Objectives
1	Introduce students to overall understanding of Building Technology and Material
2	Introduce details of Building Material and Alternate Techniques of Building.
3	Introduce students with relevant examples.

Teaching-Learning Process

Pedagogy (General Instructions):

Some sample strategies to accelerate the attainment of various course outcomes are listed below:

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

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Scheme of Teaching and Examinations for BE Programme -2025-26
Outcome Based Education and Choice Based Credit System (CBCS)
(Effective from the Academic Year 2025-26)

COURSE CURRICULUM

Module No.	Topics	Hours
1	Introduction to building material: Soil, types of soil, characteristics of soil, simple tests conducted at site, Bamboo as building construction material, properties, types, joinery details with examples.	5
Pedagogy	1. Students will gain conceptual clarity through visual aids, demonstrations, and real-life examples of soil and bamboo in construction. 2. Practical knowledge will be reinforced through hands-on activities like soil testing and bamboo joinery. 3. Critical thinking will be developed through discussions, comparisons, and analysis of case studies on alternate building materials.	
2	Masonry wall- SMB (Stabilized Mud Blocks), Hollow clay blocks, Cement blocks – Making of blocks, Properties, Specifications and Applications with examples.	5
Pedagogy	1. Introduce the types of masonry blocks—SMB, hollow clay, and cement—using visuals, videos, and real samples to explain their properties and making process. 2. Engage students in hands-on sessions or demonstrations to observe block making, testing of properties, and exploring real-life applications. 3. Facilitate comparative discussions and case studies to evaluate the suitability, specifications, and sustainability of each block type in different construction scenarios.	
3	Mud wall, Rammed Earth Wall- Making of wall, Properties, Specification and Application with examples.	5
Pedagogy	1. Explain the construction process, properties, and specifications of mud walls and rammed earth walls using diagrams, videos, and real-life examples. 2. Conduct hands-on demonstrations or site visits to show wall-making techniques and allow students to observe material behavior. 3. Encourage discussions and case study analysis to compare applications, advantages, and limitations of mud and rammed earth walls in sustainable construction.	
4	Alternate method for Foundation, Lintel and Chajja. Roof-Dome, Arch Panel Roof, Vault using SMB, Clay blocks with examples.	6
Pedagogy	1. Introduce alternate methods for foundation, lintel, chajja, and roofing (dome, arch panel, vault) using visual aids, models, and real-life examples with SMB and clay blocks. 2. Conduct hands-on sessions or demonstrations to explore construction techniques and material behavior in alternative structural elements. 3. Promote critical analysis through group discussions and case studies on the effectiveness, sustainability, and applications of these alternate construction methods.	
5	Concept of Ferro Cement structure, Building Components made out of Ferro cement such as Roof, Wall, Staircase with examples.	7
Pedagogy	1. Introduce alternate methods for foundation, lintel, chajja, and roofing (dome, arch panel, vault) using visual aids, models, and real-life examples with SMB and clay blocks. 2. Conduct hands-on sessions or demonstrations to explore construction techniques and material behavior in alternative structural elements.	

	3. Promote critical analysis through group discussions and case studies on the effectiveness, sustainability, and applications of these alternate construction methods.	
	Pedagogical Initiatives (Not limited to): • **Think Pair and Share (Blended Learning):** provides an opportunity for students to learn from one another. • Problem Solving: encourages cognitive thinking and enables creative problem solving. • **Poster Presentation:** allows students to represent the concepts visually in order to understand the topics easily. • **Case studies:** maps different domains in real time applications. • **Demonstration:** exhibits the implementation process.	

List of Activities:

Sl. No.	Activities	COs
1	**Soil Identification Activity:** Collect different types of soil samples and identify them based on color, texture, and granularity. Create a soil chart or classification board.	**CO1, CO2**
2	**Bamboo Material Study:** Display different types of bamboo and their uses in construction. Hands-on session to learn basic bamboo joinery techniques (lashing, notching, pegging).	**CO1, CO2**
3	**Block-Making Workshop:** Practical demonstration or participation in making Stabilized Mud Blocks (SMB), Hollow Clay Blocks, and Cement Blocks. Measure and compare properties like size, weight, and surface finish.	**CO2, CO3**
4	**Wall Construction Demo:** Build sample sections of mud walls and rammed earth walls. Observe and discuss structural stability and finishing methods.	**CO2, CO3, CO4**
5	**Case Study Presentation:** Research and present real-life buildings constructed using alternative materials like bamboo, SMB, rammed earth, or ferrocement.	**CO3, CO4**
6	**Ferrocement Workshop:** Demonstrate making of small-scale ferrocement components (like a thin roof slab or curved panel). Study and discuss advantages of ferrocement in construction.	**CO2, CO4, CO5**
7	**Site Visit:** Visit a construction site or campus building that uses alternative materials to observe practical applications. Interact with professionals using these technologies.	**CO3, CO4**
8	**Group Discussion/Debate:** Topics like: “Is Bamboo a viable alternative to Steel?” or “Mud vs Cement – Which is more sustainable?”	**CO3, CO4**
9	**Poster/Chart Making:** Create informative posters on soil types, bamboo joinery, or alternate roofing techniques for classroom display.	**CO1, CO5**

Text Books	
Sl. No.	**Title of the Book/Name of the author/Name of the publisher/Edition and Year**
Reference Books	
1	K S Jagadish, "Building with Stabilised Mud"; IK International Publishing House PVT Ltd.
2	K S Jagadish, B V Venkatarama Reddy, K S NanjundaRao, "Alternative Building Materials and Technology"; New Age International Publishers.
3	Jules J A Janssen , "Building with Bamboo-A Handbook
4	Chris Van Uffelen , "Bamboo Architecture and Design(Architecture and materials)
5	Laurie Bakers work.
6	Documentation "Earth Architecture", Auroville.
7	Hassan Fathy's work.

Weblinks and Video Lectures (e-Resources)	
1	https://www.bmtpc.org
2	https://cbri.res.in
3	https://www.earth-auroville.com
4	https://www.youtube.com/user/AurovilleEarth
5	https://www.ferrocement.com
6	https://www.inbar.int

Course Outcomes: At the end of the course, the student will be able to:

CO	Course Outcomes	RBT Level	RBT Level Indicator
CO1	Students will be able to **Remember & understand** various alternative building materials such as soil, bamboo, SMB, hollow clay blocks, and ferrocement.	**Remember & understand**	**L1 & L2**
CO2	Students will be able to **perform** simple soil tests, bamboo joinery, and prepare basic masonry blocks and wall samples using alternate materials.	**Apply**	**L3**
CO3	Students will be able to **Analyse** the properties, advantages, and limitations of traditional vs. alternative building technologies such as mud walls, rammed earth, and ferrocement.	**Analyse**	**L4**
CO4	Students will be able to **evaluate** the suitability and sustainability of alternate foundation, lintel, chajja, and roofing techniques using SMB, clay blocks, and bamboo in different construction scenarios.	**Evaluate**	**L5**
CO5	Students will be able to **design** and create basic models of walls, roofs, and building components using alternate materials such as bamboo, SMB, and	**Design**	**L6**

Mapping of Course Outcomes to Program Outcomes: *(75%-100%=3 ; 50%-74% = 2 ; Below 50 = 1)*

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1												**2**			
CO2	**2**														
CO3		**2**													

CO4				**2**											
CO5			**3**												

Assessment Pattern (CIE)

3 Credit Course – BSAE

Assessment Method	Component	Type of Assessment	Assessment Type used	Max. Marks	Evaluation Details	Reduced Marks	Min. Marks	Total
CIE	Continuous Comprehensive Assessment (CCA)	CCA 1	CCA-1- **(site visits, market surveys, seminars, group presentations)**	50	(50+50)	25		25
		CCA 2	CCA-2- Hands on activity	50		25		25
					Total CIE Practical / Activities		**25**	**50**

NOTE: The Minimum Marks to be secured in CIE shall be 25 (50% of Maximum marks – 50). The activities/experiments/assignments/portfolios will be assessed through only CIE. Based on the marks scored in CIE grading will be awarded for this course.

CIE- Continuous Internal Evaluation (50 Marks)

Bloom's Category	Theory				
	Poster Presentation	Activity 1	Workshop	Market survey	Group discussion
Remember	10				
Understand		10			
Apply			5		
Analyse				10	
Evaluate					10
Create			5		
Total	10	10	10	10	10

Course Contents and Lecture Schedule

Module No.	Topics	No. of Lecture hrs.
1	Introduction to the subject. Brief understanding of the syllabus and its content.	1
1	Introduction to **building material:** **Soil**, types of soil, characteristics of soil, simple tests conducted at site,	2
1	**Bamboo** as building construction material, properties, types, joinery details with examples.	2
2	**Masonry wall-** SMB (Stabilised Mud Blocks), Hollow clay blocks, Cement blocks – Making of blocks, Properties, Specifications and Applications with examp	5

3	**Mud wall**, Rammed Earth Wall- Making of wall, Properties, Specification and Application with examples.	5
4	Alternate method for Foundation, Lintel and Chajja. Roof-Dome, Arch Panel Roof, Vault using SMB, Clay blocks with examples .	6
5	Concept of Ferro Cement structure, Building Components made out of Ferro cement such as Roof, Wall, Staircase with examples.	7
	Total	**28 Hrs.**

Semester	:	**5th**				
Course Title	:	**Digital Architecture**				
Course Code	:	**BAT508(b)**				
Course Type	:	**Practical**				
Category	:	**PEC** (Professional Elective Courses)				
Stream	:	**Architecture**				
Total Hours/week (L:T:P:S)		**0:0:2:0**		**CIE**	:	**50 Marks**
				SEE (Theory)	:	**-**
Credits	:	**2**		**SEE Duration**	:	**-**

Course Learning Objectives: Students will be able to:

Sl. No	Course Objectives
1	Strategically utilizes digital media in the process of its architectural design.
2	Comprehend Conceptual Design through the early design stage, design development, analysis and representation of architectural spaces.

Teaching-Learning Process

Pedagogy (General Instructions):

Some sample strategies to accelerate the attainment of various course outcomes are listed below:

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

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COURSE CURRICULUM

Module No.	Topics	Hours
1	**Introduction to Digital Architecture:** Exploration of new design process in architecture, Exploration and case study of various available Design process involving digital media.	7
Pedagogy	Cases study of available approaches on utilization of Design tools leading to presentation of case studies and examining pros & cons and suitability of various Design approaches.	
2	**Parametric Architectural Geometry:** Explore parametric software as a first stage of learning software for replicating ideas in to 2D & 3D forms.	7
Pedagogy	Students will be given different small exercises which will be based on the primary stage form development in the parametric software.	
3	**Geometrical explorations:** Explore the relationships and dependencies of progression concepts and architecture. The exploration will be based on geometrical ideologies to develop relationships and new design process for form generation. The exercise will explore generative design methodologies through the application progression techniques.	7
Pedagogy	Students will work on geometric transformations and an approach for form generation	
4	**Simulation, Visualisation:** Explore simulation and visualisation, as a first stage of learning software leading to digital publication	7
Pedagogy	Students will be given small exercises which will be based on the primary stage form development for visualization & Publication of creative process and outputs with Desktop and Web tools.	

List of Activities:

Sl. No.	Activities	COs
1	**Case Study Presentation:** Students will research and present case studies of architectural projects utilizing digital design tools, highlighting the design process, tools used, and pros & cons.	CO1, CO4
2	**Parametric Form Modeling Exercise:** Develop basic 2D/3D forms using parametric software.	CO2, CO5
3	**Geometric Progression Workshop:** Explore geometric relationships and apply them for form generation.	CO3, CO5
4	**Visualization Assignment:** Simulate and visualize design ideas using digital tools.	CO4, CO5
5	**Digital Design Portfolio Compilation:** Compile all digital outputs into a cohesive design portfolio.	CO5

Reference Books

S.No.	Title of the Book/Name of the author/Name of the publisher/Edition and Year
1	Contemporary techniques in Architecture – by Ali Rahim

2	Digital Tectonics, Digital Cities AD: Architectural Design – Prof. Neil Leach
3	Digital to from control to design –by Michael Meredith

Weblinks and Video Lectures (e-Resources)	
1	https://ndl.iitkgp.ac.in

Course Outcomes: At the end of the course, the student will be able to:

CO	Course Outcomes	RBT Level	RBT Level Indicator
CO1	Identify and explain digital design processes and tools in architecture.	Remember & understand	L1 & L2
CO2	Apply parametric software to develop basic architectural forms.	Apply	L3
CO3	Analyze geometric relationships for architectural form generation.	Analyse	L4
CO4	Evaluate simulation and visualization techniques for digital presentation.	Evaluate	L5
CO5	Create innovative architectural forms using integrated digital methodologies.	Design	L6

Mapping of Course Outcomes to Program Outcomes: *(75%-100%=3 ; 50%-74% = 2 ; Below 50 = 1)*

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1												2			
CO2	2														
CO3		2													
CO4				2											
CO5			3												

Assessment Pattern (CIE)

2 Credit Course – PEC

Assessment Method	Component	Type of Assessment	Assessment Type used	Max. Marks	Evaluation Details	Reduced Marks	Min. Marks	Total
CIE	Continuous Comprehensive Assessment (CCA)	CCA 1	**Case Study Presentation**	50		10	5	10
		CCA 2	Parametric Form Modeling Exercise	50		10	5	10
		CCA 3	Geometric Progression Workshop	50		10	5	10
		CCA4	Visualization Assignment	50		10	5	10

		CCA5	Digital Design Portfolio Compilation	50		10	5	10
					Total CIE Practical / Activities		**25**	**50**

NOTE: The Minimum Marks to be secured in CIE shall be 25 (50% of Maximum marks – 50). The activities/experiments/assignments/portfolios will be assessed through only CIE. Based on the marks scored in CIE grading will be awarded for this course.

CIE- Continuous Internal Evaluation (50 Marks)

Bloom's Category	**Practical**					
	Task-01	**Task-02**	**Task-03**	**Task-04**	**Task-05**	**Total**
Remember	3					3
Understand	2					2
Apply		5				5
Analyse			5			5
Evaluate	5			5		10
Create		5	5	5	10	25
Total	10	10	10	10	10	50

Course Contents and Lecture Schedule

Module No.	**Topics**	**No. of Lecture hrs.**
1	Introduction to Digital Architecture	7hrs
2	Parametric Architectural Geometry	7hrs
3	Geometrical explorations	7hrs
4	Simulation, Visualization	7hrs
	Total	**28 Hrs.**

Semester	:	**5th**				
Course Title	:	**Architectural Lighting Design**				
Course Code	:	**BAT508(c)**				
Course Type (Theory/ Practical/ Integrated)	:	**Theory**				
Category	:	**PEC** (Professional Elective Courses)				
Stream	:	**Architecture**				
Total Hours/week (L:T:P:S)		**2:0:0:0**		**CIE**	:	**50 Marks**
				SEE (Theory)	:	**-**
Credits	:	**2**		**SEE Duration**	:	**-**

Course Learning Objectives: Students will be able to:

Sl. No	Course Objectives
1	This course surveys the scope and possibilities of integrating light in architecture.

Teaching-Learning Process

Pedagogical Initiatives:

Some sample strategies to accelerate the attainment of various course outcomes are listed below:

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

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COURSE CURRICULUM

Module No.	Topics	Hours
1	Introduction: Quantitative vs Qualitative aspects of lighting design.	5
Pedagogy	1. Lecture + Visual Comparison: Use PowerPoint, case study slides, and YouTube clips. 2. Measurement Demo: Introduce tools like lux meters, Dialux Evo, or Relux for simulation. 3. Classroom Activity: Students observe different rooms/spaces and document light levels and quality (observation sheets). 4. Reading Assignment: Excerpts from IES Lighting Handbook, Louis Kahn on Light. 5. Discussion Method: Use debate format — Quantitative vs Qualitative: "What matters more?"	
2	Experiencing Architecture: Fundamentals and factors that shape spatial experiences ranging from emotion, memory, imagination, aesthetics, culture etc.	5
Pedagogy	6. Multimedia Lecture: Use architecture documentaries and VR walkthroughs of iconic buildings. 7. Storytelling Exercise: Use voice recordings or group discussions to share personal space experiences. 8. Reflective Sketchbook: Encourage the use of collage, watercolors, or freehand drawing to express light-emotion connections. 9. Guest Interaction: Invite a lighting designer or theatre light expert to explain mood creation through lighting. 10. Reference Texts: "Experiencing Architecture" by Steen Eiler Rasmussen.	
3	Seeing Form-Space Relationships in developing lighting strategies.	5
Pedagogy	11. Sectional Study Exercise: Use sectional drawings, cardboard models, or digital modeling software (SketchUp, Rhino). 12. Shadow Study Lab: Use miniature scale models and table lamps/LEDs or V-Ray Sun simulation. 13. Simulation Tools: Enscape, Lumion, or DIALux to show light form interaction. 14. Overlay Exercise: Use tracing paper/light-mapping templates to mark light movement. 15. Group Critiques: Pin-up and critique the strategies using rubrics for form-light alignment.	
4	Relationship between man, light and space. A primer to Place-Making through light in architecture.	6
Pedagogy	16. Lecture + Case Study Video Analysis: Use video walkthroughs (e.g., Kimbell Art Museum, Pantheon) with slow motion for effect analysis. 17. Site Visit / Virtual Tour: Real-time documentation using light journals and mobile apps (Lux Light Meter). 18. Behavioral Mapping: Students observe how people move or pause under various lighting conditions (mapping sheets). 19. Interactive Model Demonstration: Use LED strips, adjustable angles, and person cutouts in models. 20. Discussion: Circle method or fishbowl discussion on light and human emotion.	
5	Light in Architecture – Conceptual proposal of lighting design for an architectural space using Perception Based Approach.	7

Pedagogy	21. Concept Development Workshop: Use Perception Cards (emotion + light quality), Moodboards (Pinterest, Milanote). 22. Model-Making: Encourage white card models with spotlight testing or LED simulations. 23. Digital Light Rendering: Use Enscape, Rhino + V-Ray, or Twinmotion to test experiential views. 24. Presentation Techniques: Develop storyboards, perspective sketches, or video walkthroughs for design intent. 25. Critiques: Structured peer review using feedback rubrics focused on perception and atmosphere.	

