

SYLLABUS
FOR
BACHELOR OF ARCHITECTURE
(EFFECTIVE FROM ACADEMIC YEAR 2016)



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DEPARTMENT OF ARCHITECTURE
SCHOOL OF PLANNING & ARCHITECTURE, NEW DELHI

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PART I

INTRODUCTION

1. Preamble

The School of Planning and Architecture, New Delhi is a premier institute in India and South Asia imparting Architectural and Planning education at both the undergraduate and postgraduate levels. The vision of SPA is to establish itself as a distinguished centre of research, innovation, learning, capacity building and scholarly inquiry to become a globally competitive institution by 2025. With this objective, the Department of Architecture is committed to the institution's larger mission, i.e.:

- To make SPA a multi-disciplinary academic knowledge house, a pioneer and an internationally known leader in planning and design of human habitat and the built environment through Education, Research, Consultancy and Outreach.
- To provide innovative professionals who are rooted in our cultural ethos and contribute wholesomely to the task of nation building.
- To position SPA in the vanguard of innovative pedagogy, incubating best practices as suitable for our national diversity, immersed in concerns of the local even as we are informed by the state-of-art globally, mentoring other institutions to create a nation-wide network of habitat design standards that will eventually supplant existing models of the built environment with more sustainable paradigms.

The B.Arch. Program is envisaged as a professional undergraduate program that emphasizes hands-on, creative approaches to address real-world architectural interventions in Indian settlements of varying scale and complexity. The pan-Indian vision is empowered by the twin engines of an all-India student entry and the physical presence of the School in the capital of India. The program provides both breadth and depth of understanding in the discipline of architecture. Upon obtaining the degree of B. Arch., graduates are eligible for registration as "Architect" by the Council of Architecture (CoA). This registration is a license to practice the profession of Architecture in India.

2. The Architectural Profession in India

Now well into the 21st Century, India stands at a cusp in its development as a truly modern nation. Blessed with copious natural resources, perhaps disproportionate to its geographical size, we have been the land of plenty and coveted as such throughout history. It is here that civilization started over 5000 years ago in the Indus Valley. While our conquerors invariably turned out to be expatriate businessmen, the exposition of our prowess and the assimilation of alien traditions has been a continuous process down the ages. Our cultural variety today is unparalleled in the world.

Our journey from the Third world to the First world will need new ways of building which are inclusive, frugal and ecologically sensitive, based on tectonic inventions that are solutions to indigenous needs, rather than on occidental imports which our everyday lives are being burdened to

align with today. A distinctive architecture for India will emanate from India itself, from professionals immersed in our ethos and discerning enough to make appropriate choices. Good architectural education is predicated to deliver this remarkable change.

3. Architectural Education

The advent of the 21st century has witnessed globalization, urban growth, new materials and techniques, information technology and climate change at an unprecedented rate. The four C's of education, viz., creativity, critical thinking, collaboration and communication are especially relevant to architectural education when laying a foundation for lifelong learning for students. Architectural education also needs to be viewed in the context of an ongoing paradigm shift in the field of higher education: a shift towards a learner-centric educational approach where the student is an active participant in the learning processes. These challenges make it imperative to re-visit our existing curriculum and apply new approaches to prepare students to face them and be creative, innovative, and responsible shapers of our built environment. The main aims of the program are as follows:

- To establish a foundation for **lifelong learning**
- To apply current educational theories that see learning as a process wherein the learner constructs or builds new concepts, focusing on **learner-centric education vs. teacher-centric education**.
- To transform the role of teacher to that of **facilitator**, guide and mentor and not a transmitter of information
- To encourage diverse learning styles, acknowledging Kolb's Experiential Learning Theory, which suggests that **learning is cyclical** and moving through this continuum over time every learner discovers the learning style best suitable to the person.
- To enable students to learn to find meanings and connections by critical contemplation of available resources, in the context of information overload, strengthening the innate skills of reflection, evaluation, re-iteration and research.
- To empower learning by doing. The Design studio is considered both a course and a place of study at the heart of an academic environment fostering design thinking that is simultaneously analytical and creative.
- Ultimately, to produce graduates capable of critically synthesizing architecture, engineering systems, social sciences and entrepreneurial skills to be future leaders in the field.

The proposed curriculum revision is to be seen in the context of the above stated goals, the overall vision of the school, objectives of the curriculum, content of syllabus and advances in pedagogy, while also incorporating current Guidelines for Minimum Standards of Architectural Education stipulated by the COA.

4. The Curricular Progression

The curriculum is envisaged as a Two-stage, Ten-semester program of five years duration.

The first six semesters comprise Stage 1: a period of Foundation and Exploration where basic competencies are developed and students are exposed to a breadth of knowledge in various subjects that are embedded Architectural firmament.

The next four semesters comprise Stage 2: students undergo a one-semester Practical Training and three semesters of in-depth Ideation and Synthesis. During the second stage students are encouraged to follow their interests and develop depth of understanding in any chosen field through studios, electives and research-based study.

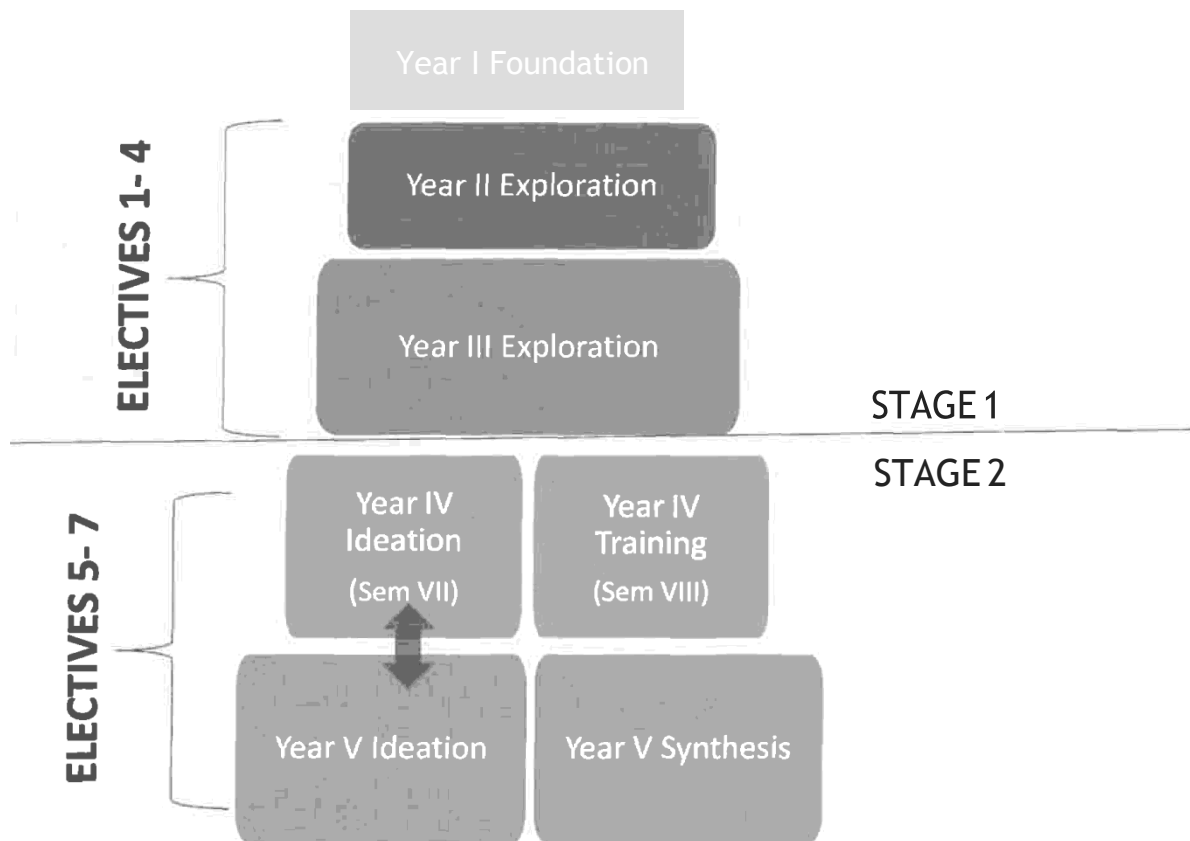


Figure 1: STAGE-WISE PROGRESSION

The curriculum provides for choice-based learning at both Stage 1 and 2, where up to 25% of the hours are dedicated to provide various choices for students to explore their own areas of interest in the form of elective subjects and research work.

At Stage 1 choice-based learning is introduced in the form of electives offered from Sem. III to Sem. VI. At Stage 2 students are offered two electives per semester as well as choice-based studios and research work. Core subjects are compulsory and account for 75% of the hours.

The curriculum proposes horizontal and vertical integration of design application and theory in a carefully calibrated manner, keeping Architectural Design as the central discipline.

5. The Architectural Design Studio

A studio is considered as the formative space where all theoretical knowledge is validated, refined and applied as the primary way of experiential learning. Presided by the Architectural Design Studio,

major subjects such as Building Construction and Structures and supportive subjects like Basic Design & Visual Arts and Architectural Practice have studios wherein students work on assignments that are designed to enhance the ability to resolve issues and make propositions as would be required in practice, in an environment that is conducive to exploration and evaluation. The pedagogic approach provides a milieu of nurturing and positivity for the students to grow their sensibilities and tastes without fear of reproach. Great emphasis is to be placed on developing a work ethic and learning by doing rather than learning by rote or copying. Freedom to think and question all ideas is encouraged.

The Architectural Design Studio is at the heart of the process and the place where learning from all other courses is synthesized. Successive studios are conceived thematically to channelize all theoretical inputs in the particular semester. The attempt is to connect knowledge gained from all courses with its practical application in the design studio to achieve a truly integrative experience. Also a multi-disciplinary approach to studio is encouraged which requires that subject area experts be involved in the studio process at appropriate stages to further enrich the studio experience.

Table 1: **PROPOSED ARCHITECTURAL DESIGN STUDIO THEMES**

	YEAR	SEMESTER	THEME	REMARKS
STAGE I	ONE	I	SPATIAL EXPLORATION-I	
		II	SPATIAL EXPLORATION-II	
	TWO	III	RESIDENTIAL & VERNACULAR	
		IV	SITE AND CONTEXT	
	THREE	V	SUSTAINABLE DESIGN –I SOLAR RESPONSIVE DESIGN	
		VI	SUSTAINABLE DESIGN-II ENERGY EFFICIENT DESIGN	
STAGE II	FOUR	VII	CHOICE BASED STUDIO- FOCUS ON LARGE BUILDINGS WITH SPECIAL REQUIREMENT OF SERVICES & STRUCTURES	E.g. HOSPITAL/ HOTEL/ APARTMENTS/ LARGE SPAN STRUCTURE/HIGH- RISE/HILL ARCHITECTURE
		VIII	PRACTICAL TRAINING	
	FIVE	IX	CHOICE BASED STUDIO- FOCUS ON LARGE SCALE URBAN LEVEL INTERVENTIONS	E.g. HOUSING/ URBAN DESIGN/ CAMPUS DESIGN
		X	ARCHITECTURAL THESIS	

The study of architectural design is seen as a cumulative process, where past experiences and the learning from the previous semesters form the base, increasing the breadth and depth of knowledge as the student progresses. The undergraduate studio sequence begins with instruction in design fundamentals and continues with design projects of increasing complexity, finally culminating in the Design Thesis in Semester X.

The studio encourages creativity, critical thinking, collaboration and communication through appropriate pedagogical strategies e.g. brainstorming, mind-mapping exercises, group/individual activities, presentations, peer-learning activities, student evaluations etc.

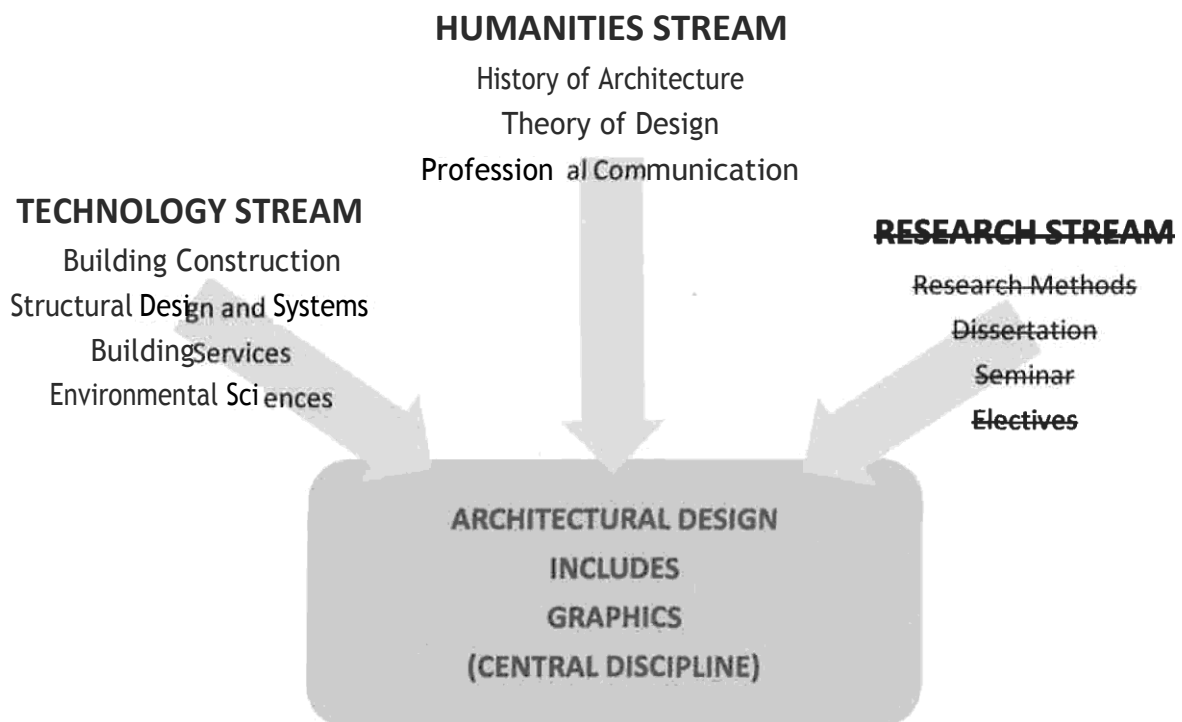


Figure 2: RELATIONSHIP OF DESIGN STUDIO TO OTHER COURSES
All subjects feed into the Central Discipline- Architectural Design

Part 2
CURRICULAR FRAMEWORK

- 1.
2. List Of Courses
- 3.
4. Table 2: LIST OF COURSES

STREAM	COURSE	CODE
DESIGN	ARCHITECTURAL DESIGN	AD1, AD2, AD3, AD4, AD5, AD6, AD7, AD8 (Training), AD9, AD10
	COMPUTER APPLICATIONS	CA1, CA2, CA3, CA4
	VISUAL ARTS & BASIC DESIGN	VA1, VA2, VA3, VA4
TECHNOLOGY	BUILDING CONSTRUCTION	BC1, BC2, BC3, BC4, BC5, BC6, BC7
	THEORY OF STRUCTURES	ST1, ST2, ST3, ST4, ST5, ST6
	BUILDING SERVICES	
	Water, Waste & Sanitation	BS1
	Electrification, Lighting & Acoustics	BS2
	HVAC, Mechanical Mobility & Fire Safety	BS3
	Sustainable Services & Green Bldgs.	BS4
	ENVIRONMENTAL STUDIES	
	Environmental Studies (UGC)	ES1
	Climate-responsive Design	ES2
	Site Planning & Landscaping	ES3
	Low-Energy Passive Systems Design	ES4
	Energy-positive Active Systems Design	ES5
	ARCHITECTURAL PRACTICE	
	Model Making & Workshop Practice	AP1
	Surveying & Leveling	AP2
	Estimating & Costing	AP3
	Specifications & Contracts	AP4
	Project Management	AP5
	Professional Practice	AP6, AP7
HUMANITIES	HISTORY OF ARCHITECTURE	HoA1, HoA2, HoA3, HoA4, HoA5
	ART & ARCH. APPRECIATION	AA1, AA2
	THEORY OF DESIGN	ToD1
	Vernacular Architecture	ToD1
	Sociology & Culture	ToD2
	Design Methodology	ToD3
	Design Theories	ToD4
	Sustainable Urban Habitat	ToD5
	Urban Design Studies	ToD6
RESEARCH	PROFESSIONAL COMMUNICATIONS	PC1, PC2
	SEMINAR	AR1
	DISSERTATION/ART THESIS	AR2/AR3
	THESIS RESEARCH	AR4
	ELECTIVES	EL1, EL2, EL3, EL4, EL5, E6, EL7, EL8