List of Activities:

Sl. No.	Activities	COs
1	Light Quality Observation Journal	CO1, CO2
2	Memory Sketch – Light & Emotion	CO2
3	Shadow Mapping with Scale Models	CO1, CO3
4	Human-Light Interaction Mapping	CO2, CO4
5	Nightscape Place-Making Proposal	CO4, CO5
6	Conceptual Lighting Proposal (Perception-Based)	CO5

Text Books	
Sl. No.	**Title of the Book/Name of the author/Name of the publisher/Edition and Year**
Reference Books	
1	Boyce, Peter R.,(2014),"Human Factors in Lighting"; CRC Press, 3rd Edition.
2	Cuttle, Christopher(2015),"Lighting Design: A Perception Based Approach"; Routledge, 1st Edition.
3	JMichel, Lou. (1995), "Light: The Shape of Space: Designing with Space and Light"; Van Nostrand Reinhold.
4	Steffy, Gary R.(2008), "Architectural Lighting Design" by Wiley.
5	Tanizaki, Junichiro,(1977), "In Praise of Shadows"; Leete'S Island Books, 1st Edition. Zumthor, Peter(2006), "Atmospheres"; Birkhäuser Architecture, 5th Edition

Weblinks and Video Lectures (e-Resources)	
1	https://www.ies.org/education/what-is-lighting/
2	https://www.youtube.com/watch?v=c2s8IoTuFYw
3	https://monoskop.org/images/7/7b/Rasmussen_Steen_Eiler_Experiencing_Architecture.pdf
4	https://www.youtube.com/watch?v=qCqCUyGdVn0
5	https://www.archdaily.com/tag/lighting
6	https://www.youtube.com/watch?v=r0z1zU-Nf2U

Course Outcomes: At the end of the course, the student will be able to:

CO	Course Outcomes	RBT Level	RBT Level Indicator
CO1	Understand and differentiate between the quantitative (measurable) and qualitative (experiential) aspects of lighting design in architectural spaces.	Remember & understand	L1 & L2
CO2	Interpret form-space relationships to formulate effective lighting strategies based on architectural geometry and user perception.	Apply	L3
CO3	Analyze the role of light in shaping spatial experiences influenced by emotion, memory, imagination, aesthetics, and culture.	Analyse	L4
CO4	Evaluate the relationship between humans, light, and built space to support inclusive and user-centered lighting environments.	Evaluate	L5
CO5	Design and present a perception-based lighting concept proposal that demonstrates place-making potential and enhances architectural narrative.	Design	L6

Mapping of Course Outcomes to Program Outcomes: *(75%-100%=3 ; 50%-74% = 2 ; Below 50 = 1)*

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1												2			
CO2	2														
CO3		2													
CO4				2											
CO5			3												

Assessment Pattern (CIE)

3 Credit Course – BSAE

Assessment Method	Component	Type of Assessment	Assessment Type used	Max. Marks	Evaluation Details	Reduced Marks	Min. Marks	Total
CIE	Continuous Comprehensive Assessment (CCA)	CCA 1	CCA-1- **(site visits, market surveys, seminars, group presentations)**	50	(50+50)	25		25
		CCA 2	CCA-2- Hands on activity	50		25		25
						TOTAL CIE	**25**	**50**

NOTE: The Minimum Marks to be secured in CIE shall be 25 (50% of Maximum marks – 50). The activities/experiments/assignments/portfolios will be assessed through only CIE. Based on the marks scored in CIE grading will be awarded for this course.

CIE- Continuous Internal Evaluation (50 Marks)

Bloom's Category	Theory					
	Poster Presentation	Activity	Workshop	Market survey	Group Discussion	Project
Remember	5					
Understand		5				
Apply			5			
Analyse				10		
Evaluate					10	
Create			5			10
Total	5	5	10	10	10	10

Course Contents and Lecture Schedule

Module No.	Topics	No. of Lecture hrs.
1	Introduction: Quantitative vs Qualitative aspects of lighting design.	5
2	Experiencing Architecture: Fundamentals and factors that shape spatial experiences ranging from emotion, memory, imagination, aesthetics, culture etc.	5
3	Seeing Form-Space Relationships in developing lighting strategies.	5
4	Relationship between man, light and space. A primer to Place-Making through light in architecture.	6
5	Light in Architecture – Conceptual proposal of lighting design for an architectural space using Perception Based Approach.	7
	Total	**28 Hrs.**

Semester	:	**5th**				
Course Title	:	**Physical Education** (Sports & Athletics/Yoga & NSS)				
Course Code	:	**BAT509**				
Course Type (Theory/ Practical/ Integrated)	:	**Practical**				
Category	:	**PE/NSS** (Physical Education / National Service Scheme)				
Stream	:			**CIE**	:	**100 Marks**
Teaching hours/ week (L:T:P:S)	:	**0:0:2:0**		**SEE**	:	
				SEE Duration	:	
Credits	:	**-**				

Course Learning Objectives: Students will be able to:

Sl. No	Course Objectives
1	Understand the Meaning and Importance of the Fit India Movement, the Definition of fitness, Benefits of fitness, Types of fitness and Fitness tips.
2	Importance of Sports & Yoga in day-to-day life
3	National Service Scheme (NSS) will enable the students to: Understand the community in which they work identify the needs and problems of the community and involve them in problem-solving.
4	Develop among themselves a sense of social & and civic responsibility & and utilize their knowledge in finding practical solutions to individual and community problems.

Teaching-Learning Process

Pedagogy (General Instructions):

Some sample strategies to accelerate the attainment of various course outcomes are listed below:

1. Adopt different teaching methods to attain the course outcomes.
2. Include videos to demonstrate various concepts in C.
3. Encourage collaborative (Group) Learning to encourage team building.
4. Ask at least three **HOTS (Higher-order Thinking Skills)** module-wise questions to promote critical thinking.
5. Adopt **Problem-Based Learning (PBL),** which fosters students' analytical skills, and develops thinking skills such as evaluating, generalizing, and analyzing information rather than simply recalling it.
6. Show different ways to solve a problem and encourage the students to come up with creative and optimal solutions.
7. Discuss various case studies to map with real-world scenarios and improve the understanding.
8. Devise innovative pedagogy to improve **Teaching-Learning Process (TLP)**.

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Outcome Based Education and Choice Based Credit System (CBCS)

(Effective from the Academic Year 2025-26)

COURSE CURRICULUM

Module No.	Topics	Hrs
SPORTS and ATHLETICS	**Athletics** Track- 110 &400 Mtrs 110 Mtrs and 400Mtrs: **Hurdling Technique:** Lead leg Technique, Trail leg Technique, Side Hurdling, Over the Hurdles Crouch start (its variations) use of Starting Block. Approach to First Hurdles, In Between Hurdles, Last Hurdles to Finishing Hurdles **Jumps- High Jump** Approach Run, Take-off, Bar Clearance (Straddle), and Landing **Throws-** Discuss Throw: Holding the Discus, Initial Stance Primary Swing, Turn, Release and Recovery (Rotation in the circle).	**8 hrs**
YOGA	Introduction of Yoga, Aim, and Objectives of Yoga, Prayer, Yoga, its origin, history, and development. 1) Yoga, its meaning, definitions. 2) Brief introduction of yogic practices for the common man- Yogic practices for the common man to promote positive health 3) Rules and regulations 4) Misconceptions of Yoga 5) Suryanamaskara 6) Different types of Asanas a. Sitting- 1. Padmasana, 2. Vajrasana b. Standing- 1. Vrikshana, 2. 2. Trikonasana c. Prone line-1. Bhujangasana 2. Shalabh asana d. Supine line- Utthita dvipadasana, 2. Ardha halasana	**8 hrs**
NSS	1. Organic farming, Indian Agriculture (Past, Present, and Future) Connectivity for marketing. 2. Waste management– Public, Private and Govt organization, 5 R's. 3. Setting of the information imparting club for women leading to contribution to social and economic issues. 4. Water conservation techniques – Role of different stakeholders– Implementation. 5. Preparing an actionable business proposal for enhancing the village income and approach for implementation. 6. Helping local schools to achieve good results and enhance their enrolment in Higher/ Technical/ vocational education. 7. Developing a Sustainable Water management system for rural areas and implementation approaches. 8. Contribution to any national-level initiative of the Government of India. Foreg. Digital India, Skill India, Swachh Bharat, Atmanirbhar Bharath, Make in India, Mudra scheme, Skill development programs, etc. 9. Spreading public awareness under rural outreach programs. (minimum 5 programs). 10. Social connections and responsibilities.	**9 hrs**

	11. Plantation and adoption of plants. Know your plants. 12. Organize National integration and social harmony events /workshops /seminars. (Minimum 02 programs). 13. Govt. school Rejuvenation and helping them to achieve good infrastructure.	

List of Programs/Activities/Experiments:

Sl. No.	Programs/Activities/Experiments	COs
1	Athletic Sessions	CO1
2	Case Study and Examples Study to understand the benefits of Health and Fitness	CO1
3	Presentations on Yoga	CO2
4	7 Day yoga challenge and recording the improvements for comparison	CO3
5	Practical Sports Sessions	CO4
Value Added Programs		
1		

Reference Books	
Sl. No.	**Title of the Book/Name of the author/Name of the publisher/Edition and Year**
1	Dharma,P N Fundamentals Of Track & Field, Khel Sahitya Kendra,New Delhi
2	Swami Kuvulyananda : Asma (Kavayadhama,Lonavala)
3	Tiwari O P : Asana Why & How
4	Swami Satyananda Saraswati : Asam Pranayama Mudhra Bandha, (Bihar School of Yoga, Munger)
5	Swami Satyananda Saraswati : Surya Namaskar (Bihar School of Yoga, Munger)
6	Nagendra H.R., The Art and Science of Pranayama
7	NSS Course Manual, Published by NSS cell, VTU, Belagavi

Weblinks and Video Lectures (e-Resources)	
1	https://ndl.iitkgp.ac.in

Course Outcomes: At the end of the course, the student will be able to:

CO	Course Outcomes	RBT Level	RBT Level Indicator
CO1	Understanding the importance of fitness/sports in day-to-day life	Remember & understand	L1 & L2

CO2	Benefits of yoga on fitness and health,	Apply	L3
CO3	Analyze the environmental and societal problems or issues and will be able to design solutions for the same.	Analyse	L4

Mapping of Course Outcomes to Program Outcomes: *(75%-100%=3 ; 50%-74% = 2 ; Below 50 = 1)*

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1												**2**			
CO2	**3**														
CO3		**3**													
CO4															
CO5															

Assessment Pattern for CIE

2 Credit Course – NCMC

Assessment Method	Component	Type of Assessment	Assessment Type used	Max. Marks	Evaluation Details	Reduced Marks	Min. Marks	Total
CIE	Continuous Comprehensive Assessment (CCA)	CCA 1	CCA-1- **Books Reading**	50		30		30
		CCA 2	CCA-2- **Case study/Social Connect Presentation on yoga**	50		30		30
		CCA 3	CCA3- **Practical Sessions**	50		40		40
					Total CIE Practical / Activities		**50**	**100**

NOTE: The Minimum Marks to be secured in CIE shall be 50 (50% of Maximum marks – 100). The activities/experiments/assignments/portfolios will be assessed through only CIE. Based on the marks scored in CIE grading will be awarded for this course.

Course Contents and Lecture Schedule:

Module No.	Topics	No. of Lecture hrs.
1	SPORTS and ATHLETICS	8
2	YOGA	8
3	NSS	9
	Total	**25 Hrs.**

Dayananda Sagar Academy of Technology & Management
(Autonomous Institute under VTU)

Semester	:	**6th**				
Course Title	:	**ARCHITECTURAL DESIGN - VI**				
Course Code	:	**BAT601**				
Course Type (Theory/ Practical/ Integrated)	:	**Studio**				
Category	:	**PCC**				
Stream	:	**Arch**		**CIE**	:	**100 Marks**
Total Hours (L: T:P:S)	:	**0:0:0:8 Hrs/Week**		**SEE**	:	**100 Marks**
Credits	:	**8**		**SEE Duration**	:	**Viva-Voce**

Course Learning Objectives: Students will be able to *enable the students to integrate design with history, theory, building construction and material science in a more informed way.*

Teaching-Learning Process-

Pedagogy (General Instructions):

These are sample Strategies, which teacher can use to accelerate the attainment of the various course outcomes.
1) The contents of the courses shall be taught in an application-oriented manner on a scientific and design basis. The course contents shall be taught and learned in lectures, seminars, labs or workshops, studio exercises and design projects, etc.

2) In-studio exercises the teachers shall take the lead to provide tasks and offer guidance for solutions finding. The students shall work either individually or in groups.

3) In design studios, the students contribute to the processing, analysis and solving of problems of direct professional practice, attended by faculty(s) entitled to conduct the studio and examine. The results shall be defended through drawings; models and reports and evaluated through periodic assessment and finally by a jury or panel, and finally, evaluated through periodic assessment and an end semester examination or viva voce.

OUTLINE:

- To understand the role of built environments of increasing complexity by:
- Intrinsic factors: Size, volume, levels, functional spaces or zones, structural possibilities
- External factors: site, approach, traffic, climate change, ecology, services
- Constraints: bye-laws, resource and planetary limits, budget, ideology, attitudes
- Create an 'Identity' to the Campus through integration of the above.

MODE OF STUDY

The aim of the studio is to explore STRUCTURING: structuring of a research or a case study, structuring of the program, spatial structuring and informal structuring.

Structuring of research: Case studies, reading material and site studies have to be a directed exercise with the involvement of tutors where visiting the project of concern would be of utmost importance. This studio is also about how one organizes research. It should be mandatory to use analytical models, diagrams to understand the chosen case study in terms of Design Intent, site and spatial structuring. There needs to be emphasis on Graphical consistency and legibility of the study. It is recommended to add a reading list as part of the studio to further enrich this discussion about institutions. Once a week, students could be asked to present the case studies and selected readings to the class. **Structuring program:** Studying requirements from various point of views which include relationship between

requirements and values, requirements and phenomenology, area of the site and functional area requirements, issues of public and private domains, open and closed spaces, interrelationship between the various components, formal and

informal, service requirements, relationship between whole and the part, requirement and climate etc. information resulting from this exercise becomes the individual's program for the project which can then lead to structuring of space.

PROJECTS

a). One major project and one minor/time project to be tackled in the semester. Institutional projects like facilities of higher learning, such as, Engineering college campus, medical college campus, Paramedical campuses, management institute campus, hotel management institute, Law college campus, Dental college campus, Nursing college campus, Juvenile Correction Centre, Art and Architecture Colleges, Fashion and Design Institute Campuses etc.

b). The minor project could include a case study documentation of the project proposed for the design intervention. This work could be done in a group and as part of its findings shall be an outline program to be a major project.

In view of the current urban contexts where land is precious and resources are scarce, the project could also be institutional buildings on a small urban plot, on multiple levels and still engage with its context and establish an environment within that captures the essential nature of an institution. However, Project selection is left to the discretion of the tutors.

Project work could be done in 5 stages of activity jointly with research and analysis.

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

a. Geography/situation (context)

b. Constraints (bye-laws, budget, ideology, attitudes, etc.)

2. Spatial structuring: To understand spatial structuring as a set of logical operations after an analytical understanding of the site, surroundings, program and intent expressing diversity of program and its resulting spatial variety and the relationship between the built and the unbuilt established through movement systems ,linkages and nodes etc.

3. Informal structuring: Architecture is an integrative discipline. Establishment of a structure enables reverse integration with other subjects where the students look beyond their studio offering a mechanism to observe the surroundings and document it, understand history and theory analytically, integrate design with building construction, climatic, environmental and material science in a more informed way.

4. The design exercise shall focus on ideas of scale, engagement (social, economic, political, and environmental), hierarchy, public/private space, and challenge the students to reflect on these as part of the design development. The emphasis should be to establish these larger goals as part of the discussion on the nature of an institution. The project and design development should focus on integrating sustainable design in every aspect and process possible,
with an emphasis on reducing thermal locals and integrating ventilation, insulation, thermal mass, shading, cool roofs, passive/natural cooling and low energy, low-carbon active cooling technologies; local materials as much as possible; sustainable systems such as storm water harvesting, water recycling and reusing, waste management systems and renewable energy systems and above all response to site context and existing informal systems.

5. Goal of the studio shall be to see the architect as instigator - defining the nature of engagement with the city, through the articulation of the program and its relationship with the context. Studio must provoke students to define clearly their agenda and to think of architecture as an active, live engagement rather than a passive and inert one. By having students spell out a hypothesis it then doesn't matter what the type is. This prepares the students to frame a series of questions to address the problem at hand.

NOTE:

- One major project and one minor/ time problem to be tackled in the semester.
- Detailing of Masterplan or Detailing of specific blocks can be attempted

Submission shall comprise duly drawn/drafted Masterplan, floor plans, elevations, section views, models, landscape details, services etc.