5. Course Intent

DESIGN STREAM

ARCHITECTURAL DESIGN

The thematic progression of the Architectural Design course has been described in PART 1. The course intends to develop architectural design abilities graphic skills necessary for rapid visualization and communication of designs, simultaneously. An intuitive grasp of designers' graphics is considered necessary for meaningful dialogue between student and teacher. It is the common ground for interaction where ideas can be transmitted and debated in real time. As issues in the studio grow in complexity, correct interpretation of the critique requires an appropriately enhanced graphic comprehension and Design melds seamlessly with Sketching, Drawing and Model-making.

In the Semesters 1 through 4, the Architectural Design Studio, works very closely with other studios like Basic Design and Visual Arts, Computer Applications in Design, Workshop Practice, Building Construction and Structures where ideation and representation skills of different kinds are being developed. As a culmination of manual drawing skills, documentation of a historic building will be conducted in conjunction with History of Architecture. This will also display an understanding of the historical background and materials and methods of construction.

In Semesters 5 through 10, a coordinated approach with courses in Environmental Studies and Building Services is intended to bring to the forefront the most significant contemporary concerns of Sustainable Architecture, Universal Design, Smart Urbanism, etc. Theory of Design courses shall contribute liberally by providing design directions, readings and studies of design processes.

VISUAL ARTS & BASIC DESIGN

The course introduces students to the graphic representation of ideas, concepts and design principles. It enables a student's mastery of Co-ordination skills, Perceptual skills, sketching, drawing, painting, sculpture, etc., over various expressive media, as well as a discovery of aesthetic principles and tastes that will guide them throughout the various studio projects and later on in practice. The student is expected to develop a unique aesthetic sensibility for "Delight", which completes the Vitruvian triad along with "Firmness" and "Commodity". An ability to express themselves graphically lies at the 'core' of the architectural learning and professional practice.

COMPUTER APPLICATIONS IN DESIGN

Digital aides have transformed the design spectrum with their ever faster and wider sweep of information sourcing and applications. Modern Architectural practice is almost wholly computer-based. The course attempts to provide students with the digital skills necessary to efficiently undertake Architectural assignments. Starting from basic understanding of the digital eco-system and routine office software, the course moves up to Computer-Aided Drawing (CAD) and digital design visualization. The course will cover both 2D and 3D drafting digital formats. Alongside, it seeks to develop a proficiency in using computers as a tool for systematic research through analysis and validation and presentation of completed design works.

TECHNOLOGY STREAM

BUILDING MATERIALS AND CONSTRUCTION

The course is designed to expose students to traditional and contemporary materials and processes of building construction. The course shall include concepts of sustainability in terms of eco-friendly materials and sustainable construction practices. Exposure to actual building processes on sites and materials in the markets shall be complemented with experimental hands-on work on campus to enable students to develop a respect for the craft of building as the only way in which their dream designs can be executed. Beginning from simple constructions of brick and bamboo, students shall progress to increasingly sophisticated methods culminating in latest technology of highly accurate, ultra-fast, computer-aided manufacturing and assembly of building components. The course has three components i.e.

- i. Lectures in materials and methods of construction,
- ii. Studio wherein the principles and practice shall be applied to the production of meaningful construction details and working drawings
- iii. Site visits and hands-on workshops for exposure to real world situations.

The Studio will be integrated with the Architectural Design Studio to the extent possible.

STRUCTURAL SYSTEMS AND DESIGN

The intent of the course is to conceptually understand the structural principles involved in building design, develop a visual and tacit structural intelligence, and to arouse students' interest in structural systems as a design concern. Active experiments with structural models and installations is encouraged to reveal the latent design potential of structural configurations. At the end of the course, the student should understand a structural system for a particular building. The course comprises:

- i. Lectures to understand principles of structural mechanics
- ii. Studio wherein the principles shall be used in design application and fundamental calculations, including an introduction to structural design software.
- iii. Laboratory and workshop for testing structural materials and systems models The Studio will be integrated with the Architectural Design Studio to the extent possible.

ENVIRONMENTAL STUDIES

The objective of the course is to provide a wide exposure to environmental issues and concerns as the larger context in which an architectural design is embedded. Issues concerning global warming, water crisis, the depletion of ozone layer, loss of biodiversity, air pollution and solid waste disposal will be addressed as articles of engagement for architects in fulfilling their social contract. Climate analysis, Site planning and landscape design, Passive and Active solar design for buildings will be introduced step-by-step leading up a total integration of sustainable building systems to create net-zero solutions. Primary concepts of sustainable building design such as site management, waste and water management, energy efficiency, and environmental control shall be covered. Wide coverage of these issues will lead up to holistic understanding and application of concepts that dovetail effectively for more sustainable building paradigms.

The course will run in tandem with the Building Services course.

BUILDING SERVICES

Utilities and services form an integral part of a building and contribute significantly to its carbon footprint. They are getting more complex by the day as environmental concerns underline the efficient operation of buildings rather than their mere existence. This course aims to give an overview of the various building services and the architectural requirements for their accommodation in buildings. The students will be introduced to basic calculations for sizing the systems' components for incorporation in building design, standards and codes relating thereto. Students will be familiarized with sustainable principles of building services with a focus on efficiency of design, installation and operation. The course culminates in a module wherein Integrated Building Management, operation of service systems and building performance modeling through Intelligent Systems shall be the focus.

The course will run in tandem with the Environment Studies course.

ARCHITECTURAL PRACTICE

The course is intended to provide an exposure to the nuts and bolts of Architectural Practice wherein the primary act of Design is supplemented with supportive activity that culminates in the successful realization of a concept. Different one-semester modules of the course will focus on skills that aid conceptualization with real-time translation into physical form or data that can be more easily evaluated.

Model-making & Workshop Practice is intended to provide students basic skills of handling and manipulating physical materials to create forms. On the one hand, it enables the facility of making models with simple materials like paper, paperboards, expanded polystyrene etc. On the other, elementary exercises in joinery and smithy encourage craft-oriented thinking and appreciation of finesse in building processes and products. Surveying and Leveling provides a better understanding of the ground reality on which the building is to be founded. Competency in reading and preparation of topographical information shall be the objective.

In Semester 5 and 6, through courses in Estimating & Costing and Specifications & Contracts, the student is enabled to formulate a more objective description of a building as a sum of parts wherein each part has material and performance criteria and is linked to other parts by standardized methods to create a built assemblage. More than the numerical skills per se, the course aims to develop in the student a knack of identifying which are the right sums that need solving to arrive at a design that can be validated across various parameters.

Thereafter, the student is introduced to the eco-system of architectural project management with its embedded checks and balances, responsibilities and covenants needed to realize the goals within time and cost constraints. The administrative, legal and ethical aspects of professionally running an architect's office will be emphasized in the last segment. Project procurement, public relations, personnel management, accounting and budgeting, etc. will be some of the segments covered, along with Contract laws, the Architects' Act 1972,

HUMANITIES STREAM

HISTORY OF ARCHITECTURE

The objective is to understand how architecture has been influenced by society and its culture through the ages. The study of history will show how and why each epoch had a way of building appropriate to its geography and traditions, now discernable as its own unique style. This helps to envision an architecture that is responsive to contemporary societal needs and reflects the prevalent philosophy. The course is designed to arouse in the student a sense of curiosity and to sharpen powers of observation. The intent is to explore concepts of culture, time and space through the lens of historic architecture. The importance of the timelessness of architecture shall be emphasized.