List of Programs:

Sl. No.	Experiments/Programs	COs
1	Analytical Case Study Documentation	CO1, CO2, CO4
2	Program Structuring Workshop	CO2, CO3, CO5
3	Site Response and Zoning Model	CO2, CO4
4	Sustainable Design Integration Exercise (Minor Exercise)	CO4, CO5
5	Design Intent and Hypothesis Framing (Major Exercise)	CO3, CO5
Value Added Programs		
1	Design Thinking and Sustainable Systems for Institutional Architecture	

Reference Books	
S.No.	**Books (Title of the Book/Name of the author/Name of the publisher/Edition and Year)**
1	Roger H. Clark and Michael Pause, " Precedents in architecture", 1984, John Wiley &Sons
2	Geoffrey H Baker , "Le Corbusier an analysis of form", 1996, Van Nostrand Reinhold.
3	Herman Hertzberger, "Lessons for students in architecture", 1991, Delft University.
4	Charles Correa , "A Place in shade", 2010, Penguin India
5	Rem Koolhaas, "Conversation with students", 1996, Princeton Architectural Press.

Weblinks and Video Lectures (e-Resources)	
1	https://ndl.iitkgp.ac.in
2	https://www.youtube.com/watch?v=FfJ6j0NjfDo
3	https://www.youtube.com/watch?v=TY_aB4TLsUA
4	https://www.youtube.com/watch?v=dRKVZZ9Srcc
5	https://www.youtube.com/watch?v=_AOzpFXocKI

Course Outcomes: At the end of the course, the student will be able to:

CO1	To **understand** the role of built environments of increasing complexity by Intrinsic factors like Size, volume, levels, functional spaces or zones, structural possibilities, External factors like site, approach, traffic, ecology, services and other Constraints like bye-laws, ideology, attitudes in campus design
CO2	**Apply** the principles of development regulations, building bylaws, and rules in the context of architectural design and the knowledge of circulation networks for both people and vehicular access to site planning.
CO3	**Analyze the** principles of campus design by analyzing spatial needs, experiential aspects, domain segregation, and climatic influences through literature and case study research, culminating in context-specific design guidelines.
CO4	**Evaluate** the architectural design strategies based on their responsiveness to contextual, social, and environmental needs, with an emphasis on sustainable practices such as passive cooling, eco-friendly materials, and efficient water management.
CO5	**Create** innovative and contextually relevant campus designs that engage with the context, reflecting institutional identity, sustainability principles and integrate innovative construction technologies and materials, while considering environmental, socio-cultural, and economic dimensions.

Mapping of Course Outcome to Program Outcome: *(75%-100%=3 ; 50%-74% = 2 ; Below 50 = 1)*

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1						1						
CO2	2		3						1			
CO3		3		3			2					
CO4					3			2				
CO5			3							2	2	

Assessment Pattern (Both CIE and SEE):

9 Credit Course-PCC

Assessment Method	Component	Type of Assessment	Assessment Type used	Max. Marks	Evaluation Details	Reduced Marks	Min. Marks	Total
CIE	Studio Assessment	AAT	Progressive Work-(Sheets)	50	Regular on time discussion + Incorporation of changes in design + Presentation skills, Accuracy, Details, Architectural Drawings.	25		25
			Group Work	20	Case study + Site analysis Presentation skill and coordination	15		15
			Site Visits	10				
			Progressive Models	20	Presession, Materials and Scale.	10		10
			Intermediate reviews	20	Completion of work, Presentation skills, Communication of ideas, Design	10		10
					Total CIE Studio			**60**
	Panel Review	Viva Voce	Review	50	Presentation skills, Communication of ideas, Design	25		40
			Final Portfolio + Models	30	She Presentation, Accuracy, Details, Architectural Drawings. etc, presentation	15		
					Total CIE Review			**40**
						CIE	**50**	**100**
SEE	**External Viva Voce**			**100**	Portfolio + Model + Review		**40**	**100**
						CIE+SEE	**100**	**200**

The Minimum Marks to be secured in CIE to appear for SEE shall be 50 (50% of Maximum marks – 100) in the StudioAssessment and Internal Review and 40 (40% of Maximum Marks -100) in the External Viva Voca. The total of CIE + SEE shall be a minimum of 100 (50% of Maximum Marks -200).

CIE- Continuous Internal Evaluation (100 Marks)

Bloom's Category	STUDIO	
	Studio Assessment	Panel Review
	60 Marks	40 Marks
Remember	10	
Understand	10	
Apply	10	10
Analyse	10	10
Evaluate	10	10
Create	10	10

Course Contents and Lecture Schedule:

Module No.	Topics	No. of Lectures
	Introductory assignment/holiday assignment	8 Hrs
	Minor Project	30 Hrs.
	Review- Minor project	8 Hrs.
	Study Model	8 Hrs
	Major Project (including case study & literature study)	54 Hrs.
	Final external Review	8 Hrs.
	Total	**120 Hrs.**

Semester	:	**6th**				
Course Title	:	**MATERIALS AND METHODS IN BUILDING CONSTRUCTION-VI**				
Course Code	:	**BAT602**				
Course Type	:	**Integrated**				
Category	:	**BSAE** (Building Science & Applied Engineering Courses)				
Stream	:	**Architecture**				
Total Hours/week (L: T:P:S)		**1:0:0:3**		**CIE**	:	**50 Marks**
				SEE (Theory)	:	**100 Marks**
Credits	:	**04**		**SEE Duration**	:	**4 Hrs.**

Course Learning Objectives: Students will be able to:

Sl.No	Course Objectives
1	To acquaint the students with construction practices pertaining to structural glazing, Metal Cladding and roofing systems and to study constructional systems and detailing of alternative material doors, windows and partition

Teaching-Learning Process Pedagogy (General Instructions):

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

1. **Integration of Theory and Practice:** Emphasize the practical application of theoretical knowledge by incorporating hands-on activities, case studies, and site visits to enhance understanding of building materials and construction methods.
2. **Demonstration and Visual Aids:** Utilize visual aids, such as diagrams, illustrations, and multimedia presentations, to enhance the understanding of different building materials, construction techniques, and structural elements.
3. **Active Learning and Collaborative Discussions:** Encourage active learning through group discussions, brainstorming sessions, and problem-solving activities to foster critical thinking and deeper understanding of the subject matter.
4. **Real-life Examples and Case Studies:** Incorporate real-life examples and case studies to demonstrate the relevance and practicality of the concepts covered in the modules. This can include showcasing, contemporary architectural projects, and sustainable construction practices.
5. **Assessment through Projects and Presentations:** Assign projects and presentations that require students to apply their knowledge and skills acquired during the modules.
6. **Continuous Feedback and Assessment:** Provide regular feedback and assessment to students throughout the learning process to monitor their progress and address any misconceptions or gaps in understanding.
7. **Encouraging Research and Exploration:** Encourage students to explore additional resources, conduct research, and stay updated with the latest advancements in building materials and construction methods, fostering a sense of curiosity and lifelong learning.

DSATM

Scheme of Teaching and Examinations for B Arch Programme -2025-26
Outcome Based Education and Choice Based Credit System (CBCS)
(Effective from the Academic Year 2025-26)

COURSE SYLLABUS

Module No.	Contents of the Module	Hours
1	1) **Glass as a building material :** Glass manufacturing in various types like plate, tinted, decorative, reinforced, laminated glass block, fibre glass, glass murals, partially coloured glass, etching of glass and its applications in building industry for both exteriors and interiors. Glass fabrication techniques, fibre reinforced composite materials and products. 2) **Frameless glass doors and windows and partitions** : Fixing and fabrication details.	12
Pedagogy	Minimum one plate on each construction topic. Site visits to be arranged by studio teachers. Study of material application in the form of portfolio.	
2	3) **Structural Glazing and cladding :** Fixing and fabrication details. 4) **Point supported glazing :** Fixing and fabrication details. 5) **Introduction to metal cladding :** ACP, Aluminium louvers; Fixing and fabrication details.	12
Pedagogy	Minimum one plate on each construction topic. Site visits to be arranged by studio teachers. Study of material application in the form of portfolio.	
3	6) **Glass and Metal cladding of facades and building envelopes :** Fixing and fabrication details. 7) **UPVC, PVC & FRP :** Doors and windows and partitions (Detailing and study of joinery). 8) **Wooden sliding and folding doors and partitions :** Principles and methods of construction and detailing.	12
Pedagogy	Minimum one plate on each construction topic. Site visits to be arranged by studio teachers. Study of material application in the form of portfolio.	
4	9) **Steel sliding and folding doors and partitions :** Principles and methods of construction and detailing. 10) **Aluminium sliding and folding doors and partitions:** Principles and methods of construction and detailing.	12
Pedagogy	Minimum one plate on each construction topic. Site visits to be arranged by studio teachers. Study of material application in the form of portfolio.	
5	11) **Skylight in steel and glass:** Principles and methods of construction and detailing. 12) **Alternative wall technologies:** Sandwich panel walls, PUF panels etc.	12
Pedagogy	Minimum one plate on each construction topic. Site visits to be arranged by studio teachers. Study of material application in the form of portfolio.	

List of Sheet work for portfolio:

Sl.No	Sheet Work with miniature models	COs
1	Sheet: **Introduction to Glass :** Types of Glasses, its properties and applications.	CO1
2	Sheet: **Frameless Glass Door & Partition :** Full height Single Door & Partition with Double Door Details. Principles and methods of construction and detailing.	CO1, CO2
3	Sheet: **Structural Glazing and cladding :** Curtain wall and structural glazing system. Principles and methods of construction and detailing.	CO1, CO2
4	Sheet: **Point supported glazing :** Glazing by using Stainless steel Stud fittings. Principles and methods of construction and detailing.	CO1, CO2
5	Sheet: **ACP Cladding :** Fabrication and installation details of exterior wall Aluminium Composite Panel Cladding. Principles and methods of construction and detailing.	CO1, CO2
6	Sheet: **UPVC Window :** Casement & Sliding Window Details. Principles and methods of construction and detailing.	CO3
7	Sheet: **PVC Door :** Fabrication Details of PVC Door. Principles and methods of construction and detailing.	CO3
8	Sheet: **Wooden sliding and folding doors and partitions :** Fabrication and operating system of wooden sliding & folding door. Principles and methods of construction and detailing.	CO3
9	Sheet: **Steel sliding and folding doors and partitions :** Fabrication and operating system of steel sliding & folding door. Principles and methods of construction and detailing.	CO3
10	Sheet: **Skylight in steel and glass :** Fabrication and Installation details of Steel and Aluminium Extrusion Supported Skylight. Principles and methods of construction and detailing.	CO4
11	Sheet: **Sandwich panel walls :** Fabrication and Installation details of Aerocon Composite Panel Partition. Principles and methods of construction and detailing.	CO4
12	Sheet: **PUF panels :** Fabrication and Installation details of PUF panel roofing system. Principles and methods of construction and detailing.	CO4

	Reference Books
S.No.	**Books (Title of the Book/Name of the author/Name of the publisher/Edition and Year)**
1	Francis, D.K. (2008), "Building Construction Illustrated", Fourth Edition, Wiley India Pvt. Ltd.
2	Mackay, J.K. (2015) – Volume 1, "Building Construction", Fourth Edition, Pearson India.
3	Roy Chudley (2015) – Volume 1, "Construction Technology" Second Edition, Pearson India.
4	Barry R. (1999) – Volume 3 & 4, "The Construction of Buildings", Fourth Edition, East-West Press Pvt. Ltd., New Delhi.
5	Lyons Arthur (2014), "Materials for Architects and Builders", Fifth Edition, Routledge.
6	Varghese P.C. (2015), "Building Materials", Second Edition, PHI Learning Pvt. Ltd.

Weblinks and Video Lectures (e-Resources)	
1	https://ndl.iitkgp.ac.in
2	https://www.youtube.com/watch?v=loCKY6kZM-U
3	https://www.youtube.com/watch?v=BGPaywY1wvs
4	https://www.youtube.com/watch?v=i_5XuGZPiog
5	https://www.youtube.com/watch?v=2fMISF6IreM

Course Outcomes: At the end of the course, the student will be able to:

CO	Course Outcomes	RBT Level	Level Indicator
CO1	Identify and describe various glazing, cladding, and partition materials and their applications.	L1, L2	Remember, understand
CO2	Apply construction knowledge to produce detailed drawings of glass and metal systems.	L3	Apply
CO3	Analyze material systems for their suitability in building envelopes and partitions.	L4	Analyse
CO4	Evaluate construction solutions based on performance, durability, and aesthetics.	L5	Evaluate
CO5	Design and develop innovative construction solutions using advanced materials.	L6	Design

Mapping of Course Outcomes to Program Outcomes: *(75%-100%=3 ; 50%-74% = 2 ; Below 50 = 1)*

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1												2			
CO2	3														
CO3		3													
CO4				2											
CO5			3												

Assessment Pattern (both CIE and SEE)

4 Credit Course-BSAE

Assessment Method	Component	Type of Assessment	Assessment Type used	Max. Marks	Evaluation Details	Reduced Marks	Min. Marks	Total
CIE	Studio	Continuous Assessment Tool	Sheet work/ Portfolio and Models	40	Accuracy and Completeness of Construction Drawing Sheets **(20 marks)** Documentation and Portfolio **(10 marks)** Quality and Presentation of Construction Models **(10 marks)**	20		20
		Internal Assessment test	IAT 1	50	Internals paper	20		20
			IAT 2	50	Internals paper			
	Theory	AAT	Seminar/ Case Study Presentations	10	Knowledge and understanding **(6 marks)** Presentation Skills **(3 marks)** Engagement and Interaction **(1 mark)**	5		5
		AAT	MCQ/Quiz	10	--	5		5
						Total CIE Marks	**25**	**50**
SEE				**100**	SEE Exam is theory exam, conducted for 75 marks.	**100**	**40**	**100**

CIE+SEE	75	150

The Marks of Continuous Internal Evaluation (CIE) is 50 and for Semester End Exam (SEE) is 100marks. The student has to obtai n a minimum of 50% (25 marks out of 50 marks) of the maximum marks of CIE and 40% (40 marks out of 100 marks) of maximum marks of SEE (theory) to pass. The passing percentage shall not be less than the 50% in aggregate for a course (i.e. CIE and SEE (put together). Based on the marks scored in CIE+SEE grading will be awarded for this course.

CIE- Continuous Internal Evaluation (50 Marks)

Bloom's Category	Studio		Theory	
	Continuous Assessment Tool	Internal Assessment Tool (IAT)	Alternative Assessment Tool (AAT)	
	Sheet Work and portfolio	Internal Papers	Seminar/ Case Study Presentations	MCQ/Quiz
	20 Marks	20 Marks	5 Marks	5 Marks
Remember	6	4	1	2
Understand	6	4	1	2
Apply	3	4	1	1
Analyse	3	4	2	-
Evaluate	2	4	-	-

CIE Internal Assessment Test Plan

CO's	Marks Distribution					Total Marks	Weightage
	IAT-1			IAT-2			
	Module-1	Module-2	Module-3	Module-4	Module-5		
CO1	2	2	2	2	2	10	20%
CO2	4	4	4	4	4	20	40%
CO3	2	2	2	2	2	10	20%
CO4	2	2	2	2	2	10	20%
Total	10	10	10	10	10	50	100 %

SEE- Semester End Examination (100 Marks)

Bloom's Category	SEE Marks
Remember & understand	30
Apply	30
Analyse	20
Evaluate	20

SEE Course Plan

CO's	Marks Distribution					Total Marks	Weightage
	Module-1	Module-2	Module-3	Module-4	Module-5		
CO1	6	6	6	6	6	30	25 %
CO2	6	6	6	6	6	30	25 %
CO3	4	4	4	4	4	20	25 %
CO4	4	4	4	4	4	20	25 %
Total	20	20	20	20	20	100	100 %

Course Contents and Lecture Schedule

Module No.	Topics	No. of Lecture hrs.
1	Glass as a building material	4 hrs
1	Frameless glass doors and windows and partitions	12 hrs
2	Structural Glazing and cladding	4 hrs
2	Point supported glazing	4 hrs
2	Introduction to metal cladding	4 hrs
3	Glass and Metal cladding of facades and building envelopes	4 hrs
3	UPVC, PVC & FRP	4 hrs
3	Wooden sliding and folding doors and partitions	4 hrs
4	Steel sliding and folding doors and partitions	6 hrs
4	Aluminium sliding and folding doors and partitions	6 hrs
5	Skylight in steel and glass	6 hrs
5	Alternative wall technologies	6 hrs
	Total	**60 Hrs.**

Semester	:	**6th**				
Course Title	:	**LNDSCAPE ARCHITECTURE**				
Course Code	:	**BAT603**				
Course Type (Theory/ Practical/ Integrated)	:	**Theory**				
Category	:	**PCC**				
Stream	:	**Architecture**		**CIE**	:	**50 Marks**
Total Hours (L: T:P:S)	:	**2:0:0:1 Hrs/Week**		**SEE**	:	**100 Marks (Reduced to 50 marks)**
Credits	:	**3**		**SEE Duration**	:	**3 Hrs.**

Course Learning Objectives: Students will be able

Sl. No	Course Objectives
1.	To introduce the students to the discipline of Landscape Architecture.
2.	To advance analytical and planning skills for Architectural project sites.
3.	To develop design skills for small landscape projects.

Teaching-Learning Process

(General Instructions)

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

1. **Lecture component:** Various landscape design projects to explain the design philosophies, theoretical aspects of site analysis and site planning, element of landscape architecture and design process will be delivered as lecture component.
2. **Literature study:** Exercise on 'relating architecture and landscape' may be undertaken as a literature study exercise.
3. **Studio component:** Studio exercises in site analysis, site planning and a small landscape design project.

Note:

- Lecture method (L) does not mean only the traditional lecture method, but a different type of teaching method may be adopted to develop the outcomes.
- Faculties handling subject can discuss how every concept can be applied to the real world - and when that's possible, it helps improve the students' understanding.
- Individual teachers can device innovative pedagogy to improve teaching-learning.

COURSE CURRICULUM

Module No.	Topics	Hours
1	**Introduction to the discipline of landscape architecture** a. Landscape as a broad terminology, Natural and Man-modified landscapes. b. Scope and nature of professional work in contemporary landscape architecture c. Historical overview of garden design; types of gardens.	6 hrs
Pedagogy	1) The teacher can use PPTs, Videos to discuss the style of Landscape design. 2) The students need to sketch and document elements of landscape architecture. 3) Quizzes, models, seminars from students can be encouraged.	
2	**Relating Architecture and Landscape, Site analysis and Site planning** a. Study of architectural response to landscapes and understanding the relation between architecture and landscape through case examples. b. The idea of site as part of whole/larger landscape, Site inventory and analysis: physical, biological, social contextual studies and layers of site analysis, site suitability analysis, inferences, and response for architectural interventions. c. Design considerations and approaches to site planning, site program, siting of buildings and open spaces, introduction to grading and land modifications, working with sloping sites. Demonstration of understanding of site analysis and site planning through studio exercise.	6 hrs
Pedagogy	1) The teacher can use PPTs, Videos to discuss the style of Landscape design. 2) The students need to sketch and document elements of landscape architecture. 3) Quizzes, models, seminars from students can be encouraged.	
3	**Elements of landscape architecture and their application in landscape design** Classification of plants, Taxonomy, Units of taxonomy, Botanical names, and common names of plant materials. Commonly used in landscape design. a. Primary landscape elements: Landform, water and vegetation, Design considerations and their role in articulating outdoor spatial design. b. Secondary landscape elements: Street furniture, landscape walls, paving, inert ground covers, trellis, outdoor shading structures, embellishments, etc. Design considerations and their role in spatial design. Hard and soft landscapes.	10 hrs
Pedagogy	1) The teacher can use PPTs, Videos to discuss the style of Landscape design. 2) The students need to sketch and document elements of landscape architecture. 3) Quizzes, models, seminars from students can be encouraged.	
4	Works of noted landscape architects and landscape projects Examples in modern landscape: works of Garret Eckbo, Lawrence Halprin and Peter Latz. Examples of contemporary landscape projects: works of Martha Schwartz , Maya lin, Peter Walker & Partners, Sasaaki, Michael Van Valkenburgh, Turenscape etc. Landscape projects in India: works of Ravindra Bhan, Shaheer Associates etc. Examples should cover various categories of landscape design such as residential,	6 hrs

	commercial, institutional, public plaza, water/riverfront, and other categories. The content of this module should emphasis on design philosophies, the changing styles and changing priorities of the profession over time.	
Pedagogy	1) The teacher can use PPTs, Videos to discuss the style of Landscape design. 2) The students need to sketch and document elements of landscape architecture. 3) Quizzes, models, seminars from students can be encouraged.	
5	**Landscape Design project** Demonstration of an understanding of landscape design through simple and small design exercise as studio project. Clarity in design process, detail development and representation of the landscape design scheme is to be emphasized. One more minor analysis activity can be included as a project: Study the design of a current or recently proposed landscape project such as riverfront development, lake projects, religious corridors, tourism projects and analyse and assess the design, identify the loopholes and its impact on the environment and inhabiting population NOTE: Studio exercises should be introduced after relevant theoretical inputs are delivered utilizing the contact periods.	**14 hrs**
Pedagogy	1) The teacher to give an assignment of an open space in the city/locality or an academic project of an earlier semester or current semester to design with all details. 2) The students need complete the assignment with details and proper presentation.	

List of Activities:

Sl. No.	Activities	COs
1	Site analysis (understanding contours, slope analysis and cut and fill)	CO2& CO3
2	Understanding plant and their species used in landscape design	CO2& CO3
3	Case study of any existing landscape project	CO3& CO4
4	Presentation on various landscape architect and understand their design philosophies	CO3& CO4
5	Landscape project	CO5

Reference Books	
Sl. No.	**Title of the Book/Name of the author/Name of the publisher/Edition and Year**
1	Laurie, M. An introduction to landscape architecture, Elsevier. 1975.
2	Motloch, J. Introduction to landscape design, John Wiley & Sons, 2001.
3	Holden, R &Liversedge, J. Landscape Architecture: An Introduction, Laurence King publishing ltd. 2014.
4	Girot, C. **The course of landscape architecture: A history of our designs on our natural world**, Thames & Hudson. 2016.
5	Simonds, J O. **Landscape Architecture: A manual of site planning and design**, McGraw- Hill, 1997.
6	LaGro, J. **Site Analysis: Sustainable site planning and design**, John Wiley & Sons. 2013.
7	Birksted, J. Relating architecture to landscape, E&FN Spon. 2004. 8. Shaheer, M &Dua, G. Landscape Architecture in India: A reader, LA, Journal of landscape architecture. 2010.

Weblinks and Video Lectures (e-Resources)	
1	https://youtu.be/N7sgg9L3F_A
2	https://youtu.be/IbwdNFEkFuE
3	https://youtu.be/C6JeM4GopVQ
4	https://youtu.be/zSDbts3i0Ak

Course Outcomes: At the end of the course, the student will be able to:

CO	Course Outcomes	RBT Level	Level indicator
CO1	To **understand** the relationship between building and outdoor environment, elements of landscape design, and role of site planning in enhancing quality of building environment.	Remember & understand	L1 & L2
CO2	To **apply** site inventory, various construction techniques of hardscape elements, landforms, and their application in articulating outdoor spaces	Apply	L3
CO3	To **analyze** contours, primary and secondary landscape elements, and their design consideration in site planning.	Analyse	L4
CO4	To **evaluate** classical landscape elements, design philosophies and contemporary approaches in landscape design through various design projects.	Evaluate	L5
CO5	To **develop** a site plan with landscape design based on visual and physical analysis and integrating required functions.	Design	L6

Mapping of Course Outcomes to Program Outcomes: *(75%-100%=3 ; 50%-74% = 2 ; Below 50 = 1)*

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1															
CO2	3														
CO3						1								2	2
CO4			2	3		3				1					
CO5			3	2			3		2						

Assessment Pattern (both CIE and SEE):

3 Credit Course – BSAE								
Assessment Method	Component	Type of Assessment	Assessment Type used	Max. Marks	Evaluation Details	Reduced Marks	Min. Marks	Total
CIE	IA exams	IAT 1	Internal Assessment exams	50	Internal paper	20		20
		IAT 2		50				
						Total CIE (IAT)		20
	Studio Assessment/exercise	AAT	seminars, group presentations/ case study etc.	30	Understanding, Presentation, Analysis, Design, Communication,	15		15
		AAT	Landscape Project	30		15		15
						Total CIE Practical / Activities		30
						TOTAL CIE	25	50
SEE	SEE Exam will be Theory exam			100	SEE Exam will be Theory exam	50	20	50

CIE+SEE	50	100

NOTE: The Minimum Marks to be secured in CIE to appear for SEE shall be 25 (50% of Maximum marks – 50). The Minimum Marks to be secured in SEE shall be 20 (40% of Maximum marks – 50). The design activities will be assessed through only CIE. The passing percentage shall not be less than the 50% in aggregate for a course (i.e. CIE and SEE (put together). Based on the marks scored in CIE+SEE grading will be awarded for this course.

CIE- Continuous Internal Evaluation (50 Marks):

Bloom's Category	Continuous Assessment Tests		Theory Alternative Assessment Tool (AAT)
	Test-1 (50 marks)	Test-2 (50 marks)	50 Marks
Remember			
Understand	15	10	-
Apply	15	10	-
Analyse	20	20	-
Evaluate	-	10	30
Create	-	-	20

CIE Internal Assessment Test Plan

	Marks Distribution					Total Marks	Weightage
	Test-1			Test-2			
CO's	Module-1	Module-2	Module-3	Module-4	Module-5		
CO1	10	5	5	5	-	25	20%
CO2	5	5	5	5		20	40%
CO3	-	10	10	5	10	35	30%
CO4	-	-	-	10	10	20	10%
CO5	-	-	-	-	-	-	-
Total	15	20	20	25	20	100	100%

SEE- Semester End Examination (50 Marks)

Bloom's Category	SEE Marks (Theory exam of 100 marks to reduce to 50)
Remember & Understand	20%
Apply	20%
Analyze	20%
Evaluate	20%
Create	20%

SEE Course Plan

CO's	Marks Distribution					Total Marks	Weightage
	Module-1	Module-2	Module-3	Module-4	Module-5		
CO1	10	10	10	10	-	40	40%
CO2	10	10	10	-	-	30	30%
CO3	-	-	-	10	-	10	10%
CO4	-	-	-	-	-	-	-
CO5	-	-	-	-	20	20	20%
Total	20	20	20	20	20	100	100%

Semester	**:**	**6th**				
Course Title	**:**	**Contemporary Architecture**				
Course Code	**:**	**BAT604**				
Course Type	**:**	**Theory**				
Category	**:**	**PCC** (Professional Core Courses)				
Stream	**:**	**Architecture**				
Total Hours/week (L:T:P:S)	**:**	**3:0:0:0**		**CIE**	**:**	**50 Marks**
				SEE (Theory)	**:**	**100 Marks (Reduced to 50 Marks)**
Credits	**:**	**03**		**SEE Duration**	**:**	**3 Hrs.**

Course Learning Objectives: Students will be taught

S.No	Course Objectives
1	**To develop a critical understanding of Contemporary Architecture:** Through analyzing and comparing Modern, Post Modern, Deconstructivism and High Tech architecture.
2	**To learn ethical and sustainable Practices:** Learning from historical practices that prioritized local materials and sustainable methods and applying these lessons to modern contemporary design practices, and an understanding of the ethical implications of architectural design and the responsibility of architects to preserve cultural heritage.
3	**To build a visual vocabulary of Contemporary Architecture:** By studying representative buildings and from each period, students will develop a strong visual vocabulary of Indian and Western architecture.

Teaching-Learning Process

Pedagogy (General Instructions): These are sample Strategies; which teachers can use to accelerate the attainment of the various course outcomes.

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

DSATM

Scheme of Teaching and Examinations for BE Programme -2025-26

Outcome Based Education and Choice Based Credit System (CBCS)

(Effective from the Academic Year 2025-26)

	COURSE SYLLABUS	
Module No.	**Contents of the Module**	**Hours**

1	• **Modern Architecture in India-1**: Architecture in India (Post-Independence): Works of public nature in Chandigarh and Ahmedabad (Legislative Assembly Complex including High Court, Legislative assembly and Secretariat, Chandigarh and Mill Owners Building, Ahmedabad), IIM, Ahmedabad and its significance. • **Modern Architecture in India-2**: Ideas and works of BV Doshi (Institute of Indology Ahmedabad, IIM-Bangalore and Gufa, Ahmedabad) and Charles Correa: (Jawahar Kala Kendra, Vidhan Bhavan Bhopal, Kala Akademi Goa, Kanchenjunga Apartments Mumbai)	**10**
Pedagogy	1. Case studies by analyzing iconic buildings from each period and engage students in design exercises where they create structures inspired by these periods, translating historical principles into contemporary solutions. 2. Compare examples quoted to known structures, focusing on spatial organization, light, engineering, climate and material usage. 3. Utilize 3D modelling software to explore historical structures virtually. 4. Explore online resources like historical building databases and virtual tours of sites.	
2	• **Modern Architecture in India-3:** Ideas and works of Raj Rewal and Uttam Jain (Pragati Maidan, New Delhi and Asian Games Village, New Delhi), Achyut Kanvinde (IIT, Kanpur and Nehru Science Centre, Mumbai), Uttam Jain (Lecture Theatres, Jodhpur and Engineering College, Kota). • **Modern Architecture in India-4:** Enrichment of Indian experience- Cost effectiveness and local influences. Lauire Baker and Anant Raje (Centre for Development Studies, Thiruvananthapuram and St. John Cathedral at Tiruvalla) and Anant Raje (IIFM, Bhopal and Management Development Centre, IIM-A). **Parallel trends in Indian architecture:** a) Revivalistic- monumental, religious b) Experimental-Pondicherry, Belgium embassy, IITB, Sriram Centre New Delhi c) Vernacular Influence-Cost effective concepts.	9
Pedagogy	**1.** Case studies by analyzing iconic buildings from each period and engage students in design exercises where they create structures inspired by these periods, translating historical principles into contemporary solutions. **2.** Compare examples quoted to known structures, focusing on spatial organization, light, engineering, climate and material usage. **3.** Utilize 3D modelling software to explore historical structures virtually. **4.** Explore online resources like historical building databases and virtual tours of sites.	
3	• **Last phase of Modern Architecture:** Ideas and works of Richard Meier (Smith House, Connecticut and Getty Centre, Brent Wood, Los Angeles) • **Post Modern Architecture**: Development of Postmodernism with its origins in the alleged failure of Modern architecture from 1950s, and spreading in the 1970s and its continuous influence on present-day architecture. Robert Venturi (Venturi House), Charles Moore (Architect's Own House at Orinda and Piazza d'Italia, New Orleans)	**10**

Pedagogy	1. Case studies by analyzing iconic buildings from each period and engage students in design exercises where they create structures inspired by these periods, translating historical principles into contemporary solutions. 2. Compare examples quoted to known structures, focusing on spatial organization, light, engineering, climate and material usage. 3. Utilize 3D modelling software to explore historical structures virtually. 4. Explore online resources like historical building databases and virtual tours of archaeological sites.	
4	• **High-tech architecture or Structural Expressionism-1:** An architectural style that emerged in the 1970s: The High-tech architecture practitioners include British architects Sir Norman Foster (Hong Kong Shanghai Bank and Renault Distribution Centre, Swindon, England), Sir Richard Rogers, Sir Michael Hopkins. • **Hig h-tech architecture or Structural Expressionism-2:** The High-tech architecture practitioners include Italian architect Renzo Piano (Pompidou Centre, Paris and Menil Museum, Houston) and Spanish architect Santiago Calatrava (Lyon-Satolas Railway Station and Olympic Stadium at Athens).	**8**
Pedagogy	1. Case studies by analysing iconic buildings from each period and engage students in design exercises where they create structures inspired by these periods, translating historical principles into contemporary solutions. 2. Compare examples quoted to known structures, focusing on spatial organization, light, engineering, climate and material usage. 3. Utilize 3D modelling software to explore historical structures virtually. 4. Explore online resources like historical building databases and virtual tours of sites.	
5	• **Hyper theories of Architecture-1:** Development of postmodern architecture in 1980s in the ideas of Deconstructivism including, Frank Gehry (Aerospace Museum, Santa Monica and Guggenheim Museum, Bilbao), Daniel Leibskind (Jewish Museum, Berlin and World Trade Centre, New York), Rem Koolhas (Dance Theatre, The Hague and Netherlands Sports Museum). • **Hyper theories of Architecture-2:** Ideas of Deconstructivism including, Peter Eisenman, Zaha Hadid (The Peak Club, Hong Kong and IBA Housing Block 2, West Berlin), Coop Himmelb(l)au, and Bernard Tschumi.	**8**
	1. Case studies by analysing iconic buildings from each period and engage students in design exercises where they create structures inspired by these periods, translating historical principles into contemporary solutions. 2. Compare examples quoted to known structures, focusing on spatial organization, light, engineering, climate and material usage. 3. Utilize 3D modelling software to explore historical structures virtually. 4. Explore online resources like historical building databases and virtual tours of sites.	

List of Exercises:

Sl.No	Exercises	COs
1	Sketching and Study models	CO2, CO4
2	Digital Presentation	CO1, CO5
3	Design of elements/ product inspired from Architectural Style	CO4, CO5
4	Quiz/ Identify the Structure	CO1, CO2
5	Debate	CO2, CO3

Reference Books	
S.No.	**Books (Title of the Book/Name of the author/Name of the publisher/Edition and Year)**
1	Morgan, Ann Lee & Taylor Colin , "Contemporary Architecture".
2	Bahga, Bahga and Bahga , "Modern Architecture in India", 1993, Galgotia Pub. Co.

Weblinks and Video Lectures (e-Resources)	
1	https://ndl.iitkgp.ac.in
2	https://www.youtube.com/watch?v=Ym2CGp69oBQ
3	https://www.youtube.com/watch?v=QkVcUJauY0Y
4	https://www.youtube.com/watch?v=BfhHYPaIVwo

Course Outcomes: At the end of the course, the student will be able to:

CO	Course Outcomes	RBT Level	Level Indicator
CO1	**Identify and describe** the key architectural characteristics and typologies of Modern Architecture, Post Modern Architecture and Deconstructivism.	**L1, L2**	Remember and understand
CO2	**Apply** the principles of design and architectural features of buildings from the Modern Architecture, Post Modern Architecture and Deconstructivism.	**L3**	Apply
CO3	**Analyze** the significance of architectural works from the Modernism to Deconstructivism, providing well-supported critiques of their design principles, aesthetic qualities, and cultural impacts.	**L4**	Analyze
CO4	Critically **evaluate** the evolution and influence of architectural styles and typologies from Modern to Deconstructivism buildings, identifying the social, cultural, and technological factors that shaped these styles.	**L5**	Evaluate
CO5	Integrate knowledge of historical architectural principles and typologies to **create** innovative design solutions that respect and reflect historical contexts.	**L6**	Design

Mapping of Course Outcomes to Program Outcomes: *(75%-100%=3 ; 50%-74% = 2 ; Below 50 = 1)*

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1															
CO2	**2**														
CO3															
CO4						**1**									**2**
CO5			**3**		**1**							**2**	**3**		

Assessment Pattern (both CIE and SEE)

3 Credit Course - PCC								
Assessment Method	**Component**	**Type of Assessment**	**Assessment Type used**	**Max. Marks**	**Evaluation Details**	**Reduced Marks**	**Min. Marks**	**Total**
CIE	Studio Assessment	AAT	Exercises	50	Presentation, Analysis, Design, Communication	25		25
	Internal Assessment Test	IAT	IAT 1	50	Internals paper	25		25
			IAT 2	50	Internals paper			
					Total CIE Review		**25**	**50**
SEE		**Exam**		**50**	Question Paper	**50**	**20**	**50**
						CIE+SEE	**50**	**100**

Note: The Minimum Marks to be secured in CIE to appear for SEE shall be 25 (50% of Maximum marks – 50). The Minimum Marks to be secured in SEE shall be 20 (40% of Maximum marks – 50). The design activities will be assessed through only CIE. The passing percentage shall not be less than the 50% in aggregate for a course (i.e. CIE and SEE (put together). Based on the marks scored in CIE+SEE grading will be awarded for this course.