Students shall undertake a critical study of architecture from across the world with an emphasis on the Indian sub-continent. A comparative study of the different stages of developments in India and other parts of the world will be linked to the socio-cultural, political, religious and climatic factors of the region. The study of the building shall also encompass how it has been built, using the building materials and technology available.

ART & ARCHITECTURAL APPRECIATION

The purpose of this course is to expose students to the broad spectrum of sensory arts, architecture being one of them. It is a medium of understanding the pre-eminent position of Architecture in the pantheon of human creativity that spans visual arts, performing arts and the growing realm of design. It will enable flowering of aesthetic sensibilities and a realization of the sensual appeal of physical form. Students will be familiarized with all forms of arts through continual exposure to creative works through presentations, film shows, seminars, workshops, symposia, exhibitions etc., in which students can participate in interest-based groups, across class and sectional divisions, on and off campus under tutorial guidance. This is a non-credit course.

The course prepares students to do an Art Thesis in the Semester VII, as an alternative to the research seminar, if they are so inclined.

THEORY OF DESIGN

The intent of the course is to understand that theory is the province of ideas that precede action and that theory and practice are inseparable. Architects cannot design buildings without a set of ideas to guide their actions. These may be traditional conventions, experimental concepts or canons of the aesthetic. Theory ultimately relies on practice to test its hypotheses and assumptions. This course attempts to help students understand the way theory can serve as a cause in the effective design process, how it can trigger a creative chain reaction. Critical reading, writing and communication will be emphasized as design tools. This course will inform the Architectural Design studio as far as possible.

Beginning with the roots of indigenous architecture in vernacular tradition, the course traces the path through the concerns that have driven architectural design, the ways in which they have been addressed in the contemporary times, what developments we can foresee in the future and how do we prepare for them with innovative methodologies.

RESEARCH STREAM

The research stream connects theory and practice through application of research methods that can inform the design process. It trains students on how to conduct architectural research, gradually leading up to an individual project presented as a dissertation or art thesis and a group research project presented in a seminar followed by a paper of publishable quality.

PROFESSIONAL COMMUNICATION

This update of oral and written language skills is intended as a non-credit bridge course, depending upon individual students' needs. As students come from diverse backgrounds all across India and abroad it is a normative platform forming the footing of the Research stream. Comprehension and expression in English and Hindi will be reinforced, as appropriate.

SEMINAR, DISSERTATION AND THESIS RESEARCH

These courses enable students to take a deep dive into an area of study of significance to Architecture. Taking in the broad sweep of the eco-system in which Architecture is embedded, the topics could be specific relevance in terms of the humanistic context of design, its conception and execution, its myriad influences and the evaluation of its impact. Through theoretical and/or applied research students gain proficiency in a range of research skills, research methodologies, and critical appraisal skills, and learn to assimilate information and draw conclusions from these processes. Thesis Research directly feeds into the Architectural design Thesis in the final semester.

ART THESIS

The Art Thesis has been introduced as an alternative to the seminar paper presentation to bring about a qualitatively different dimension of studying a subject in depth. Students particularly inclined towards the fine arts or those having superior graphic skills may apply their research to the creation of works of visual or performing arts which may be retained by the School.

ELECTIVES

Electives subjects enable students to explore their chosen areas of interest. To make such choices truly inter-disciplinary, electives will be offered across SPA in two categories, viz.,

- i. Departmental Elective, offered within the department and open to B.Arch. students only,
- ii. Crossover Elective, offered in other departments and open to B. Arch. Students also.

Semester 3 onwards, students can take up one or two electives, Departmental or Crossover as eligible, from a basket of subjects that may be on offer during a particular semester. An Elective subject may be offered on the basis of availability of faculty, a minimum number of students opting for it, coincidence of their research interests and eligible credit thresholds. Students will not be permitted to repeat an elective subject that they have already passed.

To enable a better understanding of this provision and facilitate students' choices, Electives subjects

are classified in the following representative groups:

- Group 1: **Humanities**
Art Appreciation, Human Settlements, Behavioral Studies, Gender and Architecture, Arch. Photography, Arch. Journalism, etc.
- Group 2: **Technology**
Facade Engineering, Long-span Structures, Tall Buildings, Modular Coordination, Earthquake-resistant Buildings, Adv. Building Technology, Construction Mechanization etc.
- Group 3: **Environment**
Environmental Impact Assessment, Adv. Solar Design, Renewable Energy systems, Energy Simulations, Climate Change and Cities, etc.
- Group 4: **Design Specializations**
Arch. Conservation, Recreational Landscapes, Urban Planning, Hospital Design, Campus Planning, Interior Design, Industrial Design, Exhibition Design, Theatre and Set Design etc.
- Group 5: **Emerging Concerns**
Parametric Design, Bio-mimicry in Design, Smart Buildings, Urban Resilience, Disaster Risk Management, Real Estate Management, etc.
- Group 6: **Professional Practice**
Management Information Systems, GIS Applications, Architectural Entrepreneurship, Design Outreach as Social Responsibility, etc.

SEMESTER -WISE COURSE STRUCTURE

STAGE 1

S.NO.	CODE	SEMESTER I			EXAM TYPE	MARKS			CREDITS
		COURSE	HRS/WK			INT	EXT	TOTAL	
1	AD1	ARCHITECTURAL DESIGN 1	8	Studio	IEJ	250	150	400	8
2	VA1	VISUAL ARTS AND BASIC DESIGN 1	5	Studio	IEJ	200	100	300	5
3	CA1	COMPUTER APPLICATIONS 1	2	Studio	IO	100		100	2
4	BC1	BUILDING CONSTRUCTION 1	4	1hr.Lecture + 3 hrs. Studio	IEE	100	100	200	4
5	ST1	THEORY OF STRUCTURES 1	4	2hr.Lecture + 2 hrs. Studio	IEE	100	100	200	4
6	ES1	ENVIRONMENTAL STUDIES (UGC)*	2	Lecture	IEE	50	50	100	2
7	AP1	MODEL MAKING AND WORKSHOP	3	Studio	IO	100		100	3
8	TOD1	HUMAN SETTLM. & VERNACULAR ARCH.	2	Lecture	IO	100		100	2
9	PC1	PROFESSIONAL. COMMUNICATIONS -1*	3	Tutorial	IO*	150**			A
		TOTAL	33			1000	500	1500	30

S.NO.	CODE	SEMESTER II			EXAM TYPE	MARKS			CREDITS
		COURSE	HRS/WK			INT	EXT	TOTAL	
1	AD2	ARCHITECTURAL DESIGN 2	8	Studio	IEJ	250	150	400	8
2	VA2	VISUAL ARTS AND BASIC DESIGN 2	3	Studio	IEJ	100	100	200	4
3	CA2	COMPUTER APPLICATIONS 2	2	Studio	IO	100		100	2
4	BC2	BUILDING CONSTRUCTION 2	4	1hr.Lecture + 3 hrs. Studio	IEE	100	100	200	4
5	ST2	THEORY OF STRUCTURES 2	4	2hr.Lecture + 2 hrs. Studio	IEE	100	100	200	4
6	ES2	CLIMATE-RESPONSIVE DESIGN	2	Lecture	IEE	50	50	100	2
7	AP2	SURVEYING & LEVELING	3	Tutorial	IO*	100		100	2
8	HOA1	HISTORY OF ARCHITECTURE 1	2	Lecture	IO	100		100	2
9	TOD2	SOCIOLOGY & CULTURE	2	Lecture	IO	100		100	2
10	PC2	PROFESSIONAL. COMMUNICATIONS -2*	3	Tutorial	IO*	150**			A
		TOTAL	33			1000	500	1500	30

Courses marked with an * are of institutional choice as per COA 2008 guidelines.