CIE- Continuous Internal Evaluation (50 Marks)

Bloom's Category	**Continuous Assessment Tests**		**Theory**
			Alternative Assessment Tool (AAT)
	Test-1 (50 marks)	**Test-2 (50 marks)**	**50 Marks**
Remember			
Understand	**15**	**15**	
Apply	**15**	**15**	
Analyse	**20**	**20**	
Evaluate	**-**	**-**	**30**
Create	**-**	**-**	**20**

CIE Internal Assessment Test Plan

	Marks Distribution					**Total Marks**	**Weightage**
	Test-1			**Test-2**			
CO's	**Module-1**	**Module-2**	**Module-3**	**Module-4**	**Module-5**		
CO1	**3**	**2**	**1**	**1**	**1**	**8**	**16%**
CO2	**3**	**3**	**3**	**3**		**12**	**24%**
CO3		**7**	**7**	**5**	**5**	**24**	**48%**
CO4	**6**					**6**	**12%**
Total	**12**	**12**	**11**	**9**	**6**	**50**	**100%**

SEE- Semester End Examination (50 Marks)

Bloom's Category	**SEE Marks (100% Theory)**
Remember	**20%**
Understand	**20%**
Apply	**20%**
Analyse	**20%**
Evaluate	**20%**
Create	**-**

SEE Course Plan

CO's	Marks Distribution					Total Marks	Weightage
	Module-1	Module-2	Module-3	Module-4	Module-5		
CO1	3	2	1	1	1	8	16%
CO2	3	3	3	3		12	24%
CO3		7	7	5	5	24	48%
CO4	6					6	12%
Total	12	12	11	9	6	50	100%

Semester	**:**	**6th**				
Course Title	**:**	**Building Services –IV (Acoustics & Noise Control)**				
Course Code	**:**	**BAT605**				
Course Type (Theory/ Practical/ Integrated)	**:**	**Theory**				
Category	**:**	**BSAE** (Building Science & Applied Engineering Courses)				
Stream	**:**	**Architecture**		**CIE**	**:**	**50 Marks**
Teaching hours/ week (L:T:P:S)	**:**	**3:0:0:0**		**SEE**	**:**	**100 Marks (Reduced to 50 Marks)**
				SEE Duration	**:**	**3 Hrs**
Credits	**:**	**3**				

Course Learning Objectives: Students will be able to:

Sl. No	Course Objectives
1	To impart knowledge on basics of acoustics and behavior of sound in an enclosed space and to familiarize with concepts of environmental noise control.
2	To impart knowledge and develop basic understanding on acoustical tools and measurement methods. To understand the various materials and its application used in architecture for acoustical purpose.
3	To study the historical Acoustical Design of different Architectural spaces and IS standards for acoustics.
4	To evaluate the role and capacity of sound and noise in all its variations and to enhance aural experience in built environment- within and without.
5	To design Acoustics of multiple Architectural Spaces like: Open air theatres, Halls for Indoor Sports, home theatres, recording studios, open plan offices, Auditorium etc.

Teaching-Learning Process

Pedagogy (General Instructions):

Some sample strategies to accelerate the attainment of various course outcomes are listed below:

1. Adopt different teaching methods to attain the course outcomes.
2. Include videos to demonstrate various concepts in C.
3. Encourage collaborative (Group) Learning to encourage team building.
4. Ask at least three **HOTS (Higher-order Thinking Skills)** module-wise questions to promote critical thinking.
5. Adopt **Problem-Based Learning (PBL),** which fosters students' analytical skills, and develops thinking skills such as evaluating, generalizing, and analyzing information rather than simply recalling it.
6. Show different ways to solve a problem and encourage the students to come up with creative and optimal solutions.
7. Discuss various case studies to map with real-world scenarios and improve the understanding.
8. Devise innovative pedagogy to improve **Teaching-Learning Process (TLP)**.

DSATM

Scheme of Teaching and Examinations for BE Programme -2025-26
Outcome Based Education and Choice Based Credit System (CBCS)
(Effective from the Academic Year 2025-26)

COURSE SYLLABUS

Module No.	Topics	Hours
1	**Introduction to Sound and Room Acoustics** **1) Introduction to Sound:** Origin and nature of sound, its characteristics and measurement Amplitude, frequency, period, wavelength, velocity of sound, sound pressure, sound intensity, decibel scale, sound and distance inverse square law. human hearing, auditory range for humans (Frequency and Intensity threshold of audibility and pain), pitch (association with frequency), tone, loudness (association with amplitude and intensity), Phon. **2) Room Acoustics:** Reflection - Nature of reflection from plane, convex and concave surfaces, diffraction, Absorption, Echoes, focusing of sound, dead spots, flutter echo. Room Resonance Reverberation time (RT) calculation using Sabine's and Eyring's Formulae. Effect of RT on Speech and music.	6
Pedagogy	1) The subject teacher can use PPTs & Videos to teach basics of the topics 2) The students need to work on the assignments given by the teacher. 3) Quizzes, models, seminars from students can be encouraged.	
2	**Acoustical Tools, Measurements and Materials** **3) Acoustical Tools and Measurements:** Use of SLM (Sound Level Meter), AI (Articulation Index), STI (Speech-Transmission Index), Speech Intelligibility. Sound Attenuation. Absorption coefficients of acoustical materials, NRC value, NC Curves for various spaces. **4) Acoustical Materials:** Vernacular methods of sound insulation, porous materials, panel absorbers, membrane absorbers, acoustical plasters, diffusers, cavity or Helmholtz resonators. Role of functional absorbers, Adjustable acoustics and variable sound absorbers. Acoustical correction and retrofits to existing spaces.	6
Pedagogy	1) The subject teacher can use PPTs & Videos to teach Acoustics tools & Materials. 2) The students need to work on the assignments given by the teacher. 3) Site visit for the material study and applications.	
	Acoustical Design **5) Acoustical Design of Auditoriums** - Multipurpose Halls: History of Greek, Roman theatres. Use of IS code 2526 - 1963 for design and detailing of Auditoriums – Cinema	

3	Halls - Multi- purpose Halls - Halls for speech and music. **6) Acoustical Design and Detailing of Other Spaces -** Open air theatres, Halls for Indoor Sports, home theatres, recording studios, open plan offices, etc. Need and use of sound reinforcement systems, sound masking systems and speech privacy.	**12**
Pedagogy	1) The subject teacher can use PPTs & Videos to teach Historical developments, IS Codes, designing and detailing of auditorium. 2) The students need to work on the assignments given by the teacher. 3) Site visit to understand acoustical designing and detailing of various types of spaces.	
4	**Noise reduction and Control** **7) Introduction to environmental noise control:** Noise, its sources and its classification - outdoor and indoor, airborne and structure borne, impact noise, noise from ventilation system, community and industrial noise. Noise transmission, Mass law and transmission loss. Maximum acceptable noise levels. Design Principles reduction at source, reduction near source, etc. **8) Constructional measures of noise control and sound insulation** -Enclosures, Barriers, Sound insulation (AC Ducts and plants), Vibration isolation control of mechanical noise, floor, wall, ceiling treatment. Sound Isolation. Construction details of composite walls, double walls, floating floors, wood-joist floors, plenum barriers, sound locks, etc. STC (Sound Transmission Class) ratings.	**8**
Pedagogy	1) The subject teacher can use PPTs & Videos to teach problems associated with noise and measures for the same. 2) The students need to work on the assignments given by the teacher. 3) Students interaction with acoustical experts for practical solutions.	
5	**Noise reduction and Control-II** **9) Industrial noise:** Sources of industrial noise - impact, friction, reciprocation, air turbulence and other noise. Methods of reduction by enclosures and barriers. **10) Introduction to Urban Soundscape -** Introduction to Urban noise, Noise sources - Air traffic, Rail traffic, Road traffic, Seashore and inland. Traffic planning against outdoor noise. Noise reduction and control by Site planning, Town planning and Regional Planning consideration. Role of Architects / Urban Planners in shaping the urban soundscape. Sustainable design strategies in building acoustics.	**8**
Pedagogy	1) The subject teacher could arrange for visits to acoustically designed and treated multipurpose halls - general purpose halls used for both speech and music, cinema theatres, Industrial Buildings, etc. 2) Case study reports could be submitted as group assignments. 3) Design of a multipurpose hall - rooms for speech and music for optimum acoustics - drawings and construction details of acoustical treatment.	

List of Programs:

Sl. No.	Experiments/Programs	COs
1	**Experient** to Learn how sound Behaves when traveled through different medium, and also experience the reflection of sound.	CO2
2	**Experiment** to understand the Diffraction affect in Sound, by replicating it with water waves.	CO3
3	**Evaluating** and Creating a Acoustic Heat Map, by collect noise level data of M-Block at different floors	CO4 & CO5
	Value Added Programs	
1	Creating an Acoustic Panel by using Sustainable or Waste Materials and Test them for the real world	CO5

Reference Books	
Sl. No.	**Title of the Book/Name of the author/Name of the publisher/Edition and Year**
1	M.DavidEgan , "Architectural Acoustics".
2	Leslie L. Doelle , "Environmental Acoustics".
3	Vern O.Knudsen and Cyril M.Harris , "Acoustical Designing in Architecture".
4	Peter H. Parkins and H. R. Humphreys , "Acoustics, noise and buildings".
5	F.Alton Everest and Ken C. Pohlmann , "Master Handbook of Acoustics".
6	National Building Code of India (NBC) 2016; Part 8 Section 4
7	IS 1950: 1962 Code of practice for sound insulation of non-industrial buildings
8	IS 3483: 1965 Code of practice for noise reduction in industrial buildings
9	IS 4954: 1968 Recommendations for noise abatement in town planning
10	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
11	IS 11050 (Part 2)1984: Rating of sound insulation in buildings and of building elements: Part 2 Impact sound insulation
12	IS code 2526: 1963Code of practice for acoustical design of auditoriums and conference halls

Weblinks and Video Lectures (e-Resources)	
1	https://ndl.iitkgp.ac.in
2	https://www.youtube.com/watch?v=IftFGdH52Lc
3	https://www.youtube.com/watch?v=JPYt10zrclQ
4	https://www.youtube.com/watch?v=akiWq97dSBA
5	https://www.youtube.com/watch?v=B9u7k2V4YPw
6	https://www.youtube.com/watch?v=IrNBrl9qMLw

Course Outcomes: At the end of the course, the student will be able to:

CO	Course Outcomes	RBT Level	RBT Level Indicator
CO1	Recalling the fundamentals to Sound, Room Acoustics and noise reduction and control.	R,U	L1,L2
CO2	Apply the Acoustical Measurement Tools, methods to room Acoustics quantification and Acoustical materials.	A	L3
CO3	Analyze the historical Acoustical Design, IS standards of acoustical design for different spaces like: auditorium, dance hall, multipurpose hall, music room, recording studio, sports complex etc. and noise reduction and control.	An	L4
CO4	Evaluate the design by physical and quantification method of acoustics and noise control.	E	L5
CO5	Design Acoustics, Noise control measures and detailing for different type of spaces (ex; Open air theatres, Halls for Indoor Sports, home theatres, recording studios, open plan offices, etc.	D	L6

Mapping of Course Outcomes to Program Outcomes:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1												1			
CO2	2														
CO3		3													
CO4				3	1										
CO5			3		1										

Assessment Pattern (both CIE and SEE):

3 Credit Course – BSAE								
Assessment Method	**Component**	**Type of Assessment**	**Assessment Type used**	**Max. Marks**	**Evaluation Details**	**Reduced Marks**	**Min. Marks**	**Total**
CIE	IA exams	IAT 1	Internal Assessment exams	50	Internal paper	20	10	20
		IAT 2		50				
						Total CIE (IAT)	**10**	**20**
	Assignment	AAT	Considering all the Modules	100	Understanding, Presentation, Analysis, Design, Communication,	30	15	30
						Total CIE Practical / Activities	**15**	**30**
						TOTAL CIE	**25**	**50**
SEE	SEE Exam will be Theory exam			**100**	SEE Exam will be Theory exam	**50**	**20**	**50**
						CIE+SEE	**50**	**100**
NOTE: The Minimum Marks to be secured in CIE to appear for SEE shall be 25 (50% of Maximum marks – 50). The Minimum Marks to be secured in SEE shall be 20 (40% of Maximum marks – 50). The design activities will be assessed through only CIE. The passing percentage shall not be less than the 50% in aggregate for a course (i.e. CIE and SEE (put together). Based on the marks scored in CIE+SEE grading will be awarded for this course.								

CIE- Continuous Internal Evaluation (50 Marks)

Bloom's Category	**Theory**			**Practical**
	Continuous Assessment Tests	**Continuous Comprehensive Assessment (CCA)**		**Practical Test**
	IAT-1 & IAT-2	**CCA-1**	**CCA-2**	
	25 Marks	**25 Marks**		
Remember	**8**			
Understand	**8**			
Apply	**17**			
Analyse	**17**			
Evaluate		**12**		
Create		**13**		

CIE Internal Assessment Test Plan

CO's	Marks Distribution					Total Marks	Weightage
	Test-1		Test-2		Test-3		
	Module-1	Module-2	Module-3	Module-4	Module-5		
CO1	2	2	2	2	2	10	20%
CO2	4	4	4	4	4	20	40%
CO3	2	2	2	2	2	10	20%
CO4	2	2	2	2	2	10	20%
CO5							
Total	10	10	10		50	150	50%

SEE- Semester End Examination (50 Marks)

Bloom's Category	SEE Marks (90% Theory+10% Practical Questions)
Remember	10
Understand	10
Apply	10
Analyse	10
Evaluate	10
Create	

SEE Course Plan

CO's	Marks Distribution					Total Marks	Weightage
	Module-1	Module-2	Module-3	Module-4	Module-5		
CO1	5	5	5			15	15%
CO2	5	5	5	5		20	20%
CO3			10	10	10	30	30%
CO4			10	10	15	35	35%
CO5							
Total	10	10	30	25	25	100	100%

Course Contents and Lecture Schedule

Module No.	Topics	No. of Lecture hrs.
1	Introduction to Sound and Room Acoustics	2 hrs
1	Room Acoustics:	4 hrs
2	Acoustical Tools and Measurements:	2 hrs
2	Acoustical Materials:	4 hrs
3	Acoustical Design of Auditoriums	4 hrs
3	Acoustical Design and Detailing of Other Spaces	8 hrs
4	Introduction to environmental noise control	4 hrs
4	Constructional measures of noise control and sound insulation	4 hrs
5	Industrial noise	4 hrs
5	Introduction to Urban Soundscape	4 hrs
	Total	**40 Hrs.**

Semester	**:**	**VI**			
Course Title	**:**	**Building structures-V**			
Course Code	**:**	**BAT606**			
Course Type (Theory/ Practical/ Integrated)	**:**	**Studio**			
Category	**:**	**BSAE**			
Stream	**:**	**Architecture**	**CIE**	**:**	**50 Marks**
Teaching hours/ week (L:T:P:S)	**:**	**1:0:0:2**	**SEE**	**:**	**100 Marks (Reduced to 50 Marks)**
			SEE Duration	**:**	**VIVA**
Credits	**:**	**3**			

Course Learning Objectives: Students will be able to:

Sl. No	Course Objectives
1	Integration of structures with architectural objectives by developing an understanding of building structures and selection criteria for appropriate horizontal systems; conceptual design of long span structures for gravity and lateral wind and seismic loads.

Teaching-Learning Process

Pedagogical Initiatives:

Some sample strategies to accelerate the attainment of various course outcomes are listed below:

1. Adopt different teaching methods to attain the course outcomes.
2. Include videos to demonstrate various concepts in C.
3. Encourage collaborative (Group) Learning to encourage team building.
4. Ask at least three **HOTS (Higher-order Thinking Skills)** module-wise questions to promote critical thinking.
5. Adopt **Problem-Based Learning (PBL),** which fosters students' analytical skills, and develops thinking skills such as evaluating, generalizing, and analyzing information rather than simply recalling it.
6. Show different ways to solve a problem and encourage the students to come up with creative and optimal solutions.
7. Discuss various case studies to map with real-world scenarios and improve the understanding.
8. Devise innovative pedagogy to improve **Teaching-Learning Process (TLP)**.