** Marks not to be counted towards credit but students has to be pass only.

SEMESTER III					EXAM TYPE	MARKS			CREDITS
S.NO.	CODE	COURSE	HRS/WK			INT	EXT	TOTAL	
1	AD3	ARCHITECTURAL DESIGN 3	8	Studio	IEJ	250	150	400	8
2	VA3	VISUAL ARTS AND BASIC DESIGN 3	3	Studio	IEJ	100	50	150	3
3	CA3	COMPUTER APPLICATONS 3	3	Studio	IEJ	100	50	150	3
4	BC3	BUILDING CONSTRUCTION 3	4	1 hr. Lecture + 3 hrs. Studio	IEE	100	100	200	4
5	ST3	THEORY OF STRUCTURES 3	4	2 hr. Lecture + 2 hrs. Studio	IEE	100	100	200	4
6	BS1	WATER, WASTE & SANITATION	2	Lecture	IEE	50	50	100	2
7	ES3	SITE PLANNING & LANDSCAPE STUDIES	2	Lecture	IO	100		100	2
8	HOA2	HISTORY OF ARCHITECTURE 2	2	Lecture	IO	100		100	2
9	AA1	ART & ARCHITECTURAL APPRECIATION 1*	3	Tutorial	IO*	150**			A
10	EL1	ARCH. RESEARCH - ELECTIVE 1*	2	Lecture	IO	100		100	2
		TOTAL	33			1000	500	1500	30

SEMESTER IV					EXAM TYPE	MARKS			CREDITS
S.NO.	CODE	COURSE	HRS/WK			INT	EXT	TOTAL	
1	AD4	ARCHITECTURAL DESIGN 4	8	Studio	IEJ	250	150	400	8
2	VA4	VISUAL ARTS AND BASIC DESIGN 4	3	Studio	IEJ	100	50	150	3
3	CA4	COMPUTER APPLICATIONS 4	3	Studio	IEJ	100	50	150	3
4	BC4	BUILDING CONSTRUCTION 4	4	1 hr. Lecture + 3 hrs. Studio	IEE	100	100	200	4
5	ST4	THEORY OF STRUCTURES 4	4	2 hr. Lecture + 2 hrs. Studio	IEE	100	100	200	4
6	BS2	ELECTRIFICATION, LIGHTING & ACOUSTICS	2	Lecture	IEE	50	50	100	2
7	ES4	SOLAR ACTIVE AND PASSIVE SYSTEMS*	2	Lecture	IO	100		100	2
8	HOA3	HISTORY OF ARCHITECTURE 3	2	Lecture	IO	100		100	2
9	AA2	ART & ARCHITECTURAL APPRECIATION 2*	3	Tutorial	IO*	150**			A
10	EL2	ARCH. RESEARCH - ELECTIVE 2*	2	Lecture	IO	100		100	2
		TOTAL	33			1000	500	1500	30

Courses marked with an * are of institutional choice as per COA 2008 guidelines.

** Marks not to be counted towards credit but students has to be pass only.

SEMESTER V					EXAM TYPE	MARKS			CREDITS
S.NO.	CODE	COURSE	HRS/WK			INT	EXT	TOTAL	
1	AD5	ARCHITECTURAL DESIGN 5	9	1 hr.Tutorial+8 hrs. Studio	IEJ	250	200	450	9
2	BC5	BUILDING CONSTRUCTION 5	4	1 hr.Lecture +3 hrs. Studio	IEE	100	100	200	4
3	ST5	THEORY OF STRUCTURES 5	4	2hr.Lecture + 2 hrs. Studio	IEE	100	100	200	4
4	BS3	HVAC, MECH. MOBILITY & FIRE SAFETY	2	Lecture	IEE	50	50	100	2
5	ES5	ENERGY SYSTEM & RENEWABLES*	2	Lecture	IO	100		100	2
6	AP3	ESTIMATING & COSTING	3	1hr.Lecture + 2 hrs. Studio	IEE	100	50	150	3
7	HOA4	HISTORY OF ARCHITECTURE 4	2	Lecture	IO	100		100	2
8	TOD3	DESIGN METHODOLOGY	2	Lecture	IO	100		100	2
9	AA3	ART & ARCHITECTURAL APPRECIATION 3*	3	Tutorial	IO*	150**			A
10	EL3	ARCH. RESEARCH – ELECTIVE 3*	2	Lecture	IO	100		100	2
		TOTAL	33			1000	500	1500	30

SEMESTER VI					EXAM TYPE	MARKS			CREDITS
S.NO.	CODE	COURSE	HRS/WK			INT	EXT	TOTAL	
1	AD6	ARCHITECTURAL DESIGN 6	9	1 hr.Tutorial + 8 hrs. Studio	IEJ	250	200	450	9
2	BC6	BUILDING CONSTRUCTION 6	4	1hr.Lecture + 3 hrs. Studio	IEE	100	100	200	4
3	ST6	THEORY OF STRUCTURES AND DESIGN 2	4	1hr.Lecture + 3hrs. Studio	IEE	100	100	200	4
4	BS4	GREEN SYSTEMS INTEGRATION	2	Lecture	IEE	50	50	100	2
5	ES6	SUSTAINABLE URBAN HABITATS	2	Lecture	IO	100		100	2
6	AP4	SPECIFICATIONS & CONTRACTS	3	1 hr. Lecture + 2 hrs. Studio	IEE	100	50	150	3
7	HOA5	CONTEMPORARY ARCHITECTURE*	2	Lecture	IO	100		100	2
8	TOD4	ARCHITECTURAL THEORIES	2	Lecture	IO	100		100	2
9	AA4	ART & ARCHITECTURAL APPRECIATION 4*	3	Tutorial	IO*	150**			A
10	EL4	ARCH. RESEARCH - ELECTIVE 4*	2	Lecture	IO	100		100	2
		TOTAL	33			1000	500	1500	30

Courses marked with an * are of institutional choice as per Council of Architecture - Minimum Standards of Architectural Education 2008

** Marks not to be counted towards credit but students has to be pass only.

SEMESTER-WISE COURSE STRUCTURE

STAGE 2

SEMESTER VII					EXAM	MARKS			CREDITS
S.NO.	CODE	COURSE	HRS/WK		TYPE	INT	EXT	TOTAL	
1	AD7	ARCHITECTURAL DESIGN 7	9	1 hrs. Tutorial + 8 hrs. Studio	IEJ	250	200	450	9
2	BC7	WORKINGDRAWINGS	6	Studio	IEJ	200	100	300	6
3	AP5	PROJECTMANAGEMENT	3	1hr.Lecture + 2 hrs.Tutorial	IEE	100	50	150	3
4	AA4	Structure& ARCHITECTURAL APPRECIATION 4*	3	Tutorial	IO*	150**			A
5	AR1	ARCH.RESEARCH–SEMINAR*	5	1 hr. Lecture + 4 hrs. Tutorial	IEJ	150	100	250	5
6	EL5	ARCH.RESEARCH–ELECTIVE5*	2	Lecture	IO	100		100	2
	EL6	ARCH.RESEARCH–ELECTIVE6*(Crossover)	2	Lecture	IO	100		100	2
		TOTAL	30			900	450	1350	27

SEMESTER VIII- PRACTICAL TRAINING SEMESTER					EXAM	MARKS			CREDITS
S.NO.	CODE	COURSE	TIME PERIOD		TYPE	INT	EXT	TOTAL	
	ADB	PRACTICAL TRAINING	16 WEEKS		IEJ	600	200	800	16

SEMESTER IX					EXAM	MARKS			CREDITS
S.NO.	CODE	COURSE	HRS/ WK		TYPE	INT	EXT	TOTAL	
1	AD9	ARCHITECTURAL DESIGN 9	10	2 hrs. Tutorial + 8hrs.Studio	IEJ	250	250	500	10
2	AP6	PROFESSIONAL PRACTICE*	3	1hr. Lecture + 2 hrs. Studio	IEE	100	50	150	3
3	T0D6	URBAN DESIGN STUDIES*	2	Lecture	IO	100		100	
4	AR2/3	ARCH. RESEARCH – DISSERTATION / ART THESIS*	5	1hr. Lecture + 4hrs. Tutorial	IEJ	150	100	250	5
5	EL7	ARCH. RESEARCH – ELECTIVE 7*	2	Lecture	IO	100		100	2
6	EL8	ARCH.RESEARCH–ELECTIVE 8*(Crossover)	2	Lecture	IO	100		100	2
		TOTAL	24			800	400	1200	24

Courses marked with an * are of institutional choice as per Council of Architecture - Minimum Standards of Architectural Education 2008
 ** Marks not to be counted towards credit but students has to be pass only.

S.NO.	CODE	SEMESTER X			EXAM TYPE	MARKS			CREDITS
		COURSE	HRS/ WK			INT	EXT	TOTAL	
1	AD10	ARCHITECTURAL DESIGN THESIS	12	Studio	IEJ	300	300	750	15
2	AR4	Thesis Design Research	3	Tutorial	IO	150			
3	AP7	PROFESSIONAL PRACTICE	3	1 hr. Lecture + 2 hrs. Studio	IEE	100	50	150	3
		TOTAL	18			550	350	900	18

CONTACT HOUR REQUIREMENTS AS PER COUNCIL OF ARCHITECTURE - MINIMUM STANDARDS OF ARCHITECTURAL EDUCATION 2008

	Minimum Contact hours		COA Specified Courses		Institutional Choice Courses	
	CoAGuideline	Provided	CoA Guideline	Provided	CoAGuideline	Provided
STAGE 1	3240	3168	2430	2430	810	738
STAGE 2	1080	1152	936	936	144	216
TOTAL	4320	4320	3366	3366	954	954

NOTES:

- Total Credits for B. Arch. are 265.** Definition of Credits, Grades, Grade Point Average (GPA) etc. shall be as per SPA Examination Rules.
- Each semester on-campus shall be of duration of 16 weeks. Training period in SEMESTER VIII, which shall be of 16 weeks.
- Course content for a semester is to be covered in 12 weeks, remaining hours left for scheduled holidays, tests, remedial classes, etc.
- Faculty deployment for the courses shall be nominally in the teacher: student ratio as follows:
Lecture 1 Teacher for 40 students, except elective courses where it can go up to 1 Teacher for 10 students.
Tutorial 1 Teacher for 20 students
Studio 1 Teacher for 10 students
- Courses are classified by EXAM TYPE wherein the performance may be evaluated in one of the three modes, viz.,
IO - Internal Assessment Only
IEJ - Internal Assessment + External Assessment of sessional work by a Jury
IEE - Internal assessment + External Assessment of written Examination paper
- Result will be tabulated by converting marks to Grades. For Cumulative GPA the relative weightage of semester GPA shall be as follows:
Semesters 1,2,3 and 4 = 5.0% each
Semesters 5,6,7 and 8 = 7.5% each
Semesters 9 and 10 = 25.0% each

PART 3

DETAILED COURSE CURRICULUM

ARCHITECTURAL DESIGN

Course Title: **ARCHITECTURAL DESIGN 1** Semester: I

Code: ADI

Lecture	Tutorial	Studio	Total Hours	Assessment Type	Internal Marks	Jury/Exam Marks	Total Marks	Credits
	–	8	8	IEJ	250	150	400	8

THEME: SPATIAL EXPLORATION - I

Course Objectives: Introducing basic principles of design, space articulation and architecture and the use of drawing as a communication tool for design information.

Anticipated Learning Outcomes: Ability to assemble simple spatial elements in articulated constructs and visually represent them through hand-made 2D drawings and models.

Content:

- i. Concept of space, form and enclosure; principles of design like harmony, symmetry, scale and proportion etc. and their application to endow a quality to spaces and forms.
- ii. Exercises related to elements of design and perception of space.
- iii. Parameters of design, anthropometrics, human activity and the use of space.
- iv. Visual and tactile understanding of inter-relationship of form, structure and materials.
- v. Understanding nature as a contextual setting.
- vi. Design of a simple architectural form based on an understanding of anthropometrics.
- vii. Surface development of solids; Orthographic projection, measuring and drawing to scale; Conventions of architectural drawing, practice of line-types, line-weights symbols, Lettering, rendering materials, textures, tones in pencil and pen-and-ink drawing. Model-making.

Course Title: **ARCHITECTURAL DESIGN 2** Semester: II

Code: AD2

Lecture	Tutorial	Studio	Total Hours	Assessment Type	Internal Marks	Jury/Exam Marks	Total Marks	Credits
		–	8	IEJ	250	150	400	8

THEME: SPATIAL EXPLORATION - II

Course Objectives: Introducing Architectural Design as the ideation of a functional space crafted by robust elements in an aesthetic manner and exploiting 3D drawings as a medium of near-realistic representation of architectural intent.

Anticipated Learning Outcomes: Ability to assimilate learning from Basic Design and Visual Arts, Building Construction and Structures and apply to an Architectural Design by weighing design choices, to draw insights from personal experience of surrounding environment, extract programmatic requirements therefrom and translate into a Design Concept to be expressed through hand-made 3D drawings and models.

Content:

- i. Looking at the immediate built environment and understanding its major components. Understanding human scale in context of the built environment of varied scales and experiencing spatial quality.
- ii. Exercises relating personal experiences to behavioral needs and translating them into documented information that can be used as a basis for design.
- iii. Introduction to Architectural elements and space standards
- iv. Design of a basic shelter, an architectural form with a specific function.
- v. Representation of ideas through sketches, diagrams and architectural drawings with application of line quality, thickness and intensity as appropriate to the intent.
- vi. Isometric, axonometric, and oblique views.
- vii. One- and multi-point perspectives, sectional perspectives.
- viii. Light, Shade, Shadows and Sciagraphy.

Course Title: **ARCHITECTURAL DESIGN 3**

Semester: III

Code: AD3

Lecture	Tutorial	Studio	Total Hours	Assessment Type	Internal Marks	Jury/Exam Marks	Total Marks	Credits
		8	8	IEJ	250	150	400	8

THEME: RESIDENTIAL & VERNACULAR ARCHITECTURE

Course Objectives:

Introduction of issues related to design of the human habitat, its components and space standard, in both the urban and rural environments.

Anticipated Learning Outcomes:

Ability to identify user needs and translate them into a program and thereafter use the program to manifest them in a design in terms of space, materials and construction methodology that is appropriate in a particular context.

Content:

- Exercises relating personal experiences to behavioral needs and translating them into architectural program requirements
- Sciagraphy: understanding of shade and shadows and their depiction of shadows in plans and elevations, 3D projections. Interpreting shadows as response to climatic conditions.
- Design of a simple building for residential use in the immediate or observable environment
- Study of vernacular architecture, based on the traditional way of life of a people. Understanding the impact of the social and physical environment, climate of the place, materials and methods of construction on buildings. This study could be a village or part of a small town and would involve measurement of existing buildings and a topographic survey.
- Design of a simple building / adaptive reuse in the context of the study.

Course Title: **ARCHITECTURAL DESIGN 4**

Semester: IV

Code: AD4

Lecture	Tutorial	Studio	Total Hours	Assessment Type	Internal Marks	Jury/Exam Marks	Total Marks	Credits
-----		8	8	IEJ	250	150	400	8

THEME: SITE AND CONTEXT

Course Objectives:

Appreciation of the site and its context and their value as prime generators of design

Anticipated Learning Outcomes:

Ability to interpret site information as a decision-making aid for architectural choices, particularly in respect of groups of buildings

Content:

- Focus will be on the site and context and their relationship to the built environment.
- Activities, services and construction methods, phenomena of social utility, growth and change shall also be studied and analyzed. Introduction to element of site planning and **landscaping**.
- Study of a historic precinct of buildings planned with a characteristic relationship to the importance of the locale.
- Design of a group of buildings set in the context of the study with a focus on site and **surroundings**.
- Design of the environment outside the building.