DSATM

Scheme of Teaching and Examinations for BE Programme -2024-25

Outcome Based Education and Choice Based Credit System (CBCS)

(Effective from the Academic Year 2024-25)

COURSE SYLLABUS

Module No.	Topics	Hours
1	**1) Introduction:** Horizontal or Long Span Structures **2) Structural Analysis and Design to satisfy Building Codes and Standards:** Determine the general loads to be considered in the design of the structure, based on the type of occupancy specified for each area. a) Gravity loading: Dead and Live load calculation based on IS 875 (Part 1&2) b) Seismic loading: Seismic loading calculation based on IS 1893 Code Static Analysis Procedure c) Wind loading:Wind loading calculation based on Indian Standard I.S. 875 (Part3).	6
Pedagogy	1) The teacher can use PPTs, Videos to discuss the subject/concepts 2) The students need to visit sites to understand the Concepts of Design. 3) Quizzes, models, seminars from students can be encouraged.	
2	**3) Design of Portal frame Structure System:** Design of two-dimensional rigid frames that have a rigid joint between column and beam. General framing arrangement of Portal frame for 75M X 300M building, basic load path and total structural weight calculation. **4) Design of Arch and Vault Structures:** Design of curved structural member spanning two points, of masonry, concrete or steel and used as the roofing systems of large span buildings. Design of Arch and Vault arrangement for spanning 75M X 300M building, and basic load path and total structural weight calculation. **5) Design of Dome Structures:** Domes as polar arrays of curved structural systems in masonry, concrete, steel with glass cladding, their structural strength and properties as roofing systems of large column-free spans. Design of dome(s) for spanning 75M X 300M building, basic load path and total structural weight calculation	8
Pedagogy	1) The teacher can use PPTs, Videos to discuss the subject/concepts 2) The students need to visit sites to understand the Concepts of Design. 3) Quizzes, models, seminars from students can be encouraged.	
3	**6) Long Span Planar Truss Design:** Triangular structural system; assembly of simple triangular planar trusses. Planar trusses in roofs and bridges. General framing arrangement of Long Span Truss for 75M X 300M building, and basic load path and total structural weight calculation. **7) Vierendeel truss design:** Truss design with rectangular or square assembly of members with rigid joints capable of resisting bending moments. General framing arrangement of Vierendeel truss for 75M X 300M building, and basic load path and total structural weight calculation.	10
Pedagogy	1) The teacher can use PPTs, Videos to discuss the subject/concepts 2) The students need to visit sites to understand the Concepts of Design. 3) Quizzes, models, seminars from students can be encouraged.	
4	**8) Cable and Suspension Structures:** Design for long-span systems using Cable and suspension systems. Design cable suspended roof to span 75M X 300M building and basic load path and total structural weight calculation. **9) Space Truss:** Design of three dimensional trusses, their structural properties and strength due to three dimensional triangulation. Design of Space Truss roof for spanning 75M X 300M building, and basic load path and total structural weight calculation.	8

Pedagogy	1) The teacher can use PPTs, Videos to discuss the subject/concepts 2) The students need to visit sites to understand the Concepts of Design. 3) Quizzes, models, seminars from students can be encouraged.	
5	**10) Concrete Shell structure design:** Design of double curved surfaces formed from warped surface (e.g. hyperbolic parabolic); their properties and strength as light-weight construction for column free large spans. Design of Concrete shell roof to spanning 75M X 300M building, and basic load path and total structural weight calculation. **11) Fabric Structure:** Design of membrane structures of thin flexible fabric covers that provide light-weight free-form roofing system. Design of Fabric roof to span 75M X 300M building, and basic load path and total structural weight calculation.	**8**
Pedagogy	1) The teacher can use PPTs, Videos to discuss the subject/concepts 2) The students need to visit sites to understand the Concepts of Design. 3) Quizzes, models, seminars from students can be encouraged.	

List of Activities/Programs:

Think Pair and Share (Blended Learning): provides an opportunity for students to learn from one another
Problem Solving: encourages cognitive thinking and enables creative problem solving
Visit to a construction site to evaluate Various types of large span structures.
Seminar by students in groups on their learnings.
Case studies: maps different domains in real time applications
Demonstration: exhibits the implementation process

Text Books
Title of the Book/Name of the author/Name of the publisher/Edition and Year
Martin Bechthold,Daniel L Schodek, “Structures”;2014,PHI Learning Private limited.
Works of Felix Candela Works of Frei Otto Works of Hassan Fathy Works of P.L. Nervi Works of Sir Buck minister Fuller
Reference Books

Web links and Video Lectures (e-Resources)	
1	https://ndl.iitkgp.ac.in
2	https://www.youtube.com/watch?v=GDs1HiWPZ2U https://www.youtube.com/watch?v=KWnBNf1INfs
3	https://www.youtube.com/watch?v=_JMtIkNkzbk https://www.youtube.com/watch?v=l0s9CVmusmY
4	https://www.youtube.com/watch?v=2Wamzp4TaOE
5	https://www.youtube.com/watch?v=APc0EXTw2KQ

Course Outcomes: At the end of the course, the student will be able to:

CO	Course Outcomes	RBT Level	RBT Level Indicator
CO1	**Remember and Understand** the fundamental principles, types, and behavior of long-span structural systems under different load conditions.	L1, L2	Remember
CO2	**Apply** IS codes and standards to perform structural analysis and load calculations for long-span buildings.	L3	Apply
CO3	**Analyze** the load distribution, material efficiency, and structural performance of different long-span systems.	L4	Analyze
CO4	**Evaluate** the feasibility and efficiency of various long-span structural systems based on structural behavior and material optimization.	L5	Synthesize
CO5	**Design** structural solutions for an airport terminal using appropriate long-span systems while ensuring stability and efficiency.	L6	Evaluate

Mapping of Course Outcomes to

Program Outcomes:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1															
CO2	●					●									
CO3			●							●					
CO4				●					●						
			●										●		

CO5															

Assessment Pattern (both CIE and SEE):

3 Credit Course – BSAE								
Assessment Method	**Component**	**Type of Assessment**	**Assessment Type used**	**Max. Marks**	**Evaluation Details**	**Reduced Marks**	**Min. Marks**	**Total**
CIE	Studio Assessment/exercise	AAT	Portfolio	50	Portfolio, Quiz Group Presentation POP Models Mock Review	25	12.5	25
			Group Presentation	10		5	2.5	5
			POP Models	10		5	2.5	5
			Quiz	10		5	2.5	5
			Mock Review	20		10	5	10
Total CIE Practical / Activities				**100**			**25**	**50**
SEE	SEE Exam will be Theory exam			**100**	SEE Exam will be Theory exam	**50**	**20**	**50**
						CIE+SEE	**50**	**100**
NOTE: The Minimum Marks to be secured in CIE to appear for SEE shall be 25 (50% of Maximum marks – 50). The Minimum Marks to be secured in SEE shall be 20 (40% of Maximum marks – 50). The design activities will be assessed through only CIE. The passing percentage shall not be less than the 50% in aggregate for a course (i.e. CIE and SEE (put together). Based on the marks scored in CIE+SEE grading will be awarded for this course.								

CIE- Continuous Internal Evaluation (50 Marks)

Bloom's Category	**Studio**					
	Portfolio (A)	**Group Presentation (B)**	**POP Models (C)**	**Quiz (D)**	**Mock review (E)**	**Grand Total (A+B+C+D+E)**
	25 Marks	**5 Marks**	**5 Marks**	**5 Marks**	**10 Marks**	**50 Marks**
Remember & Understand	6.2	-	-	2	2	**10.2**
Apply	4.2	-	-	3	2	**9.2**
Analyse	4.2	5	-	-	2	**11.2**
Evaluate	6.2	-	2	-	2	**10.2**
Create	4.2	-	3	-	2	**9.2**
Total	**25**	**5**	**5**	**5**	**10**	**50 Marks**

CIE Course Assessment Plan

CO's	Marks Distribution					Total Marks	Weightage
	Progressive marking						
	Portfolio (A)	Group Presentation (B)	POP Models (C)	Quiz (D)	Mock review (E)		
CO1	6.2	-	-	2	2	**10.2**	**20.4%**
CO2	4.2	-	-	3	2	**9.2**	**18.4%**
CO3	4.2	5	-	-	2	**11.2**	**22.4%**
CO4	6.2	-	2	-	2	**10.2**	**20.4%**
CO5	4.2	-	3	-	2	**9.2**	**18.4%**
Total	**25**	**5**	**5**	**5**	**10**	**50 Marks**	**100%**

SEE- Semester End Examination (50 Marks)

Bloom's Category	SEE Marks
Remember	**25%**
Understand	**10%**
Apply	**30%**
Analyse	**20%**
Evaluate	**10%**
Create	**10%**

SEE Course Plan

CO's	Marks Distribution					Total marks	Weightage
	Portfolio (A)	Group Presentation (B)	POP Models (C)	Quiz (D)	Mock review (E)		
CO1	6.2	-	-	2	2	**10.2**	**20.4%**
CO2	4.2	-	-	3	2	**9.2**	**18.4%**
CO3	4.2	5	-	-	2	**11.2**	**22.4%**
CO4	6.2	-	2	-	2	**10.2**	**20.4%**
CO5	4.2	-	3	-	2	**9.2**	**18.4%**
Total	**25**	**5**	**5**	**5**	**10**	**50 Marks**	**100%**

Course Contents and Lecture Schedule

Module No.	Topics	No. of Lecture hrs.
1	Introduction: Horizontal or Long Span Structures	2 hrs
1	Structural Analysis and Design to satisfy Building Codes and Standards	4 hrs
2	Design of Portal frame Structure System:	2 hrs
2	Design of Arch and Vault Structures	3 hrs
2	Design of Dome Structures	3 hrs
3	Long Span Planar Truss Design	5 hrs
3	Vierendeel truss design	5 hrs
4	Cable and Suspension Structures	4 hrs
4	Space Truss	4 hrs
5	Concrete Shell structure design	4 hrs
5	Fabric Structure	4 hrs
	Total	**40 Hrs.**

Semester	**:**	**6th**			
Course Title	**:**	**Working Drawing-I**			
Course Code	**:**	**BAT607**			
Course Type (Theory/ Practical/ Integrated)	**:**	**Integrated**			
Category	**:**	**PCC**			
Stream	**:**	**Architecture**	**CIE**	**:**	**100 Marks**
Teaching hours/ week (L:T:P:S)	**:**	**0:0:0:4**	**SEE**	**:**	**-**
			SEE Duration	**:**	**-**
Credits	**:**	**4**			

Course Learning Objectives: Students will be able to:

Sl. No	Course Objectives
1	Developing a strong understanding of architectural principles: This emphasizes the theoretical foundation.
2	Acquiring proficiency in technical skills: Acquire proficiency in reading and interpreting architectural and engineering drawings.
3	Explore advanced techniques: Learn to effectively utilize layers, blocks, templates, assemblies, libraries, layouts, plot styles, and error-checking tools within CAD software.
4	Fostering teamwork and collaboration: This emphasizes the importance of professional and interpersonal skills.
5	Real-world Application: The final project, involving the preparation of working drawings for a real-world building project, provides valuable experience in applying theoretical knowledge to a practical context.

Teaching-Learning Process

Pedagogical Initiatives:

Some sample strategies to accelerate the attainment of various course outcomes are listed below:

1. Use of theory, activities, sketches, drawings, assignment and tutorial for teaching.
2. Site visits as per the topic for better understanding the distribution systems.
3. Making physical models and doing role play of the topics helps in good visualization.
4. Evaluation by quiz, tests, classroom activities.
5. Devise innovative pedagogy to improve **Teaching-Learning Process (TLP)**.

DSATM

Scheme of Teaching and Examinations for BE Programme -2025-26

Outcome Based Education and Choice Based Credit System (CBCS)

(Effective from the Academic Year 2025-26)

	COURSE SYLLABUS	
Module No.	**Contents of the Module**	**Hours**
1	Introduction: Overview of Working Drawings; historical perspective; consultants involved in preparation of working drawings, their role and scope; reading, error checking, problems in working drawings	**12**
Pedagogy	1) The teacher can use PPTs, Videos to discuss the concepts in sociology. 2) The students need to do assignments for better understanding of the concepts.	
2	Drafting Conventions: Representation of materials, graphic symbols, line type conventions, grid lines, lettering, colour codes, paper sizes, title blocks, office practices, standardization of details.	**12**
Pedagogy	1) The teacher can use PPTs, Videos to discuss the concepts in sociology. 2) The students need to do assignments for better understanding of the concepts.	
3	CAD Drawings: Working with layers, blocks, templates, assemblies, libraries, layouts, plot styles, error checking, editing.	**8**
Pedagogy	1) The teacher can use PPTs, Videos to discuss the concepts in sociology. 2) The students need to do assignments for better understanding of the concepts.	
4	Project work: Preparation of Architectural Working drawings and details for one of the design projects of medium rise-framed structure, from earlier semester, like Residence, Primary Health Center or School etc. Alternatively, the design of this project may be taken up at the beginning of the semester in a site measuring 30 m x 40 m or less and within B+G+3 floors.	**12**
Pedagogy	1) The teacher can use PPTs, Videos to discuss the concepts in sociology. 2) The students need to do assignments for better understanding of the concepts.	
5	Preparation of Submission Plan of the project assignment. Refer local guidelines and requirements for such building to get permission as per the byelaws. Sustainable systems like rainwater harvesting systems, solar power generation, waste management infrastructure, percolation tanks, soft landscape, trees, etc to be the fundamentals of building design, to be incorporated in the project.	**14**
Pedagogy	1) The teacher can use PPTs, Videos to discuss the concepts in sociology. 2) The students need to do assignments for better understanding of the concepts.	
	Pedagogical Initiatives (Not limited to): ● **Think Pair and Share (Blended Learning):** provides an opportunity for students to learn from one another. ● Problem Solving: encourages cognitive thinking and enables creative problem solving. ● **Poster Presentation:** allows students to represent the concepts visually in order to understand the topics easily. ● **Case studies:** maps different domains in real time applications. ● **Demonstration:** exhibits the implementation process.	

List of Sheet work for portfolio:

Sl. No.	Sheet Work	COs
1	**All Detail floor plans**	**CO5**
2	**Working Drawings:** (Below mentioned sheets are mandatory and any extra sheets could be added as per the subject teacher's requirements) - Center line drawing with columns - Excavation and Footing Drawings - Plinth Beam Drawing - Masonry Drawing - Door window schedule - Elevations 4 sides & Sections through toilet and staircase - Balcony, Toilet sunken slab and Sky-light details - Staircase sections in details	**CO2 & CO3**

Text Books	
Sl. No.	**Title of the Book/Name of the author/Name of the publisher/Edition and Year**
1	Time saver standards by Callender.
2	Time saver standards by E & OE
3	Time saver standards by Nuferts.
Web links and Video Lectures (e-Resources):	
1	https://ndl.iitkgp.ac.in
2	https://www.youtube.com/watch?v=YDQqMFqjChY
3	https://www.youtube.com/watch?v=FZiFAAvsJqc
4	https://www.youtube.com/watch?v=Pyaw8ivOz6Q

Course Outcomes: At the end of the course, the student will be able to:

CO	Course Outcomes	RBT Level	RBT Level Indicator
CO1	**Understand** the significance, historical evolution, and role of consultants in working drawings while developing skills in reading, analyzing, and error-checking them.	**Remember & understand**	**R & U**
CO2	**Apply** drafting conventions, including material representation, symbols, line types, and grid lines, while implementing standard office practices, title blocks, and detail standardization.	**Apply**	**A**
CO3	**Utilize** CAD tools efficiently for layers, blocks, templates, and assemblies while ensuring error checking, editing, and layout organization with industry-standard software.	**Analyze**	**An**
CO4	**Evaluate** the effectiveness of different drawing techniques and technologies in communicating design intent.	**Evaluate**	**E**

CO5	**Develop** detailed architectural working drawings for a selected project, incorporating framing details and structural elements for a medium-rise framed structure, floor design following professional drafting practices.	**Create**	**C**	**Ma pp ng of**

Course Outcomes to Program Outcomes:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1															
CO2	2														
CO3		2													
CO4				3											
CO5			3		1										

Marks	> 15%	≥10% and ≥15%	≤10%
Level	3	2	1

Assessment Details of CIE
The weightage of Continuous Internal Evaluation (CIE) is 100%.
The CIE Marks for the **Sheets component** of the IC shall be minimum of 75 Marks,
Internal VIVA VOCE, for which the weightage could be minimum of 25 Marks

Assessment Pattern (both CIE and SEE):

3 Credit Course – PCC

Assessment Method	Component	Type of Assessment	Syllabus Covergae	Max. Marks	Evaluation Details	Reduced Marks	Min. Marks	Total
CIE	Continuous Assessment through sheets	All the sheets mentioned in the list of activities.	Considering all the Modules	75	Drafting details and self-explanation of the drawings need to be given emphasis.	--	-	75
		Internal VIVA VOCE		25		--	-	25
Total CIE Practical / Activities				**100**		**--**	**50**	**100**

NOTE: The Minimum Marks to be secured in CIE to appear for SEE shall be 25 (50% of Maximum marks – 50). The Minimum Marks to be secured in SEE shall be 20 (40% of Maximum marks – 50). The design activities will be assessed through only CIE. The passing percentage shall not be less than the 50% in aggregate for a course (i.e. CIE and SEE (put together). Based on the marks scored in CIE+SEE grading will be awarded for this course.

Semester	:	**6th**			
Course Title	:	**CULTURE AND BUILT ENVIRONMENT**			
Course Code	:	**BAT618**			
Course Type (Theory/ Practical/ Integrated)	:	**Theory**			
Category	:	**Professional Elective Courses**			
Stream	:	**Architecture**			
Total Hours/week (L:T:P:S)	:	**2:0:0:0**	**CIE**	:	**50 Marks**
			SEE (Theory)	:	**-**
Credits	:	**2**	**SEE Duration**	:	**-**

Course Learning Objectives: Students will be able to:

Sl. No	Course Objectives
1	To sensitise students to culture and behavioral sciences.
2	To understand the influence of culture on design and built environment.
3	Introduce students with relevant examples.

Teaching-Learning Process

Pedagogical Initiatives:

Some sample strategies to accelerate the attainment of various course outcomes are listed below:

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

DSATM

Scheme of Teaching and Examinations for BE Programme -2025-26
Outcome Based Education and Choice Based Credit System (CBCS)
(Effective from the Academic Year 2025-26)

	COURSE SYLLABUS	
Module No.	**Topics**	**Hours**
1	Understand the interrelationship between design and behavioral sciences	**5**
Pedagogy	1. Students will gain conceptual clarity through visual aids, demonstrations, and real-life examples. 2. Explores how the physical environment influences our actions, thoughts, and feelings, and vice versa. 2. Critical thinking will be developed through discussions, comparisons, and analysis of case studies	
2	Understand the contributions to the design field that behavioral sciences have made and can make	**5**
Pedagogy	1. Understanding prevailing cultural factors influencing global architecture, available construction materials, predominant religious practices, common structural forms evolved for local climates, symbolic ornamentation denoting social status hierarchies, and indicators of shared lifestyle ideals or values prioritized per era.	
3	What biosocial, psychological, and cultural characteristics of human beings, as members of a species, as individuals, as a member of various groupings, influence (and, in design, should influence) what characteristics of the built environment?	**5**
Pedagogy	1. Explain the construction process, sustainability issues, life cycle of buildings, etc., 2. Understanding Cultural preferences, beliefs, and traditions often dictate building designs, materials, and aesthetics. 3. Encourage discussions and case study analysis to compare applications, advantages, and limitations.	
4	What effects do what aspects of what environments have on groups of people, under what circumstances and why?	**5**
Pedagogy	1. Understanding the design of public spaces and buildings and its impact on how people interact and socialize. 2. Analysing the needs and preferences of diverse communities is essential for creating inclusive spaces that cater to different cultural groups. 3. Promote critical analysis through group discussions and case studies.	
5	Given these two way interactions between people and environments, what are the mechanisms that link them?	**5**
Pedagogy	1. Understanding how.the built environment can contribute to a sense of place, identity, and community. 2. Promote critical analysis through group discussions and case studies on the effectiveness, sustainability, and applications of different construction techniques.	
	Pedagogical Initiatives (Not limited to): ● **Think Pair and Share (Blended Learning):** provides an opportunity for students to learn from one another. ● Problem Solving: encourages cognitive thinking and enables creative problem solving. ● **Poster Presentation:** allows students to represent the concepts visually in order to understand the topics easily. ● **Case studies:** maps different domains in real time applications. ● **Demonstration:** exhibits the implementation process.	

Sl. No.	Activities	COs
1	**Book reading Activity-** *Culture, Architecture and design*., by Amos Rapoport ● Understanding biosocial, psychological, and cultural characteristics of human beings, as members of a species, as individuals, as a member of various groups. ● what aspects of environments have on groups of people, under what circumstances and why. ● Understanding two way interactions between people and environments, and the mechanisms that link them.	**CO2, CO3**
2	**Case Study Presentation:** Research on the construction material and technology used and understand the influence of culture over the built environment quoting examples across the world.	**CO3, CO4**
3	**Group Discussion/Debate:** Topics like: Are the buildings connecting culture with built environment helps to sustain the demanding needs of the community or the present generation?	**CO3, CO4**
4	**Poster/Chart Making:** Create informative posters on for classroom display.	**CO1, CO5**

Text Books	
Sl. No.	**Title of the Book/Name of the author/Name of the publisher/Edition and Year**
Reference Books	
1	Rapoport, "A. Culture, Architecture and design,' Locke Science publication, 2005
2	Zube, E & Moore., G (Ed,) ' Advances in environment, behavior and design', Springer, 1991

Weblinks and Video Lectures (e-Resources)	
1	https://www.youtube.com/watch?v=y_px2caS6JU
2	https://www.youtube.com/watch?v=i8FeYc8u-Uc
3	https://www.youtube.com/watch?v=lK3oqU2WNY0

Course Outcomes: At the end of the course, the student will be able to:

CO	Course Outcomes	RBT Level	RBT Level Indicator
CO1	Students will be able to **Remember & understand** various building materials and construction method used across different culture and during different eras.	**Remember & understand**	**L1 & L2**
CO2	Students will be able to **perform** simple demonstration of material and technology involved in construction and their limitations	**Apply**	**L3**
CO3	Students will be able to **Analyse** the properties, advantages, and limitations of traditional vs current building technologies.	**Analyse**	**L4**
CO4	Students will be able to **evaluate** the life cycle of certain building materials and its sustainability along with its relationship with culture.	**Evaluate**	**L5**
CO5	Students will be able to **design** and create buildings blending cultural aspects into built environments in the most sustainable way.	**Design**	**L6**

Mapping of Course Outcomes to Program Outcomes:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	3	1	3		3	1						2	2	
CO2	3	1	2	3		3	3						2	2	2
CO3	3	1	2	3		3	2					3	1	2	2
CO4				3		3	3					2		2	2
CO5	3	3	3	3		3	3					3	2		2

Assessment Pattern (both CIE and SEE)

2 Credit Course – PEC

Assessment Method	Component	Type of Assessment	Assessment Type used	Max. Marks	Evaluation Details	Reduced Marks	Min. Marks	Total
CIE	Continuous Comprehensive Assessment (CCA)	CCA 1	CCA-1- **(Case Study- Individual presentation, Group discussions)**	50		25	12.5	25
		CCA 2	CCA-2- **Book reading activity**	50		25	12.5	25
					Total CIE Practical / Activities		**25**	**50**

NOTE: The Minimum Marks to be secured in CIE to appear for SEE shall be 25 (50% of Maximum marks – 50). The Minimum Marks to be secured in SEE shall be 20 (40% of Maximum marks – 50). The design activities will be assessed through only CIE. The passing percentage shall not be less than the 50% in aggregate for a course (i.e. CIE and SEE (put together). Based on the marks scored in CIE+SEE grading will be awarded for this course.

CIE- Continuous Internal Evaluation (50 Marks)

Bloom's Category	Studio						
	Poster presentation (A)	Culture and its interrelationship (B)	Construction technology (C)	Case study (D)	Group discussion (E)	Demonstrate (F)	Grand Total (A+B+C+D+E+F)
Max Marks	15 Marks	5 Marks	5 Marks	5 Marks	10 Marks	10 Marks	50 Marks

Remember & Understand	4.2	-	-	2	2	2	**10.2**
Apply	2.2	-	-	3	2	2	**9.2**
Analyse	2.2	5	-	-	2	2	**11.2**
Evaluate	4.2	-	2	-	2	2	**10.2**
Create	2.2	-	3	-	2	2	**9.2**
Total	**15**	**5**	**5**	**5**	**10**	**10**	**50 Marks**

Course Contents and Lecture Schedule:

Module No.	Topics	No. of Lecture hrs.
1	Introduction to the subject. Brief understanding of the syllabus and its content.	2
1	Understand the interrelationship between design and behavioral sciences.	2
1	Understanding Culture and built environment with examples across the world.	4
2	Understanding biosocial, psychological, and cultural characteristics of human beings, as members of a species, as individuals, as a member of various groups.	2
3	Understanding two way interactions between people and environments, and the mechanisms that link them.	6
4	Case studies to understand cultural influence with built spaces, Analysing various building material and construction techniques.	4
5	Group discussion on sustainability, practicality, life cycle of buildings, etc.,	5
	Total	**25 Hrs.**

Semester	**:**	**6th**			
Course Title	**:**	**GEOGRAPHICAL INFORMATION SYSTEM**			
Course Code	**:**	**BAT628**			
Course Type (Theory/ Practical/ Integrated)	**:**	**Integrated**			
Category	**:**	**Professional Elective Courses**			
Stream	**:**	**Architecture**			
Total Hours/week (L:T:P:S)		**2:0:0:0**	**CIE**	**:**	**50 Marks**
			SEE (Theory)	**:**	**-**
Credits	**:**	**2**	**SEE Duration**	**:**	**-**

Course Learning Objectives: Students will be able to:

Sl. No	Course Objectives
1	To Integrate hardware, software, and data for capturing, managing, analyzing, and displaying all forms of geographically referenced information.
2	To do architectural analysis and Presentation using basic GIS techniques
3	To establish a bridge between the conceptual realms - Architecture /Site -Terrain Analysis/ Landscape architecture/Urban planning.

Teaching-Learning Process

Pedagogical Initiatives:

Some sample strategies to accelerate the attainment of various course outcomes are listed below:

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

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	COURSE SYLLABUS	
Module No.	**Topics**	**Hours**
1	**Introduction to GIS:** GIS as a Hardware/software/application? GIS data, Vector date, Raster data, attribute data, Data capture & methods, Coordinate reference systems	**5**
Pedagogy	**Use Interactive Maps and Demos** → Incorporate tools like Google Earth or QGIS live demos to make abstract concepts tangible. **Visualize Concepts Through Diagrams** → Use clear graphics to differentiate vector vs raster data, and show CRS transformations. **Apply Problem-Based Learning** → Assign mini-projects (e.g., mapping local amenities) to help students learn by doing and see the real-world value of GIS.	
2	**Introduction to Google Earth :** An overview of Google Earth & KML, Google Objects, Descriptive HTML in Placemarks, Ground overlays, Screen overlays, Paths, manipulating a path Polygon, taking profiles of site, creating KML files and exporting to GIS format.	**5**
Pedagogy	**Demonstration-**based learning to visually explore and create spatial data using Google Earth tools and KML. **Hands-on activities** for drawing paths, overlays, and exporting KML to GIS-compatible formats. **Integration of descriptive HTML** in Placemarks to enhance data presentation and user interactivity.	
3	**Creating & analyzing GIS data:** Capturing survey data through hand held GPS or mobile application. Traversing boundary of site, bringing routes and way point data into GIS. Spatial data, loading raster files, Mosaic raster, Geo referencing raster and vector files, Loading data from OGC web services, databases. Creating vector data layers, joining tabular data, Topology errors & tools, analyzing raster data, combining raster and vector data, Raster surface through interpolation, leveraging the power of Spatial database, Vector and raster analysis, Vector Spatial analysis (Buffers), Spatial analysis (interpolation).	**5**
Pedagogy	**Hands-on learning** through field data collection using GPS/mobile apps and integrating it into GIS platforms. **Step-by-step practice** of spatial data handling, including raster/vector loading, mosaicking, and georeferencing. **Analytical skill-building** via real-world vector and raster spatial analysis using interpolation, buffering, and spatial databases.	
4	**Terrain Analysis& scientific computing of Raster dataset:** Creating Digital elevation model (DEM) from point data, Hill shade, Slope, Aspect **Creating great Maps: Composing maps:** Vector styling, Labelling, Using adobe illustrator for composing multiple vector layers of maps, Designing print maps, Publishing GIS 2D maps on the web	**5**
Pedagogy	**Hands-on Learning –** Emphasize practical exercises using real-world spatial datasets for terrain and raster analysis. **Integrated Tool Use –** Teach students to seamlessly combine GIS tools with design software like Adobe Illustrator for high-quality map production. **From Analysis to Presentation –** Guide learners through the complete workflow from data processing to publishing maps for print and web platforms.	

5	**Create 3D maps:** 3D maps in html format and navigate in the internet browser	**5**
Pedagogy	**Enhances spatial learning** by allowing students to interact with and explore geographic data in a realistic, immersive 3D environment. **Promotes digital literacy** by engaging learners in web-based technologies such as HTML, WebGL, and JavaScript libraries like Three.js or Cesium. **Encourages inquiry-based learning** through real-time map navigation, enabling students to analyze terrain, elevation, and geographic relationships dynamically.	
	Pedagogical Initiatives (Not limited to): ● **GIS Fundamentals:** Introduce GIS concepts with hands-on practice on hardware, software, and data formats, building a foundational understanding of spatial analysis and data management. ● **Google Earth Integration:** Utilize Google Earth and KML for creating interactive maps, guiding students to seamlessly export and integrate data into GIS systems. ● **Data Capture & GIS Analysis:** Provide practical experience in capturing survey data using GPS, applying spatial analysis techniques, and integrating vector and raster data for complex problem-solving. ● **Advanced Terrain Analysis:** Foster advanced GIS skills by teaching DEM creation, terrain modeling, and slope/aspect analysis, encouraging students to conduct scientific computations on raster datasets. ● **3D Map Creation & Web Publishing:** Empower students to create and navigate 3D maps, enhancing skills in publishing GIS maps online for modern digital presentation and analysis.	

List of Activities/Exercises:

Sl. No.	Activities/Exercises	COs
1	Activity: List and define the basic components of a GIS system (hardware, software, data types).	**CO1**
2	Exercise: Explain the difference between vector and raster data with examples.	**CO1**
3	Assignment: Import a dataset (vector/raster) into GIS software and visualize it using appropriate map styles.	**CO2**
4	Exercise: Identify and categorize different GIS data types (spatial vs attribute data) within a sample project.	**CO3**
5	Assignment: Compare the advantages and limitations of different data capture methods (e.g., field surveys vs satellite imagery).	**CO4**
6	Project: Design a GIS project plan, including data sources, software tools, and methodology for a spatial analysis task (e.g., site suitability analysis).	**CO5**

Reference Books	
Sl. No.	**Title of the Book/Name of the author/Name of the publisher/Edition and Year**
1	Anita Graser, "Learning QGIS" PAKT open source, 2016.
2	GISP Dr. John Van Hoesen, Dr. Luigi Pirelli, GISP Dr. Richard Smith Jr., GISP Kurt Menke, " A refreshing look at QGIS: Mastering QGIS", PACKT Pub., 2016.
3	Displaying and analyzing 3D data in Surfer software. Carson, Tom, Baker, Donna L., "Adobe® Acrobat® and PDF for Architecture, Engineering, and Construction", Springer publication, 2006, available as Google Ebook.

WEBLINKS	
1	**QGIS Tutorials/Full Course:** https://www.youtube.com/playlist?list=PLX50j2HV43tdkUIiXMMWkGquWh_5I058S
2	**G.I.S. & CONTOURING :** https://www.youtube.com/playlist?list=PLX50j2HV43teLgDgSZCjlO51zi6cGfbzq

Course Outcomes:

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

CO	Course Outcomes	RBT Level	RBT Level Indicator
CO1	Recall and understand the fundamental concepts of GIS, including hardware/software, data types, and basic data capture methods.	Remember & understand	L1 & L2
CO2	Apply GIS tools and Google Earth to capture, manipulate, and analyze spatial data, including creating and exporting KML files.	Apply	L3
CO3	Analyze GIS data by identifying errors, performing spatial analysis, and integrating raster and vector data layers.	Analyse	L4
CO4	Evaluate the quality and effectiveness of GIS data and analysis methods for real-world applications.	Evaluate	L5
CO5	Create professional GIS maps and 3D visualizations for web and print, integrating advanced data and analysis techniques.	Design	L6

Mapping of Course Outcomes to Program Outcomes:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1												2			
CO2	2														
CO3		2													
CO4				3											
CO5			3												

Assessment Pattern for CIE

2 Credit Course – PEC								
Assessment Method	**Component**	**Type of Assessment**	**Assessment Type used**	**Max. Marks**	**Evaluation Details**	**Reduced Marks**	**Min. Marks**	**Total**
CIE	Continuous Comprehensive Assessment (CCA)	CCA 1	CCA-1- **Creating TimeLine Map Story Using Google Earth**	50		15	7.5	15
		CCA 2	CCA-2- **Creating a walk Through**	50		15	7.5	15

			using Google Earth					
		CCA 3	CCA3- **Terrain Analysis, Contour Extraction**	50		20	10	20
					Total CIE Practical / Activities		**25**	**50**

NOTE: The Minimum Marks to be secured in CIE to appear for SEE shall be 25 (50% of Maximum marks – 50). The Minimum Marks to be secured in SEE shall be 20 (40% of Maximum marks – 50). The design activities will be assessed through only CIE. The passing percentage shall not be less than the 50% in aggregate for a course (i.e. CIE and SEE (put together). Based on the marks scored in CIE+SEE grading will be awarded for this course.

CIE- Continuous Internal Evaluation (50 Marks)

Bloom's Category	**Map Story (A)**	**Walk Through (B)**	**Terrain Analysis (C)**	**Grand Total (A+B+C)**
Max Marks	**15 Marks**	**15 Marks**	**20 Marks**	**50 Marks**
Remember & Understand	5	5		**10**
Apply	5	5		**10**
Analyse	5	5	5	**15**
Evaluate			5	**5**
Create			10	**10**
Total	**15**	**15**	**20**	**50 Marks**

Course Contents and Lecture Schedule:

Module No.	**Topics**	**No. of Lecture hrs.**
1	**Introduction to GIS:** GIS as a Hardware/software/application?	2
1	Raster data, attribute data, Data capture & methods	3
2	Introduction to Google Earth : An overview of Google Earth & KML	2
2	Creating KML files and exporting to GIS format.	3
3	Creating & analyzing GIS data: Capturing survey data through hand held GPS or mobile application.	5
4	Terrain Analysis& scientific computing of Raster dataset	3
4	Creating great Maps: Composing maps	2
5	Create 3D maps	5
	Total	**25 Hrs.**

Dayananda Sagar Academy of Technology & Management

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Semester	:	**6th**			
Course Title	:	**Elective – Design of Highrise Buildings**			
Course Code	:	**BAT638**			
Course Type (Theory/ Practical/ Integrated)	:	**Integrated**			
Category	:	**PEC** (Professional Elective Course)			
Stream	:	**Architecture**			
Total Hours/week (L: T:P:S)	:	**2:0:0:0**	**CIE**	:	**50 Marks**
			SEE	:	
Credits	:	**02**	**SEE Duration**	:	

Course Learning Objectives:

Sl.No	Course Objectives
1	To understand basic design concepts, structural systems, environmental impacts, economics and emerging technologies of high-rise buildings.