Course Title: **ARCHITECTURAL DESIGN 5**

Semester: V

Code: AD5

Lecture	Tutorial	Studio	Total Hours	Assessment Type	Internal Marks	Jury/Exam Marks	Total Marks	Credits
-----	1	8	9	IEJ	250	200	450	9

THEME: SOLAR RESPONSIVE DESIGN

Course Objectives:

Introduction of passive solar design concepts and techniques and their application in urban buildings in a given climatic zone, Universal Access and barrier-free design

Anticipated Learning Outcomes:

Students are expected to apply appropriate passive design strategies such as building orientation, shading devices and insulating walls and roofs in the design of the given studio project.

Content :

- i. Study of an urban environment in use, understanding the activities, social utility, provision of services, construction methods and possibility for change.
 - ii. Design of a multifunctional public building set in the context of the study. The engagement should help comprehension of program development and design methodology, with articulation of a multi-use and multi-user program focusing on programmatic relationship, site and the context as a moderator of urban space. Introduction to development controls, codes and bye-laws,
 - iii. Introduction and application of shading devices and energy simulation software.
- The building project should be of low services complexity largely relying on **passive solar** design strategies and natural systems of lighting and ventilation.

Course Title: **ARCHITECTURAL DESIGN 6**

Semester: VI

Code: AD6

Lecture	Tutorial	Studio	Total Hours	Assessment Type	Internal Marks	Jury/Exam Marks	Total Marks	Credits
—	1	8	9	IEJ	250	200	450	9

THEME: ENERGY EFFICIENT DESIGN

Course Objectives:

The objective of the course is to focus on **energy efficiency as an important design determinant**.

Anticipated Learning Outcomes:

Students should be able to demonstrate through their design their understanding of energy efficient systems, structural systems, services and construction systems in the design of a modern medium to high-rise building in the urban context; understanding of developmental regulations and their application design studio work

Content:

- i. Design of a medium to high-rise building in a dense urban setting. The problem should attempt to bring out a comprehension of the framework that outlines a building interior, the structural system and the services core, and the relation of this interior with the exterior environment through the building skin.
 - ii. The project should be of high services complexity with mechanical systems for air-conditioning, parking and other services, and include **the integration of active energy systems**. The project should be seen as a culmination of understandings for conceptualization and realization of individual building design including structural and construction systems.
 - iv. Introduction to National Building Codes, building byelaws and regulations, their need and relevance. Application of building byelaws for structural, earthquake and fire safety and universal accessibility, statutory provisions environment related services.
- General definitions like setbacks, ground coverage, FAR, building height. Statutory approvals for construction. Stipulations of NBC, EIA, ASI, AAI, DUAC. Easements, Fire norms, Traffic Management Agency, Electricity board, Jai board etc. statutory

Course Title: **ARCHITECTURAL DESIGN 7**

Semester: VII

Code: AD7

Lecture	Tutorial	Studio	Total Hours	Assessment Type	Internal Marks	Jury/Exam Marks	Total Marks	Credits
-----	1	8	9	IEJ	250	200	450	9

THEME: SERVICES AND STRUCTURES (CHOICE-BASED STUDIO)

Course Objectives:

Application of an understanding of structures and services in Architectural design

Anticipated Learning Outcomes:

Students should demonstrate their understanding of architectural structures and building services and the coordination thereof through a comprehensive resolution of the design of a complex building in the urban context.

Content:

Design of a building involving a high level of services and advanced structural systems e.g. A hospital, hotel, housing, sports facilities, long span structure etc.. This will be a choice based studio, with students opting for a studio of their interest. Besides Architectural Design, the choice may be Interior Design, Adaptive Re-use, Urban Design, Landscape Design, etc.

The studio will emphasize sustainable design principles with exercises in simulation and conceptual modeling.

Course Title: **ARCHITECTURAL DESIGN 8**

Semester: VIII

Code: AD8

Lecture	Tutorial	Studio	Total Hours	Assessment Type	Internal Marks	Jury/Exam Marks	Total Marks	Credits
—			24 weeks	IEJ	600	200	800	16

PRACTICAL TRAINING SEMESTER

Course Objectives:

- i. Structured work-based learning in the industry in order to enhance knowledge, attitudes and skills towards better practical employability in the profession.
- ii. Understanding Office Management and Site Management practices.
- iii. Learning interpersonal skills for interaction with co-workers, clients, consultants, contractors, service providers, industry representatives, etc..

Anticipated Learning Outcomes:

Students must demonstrate an understanding of:

- i. The design philosophy, or vision of the architectural office and its implementation
- ii. How the architectural design process evolves when structural and service issues are integrated to create the final product based on the projects handled by the student.
- iii. How drawings are used at site and an insight into the relationship between the site and the office based on the projects handled by the student.

Content:

Training shall be taken in the office of an architect registered with CoA with minimum five years experience after CoA registration, and working in the field of architecture and allied disciplines. In case the student chooses to work in a firm where the principal is not an architect, he/she must be mentored by an employee of the firm registered with CoA and with the necessary experience. Progress during training shall be certified by the mentor. Training anywhere in the world is permitted subject to conditions.

Course Title: **ARCHITECTURAL DESIGN 9** Semester: IX Code: AD9

Lecture	Tutorial	Studio	Total Hours	Assessment Type	Internal Marks	Jury/Exam Marks	Total Marks	Credits
	2	8	10	IEJ	250	250	500	10

THEME: URBAN INTERVENTIONS (CHOICE-BASED STUDIO)

Course Objectives:

To understand the city under study, read the issues in a given area after a methodical analysis and propose housing /urban design/ campus design solutions.

Anticipated Learning Outcomes:

Students will demonstrate through design their understanding of urban issues relating to the built environment.

Content:

Issues related to the growing problems of urban areas in third world countries and their future development shall be explored. Emphasis shall be on the design with relation to the contextual environment, heritage, traffic, planning controls and impact analysis. An understanding of the architectural implications of such development scheme should lead to insights in the formulation of urban design controls and urban planning policy.

The studio exercise could involve the design of a group of buildings in the metropolitan context. This could be a greenfield/ brownfield development, redevelopment or revitalization project in the context of the city under study.

Course Title: **ARCHITECTURAL DESIGN THESIS** Semester: X Code: AD10

Lecture	Tutorial	Studio	Total Hours	Assessment Type	Internal Marks	Jury/Exam Marks	Total Marks	Credits
	3	12	15	IEJ	450	300	750	15

Course Objectives:

To demonstrate the students' capability of synthesizing architecture, engineering systems, social sciences and humanities through a capstone project which showcases creative and critical thinking abilities and skills developed through the course.

Anticipated Learning Outcomes:

Ability to independently handle an Architectural Design Project, research the requirements of a project, Prepare a brief, try alternative approaches/ concepts, and evaluate them on way to make a final comprehensive proposition.

Content:

The Architectural Thesis is the culmination of the development of the student's knowledge, attitudes and skills over the course of studies in architecture. It is a demonstration of the best that a student can do to claim the title of Architect. It is an occasion for exercising conscious choices in the field based on the student's personal abilities and inclinations, and for testing out his commitment.

The student, in consultation with the faculty, is expected to demonstrate through an imaginative approach, his expertise in effecting positive changes in our built environment.

COMPUTER APPLICATIONS IN DESIGN

Course Title: **COMPUTER APPLICATIONS 1**

Semester: I

Code: CA1

Lecture	Tutorial	Studio	Total Hours	Assessment Type	Internal Marks	Jury/Exam Marks	Total Marks	Credits
-----		2	2	IO	100	-	100	2

Course Objectives: Introducing basic computer skills as relevant to the architectural profession and to bring all students from different backgrounds up to a common level of computer proficiency.

Anticipated Learning Outcomes:

Ability to do word and image processing to make short reports and seminar presentations and make 2D orthographic projections in CAD.

Content:

- i. Word processing: basic templates for creating text documents, editing, formatting, spelling/grammar check, dictionary and thesaurus, page layout, fonts, indentation, inserting tables and images, document review and annotation in software like MS Word.
- ii. Image processing: basic image sourcing, editing and insertion for desktop publishing in Adobe Photoshop or similar software.
- iii. Simple exercises in to 2D CAD software (AutoCAD/Revit) specifically for proficiency of, drawing/editing objects, text, dimensioning, making and inserting blocks, etc. and an understanding of units settings, scale, limits, line type, line weight, layers, colours, and print commands.