Teaching-Learning Process

Pedagogy (General Instructions):

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

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

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COURSE SYLLABUS

S.N.	Course Outline	Hours
1	**Introduction to Tall Structures :** a) History of Ancient tall structures. b) Origin of Skyscrapers. c) Scientific Invention of Mobility, New materials and Artificial Air condition system.	3
2	**Highrise Buildings - Basic Design Considerations :** a) Space planning and design standards. b) Safe access, functional efficiency and aesthetic. c) Building byelaws and codes.	3
3	**Structural Systems in Highrise Buildings :** a) Considerations for structural loads, wind loads and earthquake loads. b) Structural Systems – Interior & Exterior. c) Evolution of Structural System. d) Structural systems in Steel, RCC and Composite System.	7
4	**Service Core in Highrise Buildings :** a) Parking, building services-vertical transportation. b) HVAC, electrical, firefighting and security, water supply and sanitation. c) Building Automation System; Code provisions for building services. d) Damping Systems.	6
5	**Construction of Highrise Buildings :** a) Construction planning and management, equipment and construction techniques. b) Environment impact and Sustainable resource management. c) Economic rationale.	6
	Total Hours :	**25**

List of Activities

Sl.No	Exercises	COs
1	Group Work : Presentation about heritage typologies of protected and unprotected monuments.	
2	Onsite Group Work : Taking horizontal, vertical measurements, levels & condition mapping.	
3	Group Work : Literature data collection and photography.	
4	Group Work : Preparation of measured drawings, analysis and reports.	

Reference Books

1	Basem M.M., "Construction Technology for High Rise Buildings: Handbook", 2014, CreateSpace .
2	Basem M.M., " Mechanical and Electrical Services for High Rise Buildings: Handbook", 2014, CreateSpace.
3	Mark Sarkisian, " Designing Tall Buildings: Structure as Architecture Routledge, Newyork, 2012.
4	Johann Eisele & Ellen Kloft, **"** High-rise Manual : Typology and Design, Construction, and Technology" Birkhäuser, 2003.
5	Nigel Clark and Bill Price, ″Tall Buildings: A Strategic Design Guide", RIBA & BCO, 2016.

Course Outcomes: At the end of the course, the student will be able to:

CO	Course Outcomes	RBT Level	Level Indicator
CO1	Identify the historical evolution of tall structures and explain basic design and service concepts.	Remember &understand	L1, L2
CO2	Apply design standards and codes in planning Highrise buildings.	Apply	L3
CO3	Analyze structural systems and load considerations for highrise construction.	Analyze	L4
CO4	Evaluate building services and automation systems for functionality and compliance.	Evaluate	L5
CO5	Design a sustainable and cost-effective highrise building integrating all systems.	Create	L6

Mapping of Course Outcomes to Program Outcomes:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1												2		
CO2	2													
CO3		2												
CO4				3										
CO5			3											

Assessment Pattern (CIE)

Assessment Method	Component	Type of Assessment	Assessment Type used	Max. Marks	Evaluation Details	Min. Marks	Total
CIE	Studio Assessment	Continuous Assessment Tool	Individual Work	15	● Presentation about heritage tall structures & cultural values. ● Study about type of Structure. ● Materials, Construction methods.	7.5	15
	Studio Assessment	Continuous Assessment Tool	Individual Work	15	● Case Study of High-rise Buildings. ● Detail about Structural Systems. ● Analyse the Core Services. ● Understanding the Façade systems. ● Materials & method of construction study.	7.5	15
	Studio Assessment	Time Problem	Individual Work	20	● Design the concept of High-rise Building. ● Considering Basic Structural systems & Core Services. ● Preparation of two- & three-dimensional Conceptual drawings.	10	20
					Total	25	50

NOTE: The Minimum Marks to be secured in CIE to appear for SEE shall be 25 (50% of Maximum marks – 50). The Minimum Marks to be secured in SEE shall be 20 (40% of Maximum marks – 50). The design activities will be assessed through only CIE. The passing percentage shall not be less than the 50% in aggregate for a course (i.e. CIE and SEE (put together). Based on the marks scored in CIE+SEE grading will be awarded for this course.

CIE- Continuous Internal Evaluation (50 Marks)

Bloom's Category	Presentation (A)	Case Study (B)	Design (C)	Grand Total (A+B+C)
Max Marks	**15 Marks**	**15 Marks**	**20 Marks**	**50 Marks**
Remember & Understand	5	5		**10**
Apply	5	5		**10**
Analyse	5	5	5	**15**
Evaluate			5	**5**
Create			10	**10**
Total	**15**	**15**	**20**	**50 Marks**

Course Contents and Lecture Schedule:

Module No.	Topics	No. of Lecture hrs.
1	Introduction to Tall Structures	3
2	Highrise Buildings - Basic Design Considerations	3
3	Structural Systems in Highrise Buildings	7
4	Service Core in Highrise Buildings	6
5	Construction of Highrise Buildings	6
	Total	**25 Hrs.**

Semester	**:**	**6th**				
Course Title	**:**	**Physical Education (Sports & Athletics/Yoga & NSS)**				
Course Code	**:**	**BAT609**				
Course Type (Theory/ Practical/ Integrated)	**:**	**Practical**				
Category	**:**	**NCMC**				
Stream	**:**			**CIE**	**:**	**100 Marks**
Teaching hours/ week (L:T:P:S)	**:**	**0:0:2:0**		**SEE**	**:**	
				SEE Duration	**:**	
Credits	**:**	**-**				

Course Learning Objectives: Students will be able to:

Sl. No	Course Objectives
1	Understand the Meaning and Importance of the Fit India Movement, the Definition of fitness, Benefits of fitness, Types of fitness and Fitness tips.
2	Importance of Sports & Yoga in day-to-day life
3	National Service Scheme (NSS) will enable the students to: Understand the community in which they work identify the needs and problems of the community and involve them in problem-solving.
4	Develop among themselves a sense of social & and civic responsibility & and utilize their knowledge in finding practical solutions to individual and community problems.

Teaching-Learning Process

Pedagogical Initiatives:

Some sample strategies to accelerate the attainment of various course outcomes are listed below:

1. Adopt different teaching methods to attain the course outcomes.
2. Include videos to demonstrate various concepts in C.
3. Encourage collaborative (Group) Learning to encourage team building.
4. Ask at least three **HOTS (Higher-order Thinking Skills)** module-wise questions to promote critical thinking.
5. Adopt **Problem-Based Learning (PBL),** which fosters students' analytical skills, and develops thinking skills such as evaluating, generalizing, and analyzing information rather than simply recalling it.
6. Show different ways to solve a problem and encourage the students to come up with creative and optimal solutions.
7. Discuss various case studies to map with real-world scenarios and improve the understanding.
8. Devise innovative pedagogy to improve **Teaching-Learning Process (TLP)**.

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(Effective from the Academic Year 2025-26)

COURSE CURRICULUM

Module No.	Topics	Hrs
SPORTS and ATHLETICS	**Athletics** Track- 110 &400 Mtrs 110 Mtrs and 400Mtrs: **Hurdling Technique:** Lead leg Technique, Trail leg Technique, Side Hurdling, Over the Hurdles Crouch start (its variations) use of Starting Block. Approach to First Hurdles, In Between Hurdles, Last Hurdles to Finishing Hurdles **Jumps- High Jump** Approach Run, Take-off, Bar Clearance (Straddle), and Landing **Throws-** Discuss Throw: Holding the Discus, Initial Stance Primary Swing, Turn, Release and Recovery (Rotation in the circle).	**8**
YOGA	Introduction of Yoga, Aim, and Objectives of Yoga, Prayer, Yoga, its origin, history, and development. 1)Yoga, its meaning, definitions. 2) Brief introduction of yogic practices for the common man- Yogic practices for the common man to promote positive health 3) Rules and regulations 4) Misconceptions of Yoga 5) Suryanamaskara 6) Different types of Asanas a. Sitting- 1. Padmasana, 2. Vajrasana b. Standing- 1. Vrikshana, 2. 2. Trikonasana c. Prone line-1. Bhujangasana 2. Shalabh asana d. Supine line- Utthita dvipadasana, 2. Ardha halasana	**8**
NSS	1. Organic farming, Indian Agriculture (Past, Present, and Future) Connectivity for marketing. 2. Waste management– Public, Private and Govt organization, 5 R's. 3. Setting of the information imparting club for women leading to contribution to social and economic issues. 4. Water conservation techniques – Role of different stakeholders– Implementation. 5. Preparing an actionable business proposal for enhancing the village income and approach for implementation. 6. Helping local schools to achieve good results and enhance their enrolment in Higher/ Technical/ vocational education. 7. Developing a Sustainable Water management system for rural areas and implementation approaches. 8. Contribution to any national-level initiative of the Government of India. Foreg. Digital India, Skill India, Swachh Bharat, Atmanirbhar Bharath, Make in India, Mudra scheme, Skill development programs, etc. 9. Spreading public awareness under rural outreach programs. (minimum 5 programs). 10. Social connections and responsibilities. 11. Plantation and adoption of plants. Know your plants. 12. Organize National integration and social harmony events /workshops /seminars.	**9**

	(Minimum 02 programs). 13. Govt. school Rejuvenation and helping them to achieve good infrastructure.	

List of Activities/Exercises:

Sl. No.	Activities/Exercises	COs
1	Yoga Meditation Books Reading Sessions	CO1
2	Case Study and Examples Study to understand the benefits of Health and Fitness	CO1
3	Presentations on Yoga	CO2
4	7 Day yoga challenge and recording the improvements for comparison	CO3
5	Practical Sports Sessions	CO4
6	Practical Yoga Session and Demonstration by students for Yoga Awareness	CO5

Suggested Learning Resources	
Text Books	
References:	
•	Dharma,P N Fundamentals Of Track & Field, Khel Sahitya Kendra,New Delhi
•	Swami Kuvulyananda : Asma (Kavayadhama,Lonavala)
•	Tiwari O P : Asana Why & How
•	Swami Satyananda Saraswati : Asam Pranayama Mudhra Bandha, (Bihar School of Yoga, Munger)
•	Swami Satyananda Saraswati : Surya Namaskar (Bihar School of Yoga, Munger)
•	Nagendra H.R., The Art and Science of Pranayama
•	NSS Course Manual, Published by NSS cell, VTU, Belagavi

Course Outcomes: At the end of the course, the student will be able to:

CO	Course Outcomes	RBT Level	RBT Level Indicator
CO1	Understanding the importance of fitness/sports in day-to-day life	Remember & understand	L1 & L2
CO2	Applying Various Yoga postures to improve the Mental and Physical health	Apply	L3
CO3	Analyze the environmental and societal problems or issues and will be able to design solutions for the same.	Analyse	L4
CO4	Evaluate the effect of yoga and sports in improving there focus and concentration and also stress release.	Evaluate	L5
CO5	Creating various techniques and methods to implement for mental and physical Health	Design	L6

Mapping of Course Outcomes to Program Outcomes:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1												2			
CO2	2														
CO3		2													
CO4				3											
CO5			3												

Assessment Pattern for CIE

2 Credit Course – NCMC								
Assessment Method	**Component**	**Type of Assessment**	**Assessment Type used**	**Max. Marks**	**Evaluation Details**	**Reduced Marks**	**Min. Marks**	**Total**
CIE	Continuous Comprehensive Assessment (CCA)	CCA 1	CCA-1- **Books Reading**	50		30	15	30
		CCA 2	CCA-2- **Case study/Social Connect Presentation on yoga**	50		30	15	30
		CCA 3	CCA3- **Practical Sessions**	50		40	20	40
					Total CIE Practical / Activities		**50**	**100**

NOTE: The Minimum Marks to be secured in CIE to appear for SEE shall be 25 (50% of Maximum marks – 50). The Minimum Marks to be secured in SEE shall be 20 (40% of Maximum marks – 50). The design activities will be assessed through only CIE. The passing percentage shall not be less than the 50% in aggregate for a course (i.e. CIE and SEE (put together). Based on the marks scored in CIE+SEE grading will be awarded for this course.

CIE- Continuous Internal Evaluation (50 Marks)

Bloom's Category	Books Reading (A)	Presentation (B)	Practical Sessions (C)	Grand Total (A+B+C)
Max Marks	**30 Marks**	**30 Marks**	**40 Marks**	**100 Marks**
Remember & Understand	10	10		**20**
Apply	10	10		**20**
Analyse	10	10	10	**30**
Evaluate			10	**10**
Create			20	**20**
Total	**30**	**30**	**40**	**100 Marks**

Course Contents and Lecture Schedule:

Module No.	Topics	No. of Lecture hrs.
1	SPORTS and ATHLETICS	8
2	Introduction of Yoga, Aim, and Objectives	8
2	NSS Activities	9
	Total	**25 Hrs.**

Dayananda Sagar Academy of Technology & Management

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Semester	:	**6th**			
Course Title	:	**Study Tour**			
Course Code	:	**BAT610**			
Course Type (Theory/ Practical/ Integrated)	:	**Practical**			
Category	:	**NCMC**			
Stream	:	Architecture	**CIE**	:	**50 Marks**
Teaching hours/ week (L:T:P:S)	:	**0:0:0:0**	**SEE**	:	
			SEE Duration	:	
Credits	:	**-**			

Course Learning Objectives: Students will be able to:

Sl. No	Course Objectives
1	To expose students to historical, vernacular and contemporary architecture.

Teaching-Learning Process

Pedagogical Initiatives:

Some sample strategies to accelerate the attainment of various course outcomes are listed below:

1. **Pre-Tour Research Assignment –** Students research the architectural significance of selected sites before the tour.
2. **Sketching Sessions On-Site –** Students create quick architectural sketches of buildings during the visit.
3. Photo Documentation Task – Each group captures key architectural details through photographs for later analysis.
4. **On-Site Peer Discussions –** Groups hold guided discussions about architectural elements while at the site.
5. **Expert Interaction Module –** Arrange short sessions with local architects or guides at selected locations.
6. **Daily Reflective Journal –** Students write short daily reflections on learnings and observations during the tour.
7. **Post-Tour Group Presentation –** Groups present key insights and comparative analysis of sites visited.
8. **Architectural Analysis Report –** Each group submits a structured report analyzing architectural features, style, and relevance.
9. **Map and Route Planning Task –** Students plan the tour route and justify it based on urban context and accessibility.
10. **Design Inspiration Workshop –** Conduct a workshop where students sketch conceptual designs inspired by the tour.

DSATM

Scheme of Teaching and Examinations for BE Programme -2025-26

Outcome Based Education and Choice Based Credit System (CBCS)

(Effective from the Academic Year 2025-26)

COURSE CURRICULUM

Module No.	Topics	Hrs
Pre-Tour Preparation	Selection of tour locations (India/Abroad) by faculty in consultation with students. Pre-tour briefing on the historical, cultural, and architectural relevance of selected sites. Formation of student groups (4–6 members each). **Activities:** Pre-tour research presentation. Itinerary planning and logistics discussion. Distribution of documentation roles within groups.	**-**
On-Tour Engagement	Site visits to selected architectural landmarks. Observational learning through real-world exposure. On-site analysis and documentation (photography, sketching, note-taking). **Activities:** On-site sketching and photography. Interviews or discussions with local experts. Guided peer discussions and reflection exercises.	-
Post-Tour Reporting and Reflection	Compilation and submission of group reports. Presentation and critique sessions. Assessment of learning through documentation quality and group interaction. **Activities:** Group report preparation with architectural analysis. Visual presentations of findings and experiences. Reflective journals and design response exercises.	**-**

List of Activities/Exercises:

Sl. No.	Activities/Exercises	COs
1	Pre-tour Research & Planning	**CO1**
2	On-tour Documentation & Engagement	**CO1**
3	Study Tour Report (Group Work)	**CO2**
4	Presentation & Reflection	**CO3,CO4**
5	Comprehensive Group Report	**CO5**

Course Outcomes: At the end of the course, the student will be able to:

CO	Course Outcomes	RBT Level	RBT Level Indicator
CO1	Recall and explain the historical, cultural, and architectural significance of the buildings and sites visited during the study tours.	Remember & understand	L1 & L2
CO2	Apply observational and documentation techniques such as sketching, photography, and note-taking to record architectural elements on-site.	Apply	L3
CO3	Compare and contrast architectural styles, materials, spatial organization, and cultural contexts of the visited structures.	Analyse	L4
CO4	Critically evaluate the design principles, functional aspects, and contextual relevance of the built environments observed.	Evaluate	L5
CO5	Synthesize learning from the tours to produce a comprehensive and visually rich group report that reflects critical thinking, design insight, and collaborative effort.	Design	L6

Mapping of Course Outcomes to Program Outcomes:

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1												3			
CO2	2														
CO3		2													
CO4				2											
CO5			3												

Assessment Pattern for CIE (50 Marks)

NCMC								
Assessment Method	**Component**	**Type of Assessment**	**Assessment Type used**	**Max. Marks**	**Evaluation Details**	**Reduced Marks**	**Min. Marks**	**Total**
CIE	Continuous Comprehensive Assessment (CCA)	CCA 1	CCA-1- **Pre-tour Research & Planning**	50		15	7.5	15
		CCA 2	CCA-2- **Presentation & Reflection**	50		15	7.5	15
		CCA 3	CCA3- **Comprehensive Group Report**	50		20	10	20
					Total CIE Practical / Activities		**25**	**50**

NOTE: The Minimum Marks to be secured in CIE to appear for SEE shall be 25 (50% of Maximum marks – 50). The Minimum Marks to be secured in SEE shall be 20 (40% of Maximum marks – 50). The design activities will

be assessed through only CIE. The passing percentage shall not be less than the 50% in aggregate for a course (i.e. CIE and SEE (put together). Based on the marks scored in CIE+SEE grading will be awarded for this course.

CIE- Continuous Internal Evaluation (50 Marks)

Bloom's Category	Research & Planning (A)	Presentation (B)	Group Report (C)	Grand Total (A+B+C)
Max Marks	**15 Marks**	**15 Marks**	**20 Marks**	**50 Marks**
Remember & Understand	5	5		**10**
Apply	5	5		**10**
Analyse	5	5	5	**15**
Evaluate			5	**5**
Create			10	**10**