Course Title: **COMPUTER APPLICATIONS 2**

Semester: II

Code: CA2

Lecture	Tutorial	Studio	Total Hours	Assessment Type	Internal Marks	Jury/Exam Marks	Total Marks	Credits
		2	2	IO	100	-	100	2

Course Objectives: Basic proficiency in architectural office software; transposing textual, numerical and graphic information across software platforms and devices to describe concepts holistically.

Anticipated Learning Outcomes: Ability to process numerical data, store, retrieve and present information appropriately for multiple usage across publication and presentation platforms and track editions over a project period, Ability to visualize design concepts in-the-round and make simple and complex 3D objects in CAD

Content:

- i. Numerical processing: preparing and editing spreadsheets in software like MS Excel. Collating raw data into numbers for analytical use. Presentation of data as tables, charts and graphs.
- li. Inserting tables, text and images in drawings for print and projection formats.
- iii. Slide Presentations in software like MS PowerPoint, insertion of drawings, audio/video clips.
- lv, 3D Visualization: Sketch Up software.
- v. Basic exercises in 3D CAD software (AutoCAD/Revit). Understanding the co-ordinate system, 3D primitives, solid modeling and surface modeling.

Course Title: **COMPUTER APPLICATIONS 3**

Semester: III

Code: CA3

Lecture	Tutorial	Studio	Total Hours	Assessment Type	Internal Marks	Jury/Exam Marks	Total Marks	Credits
		3	3	IO	100	50	150	3

Course Objectives: Advanced proficiency in architectural office software; transposing textual, numerical and graphic information across software platforms and devices to describe concepts holistically.

Anticipated Learning Outcomes: Ability to make photorealistic imagery of architectural objects with 3D CAD software through rendered perspective and walk-through presentations. Basic programming and scripting for architectural applications will be introduced.

Content:

- i. Isometric views, perspectives, manipulation of camera angles, viewpoints, etc.
- ii. Rendering 3D views using material palettes, colours, textures, shades and shadows. Inserting objects from digital libraries and other sources, using software such as 3DS Max
- iii. 3D animation, walk-through sequences, superimposing animated videos over base images.
- iv. Data-base management: Information filing and profiling, Technical Record-keeping and document transmission

Course Title: **COMPUTER APPLICATIONS 4**

Semester: IV

Code: CA4

Lecture	Tutorial	Studio	Total Hours	Assessment Type	Internal Marks	Jury/Exam Marks	Total Marks	Credits
-----	-----	3	3	IO	100	50	150	3

Course Objectives: Advanced proficiency in software for architectural design, presentation and building information management.

Anticipated Learning Outcomes: Ability to make professional presentations of architectural design concepts and drawings in both 2D and 3D formats.

Content:

1. Isometric views, perspectives, manipulation of camera angles, viewpoints, etc.
2. Rendering 3D views using material palettes, colours, textures, shades and shadows. Inserting objects from digital libraries and other sources, using software such as 3DS Max
3. 3D animation, walk-through sequences, superimposing animated videos over base images.
4. Data-base management: Information filing and profiling, Technical Record-keeping and document transmission

BASIC DESIGN & VISUAL ARTS

Course Title: **VISUAL ARTS & BASIC DESIGN 1**

Semester: I

Code: VA1

Lecture	Tutorial	Studio	Total Hours	Assessment Type	Internal Marks	Jury/Exam Marks	Total Marks	Credits
-----	-----	5	5	IEJ	200	100	300	5

Course Objectives: Introducing free-hand drawing and Two-Dimensional graphic design as a way of understanding the place of art in architecture.

Anticipated Learning Outcome: Ability to draw in various media and materials, to develop the power of drawing as a means of coordinating eye and hand in studio and field observation, to judge proportion, scale, and spatial relationships, understand principles of visual composition and experiment with them.

Content:

- i. Indoor and outdoor sketching: An immersive experience of live drawing in various contexts to develop a professional level ability to draw existing objects, in pencil and pen/ink.
- ii. Free-hand perspective drawing and rendering of imagined objects, in pencil and pen/ink.
- iii. Understanding principles of visual composition in historic architecture, art and design.
- iv. An introduction to the basic formal concepts in the two-dimensional arts and the principles of aesthetic organization: line, shape, value, texture, harmony, balance, symmetry, etc., from observation of contemporary examples of design and their application by drawing in varied media.
- v. Using Line, plane and volume as a means to express objective and spatial concepts in various media to construct aesthetically pleasing compositions.

Course Title: **VISUAL ARTS & BASIC DESIGN 2**

Semester: II

Code: VA2

Lecture	Tutorial	Studio	Total Hours	Assessment Type	Internal Marks	Jury/Exam Marks	Total Marks	Credits
-----	-----	3	3	IEJ	100	100	200	4

Course Objectives: Introducing design elements in three-dimensional forms and space leading to classical methods of architectural form development, theory and application of colours,

Anticipated Learning Outcomes: Ability to identify and analyze the elements, principles and vocabulary of three-dimensional design; Identify and apply color properties and concepts

Content:

- i. Understand colour vocabulary and terminology. Observing the basic historical and contemporary aspects of color. Understanding the psychology of colour perception.
- ii. Exercises in informed application of basic color properties and harmonies, critical thinking and problem solving skills as applies to the use of colour through visual and physical control of varied media. Rendering architectural drawings in colour with the use of light and shade, material textures and tonal values.
- iii. Basic components of 3-dimensional art, including subject, form, and content.
- iv. Sculpture by casting, modeling, additive/subtractive techniques and fabrication. Materials used will include plaster, wire, clay, wood, paint, board, paper, etc.
- v. Discussions centered on 3-dimensional design and concepts.

Course Title: **VISUAL ARTS & BASIC DESIGN 3**

Semester: III

Code: VA3

Lecture	Tutorial	Studio	Total Hours	Assessment Type	Internal Marks	Jury/Exam Marks	Total Marks	Credits
----		3	3	IEJ	100	50	150	3

Course Objectives: Proficiency in the composition of three-dimensional forms and space.

Anticipated Learning Outcomes: To explore experimental methods of life drawing; understanding the difference between 'machine perception' (i.e. Photography) and 'human perception' understanding design and art styles.

Content:

- i. Exercises aimed at developing a visually acute eye for detail and discrepancy in visual media.
- ii. Understanding of minimalist philosophies through simplification exercises.
- iii. Unique interpretations design theory in projects created by each student.
- iv. Exercises in the following painting mediums- watercolor, acrylic, oil and encaustic.
- v. Discussions centered on 3-dimensional design and creative ideas to help foster artistic awareness Proportion and tonal value will be explored in the observational study of drapery, still life objects and live models.

Course Title: **VISUAL ARTS & BASIC DESIGN 4**

Semester: IV

Code: VA4

Lecture	Tutorial	Studio	Total Hours	Assessment Type	Internal Marks	Jury/Exam Marks	Total Marks	Credits
		3	3	IEJ	100	50	150	3

Course Objectives: Advanced proficiency in use of graphics for ideation, presentation and publication with emphasis on developing ones signature style for further design applications.

Anticipated Learning Outcomes: Ability to select types and fonts, source and insert graphic material in digital media considering visual organization as a key component of effective communication.

Content:

- i. Typography and typographic application.
- ii. Cut and paste methods, Reprographic technique and printmaking, publication in digital media; design idea generation, problem solving and technical skills related to graphic design practice. lii Explore ideas, form, content and meaning through various modes of art and design--- photography, photomontage, video, film, audio-visual projections, animations etc.

Course Title: **ART THESIS**

Semester: IX

Code: AR3

Lecture	Tutorial	Studio	Total Hours	Assessment Type	Internal Marks	Jury/Exam Marks	Total Marks	Credits
1	4		5	IEJ	150	100	250	5

Course Objectives: Creating a seminal work demonstrating a superior level of skills, technique and thought applied in a major art object fit for public exhibition.

Anticipated Learning Outcomes: Ability to independently harness cerebral faculties in producing an impactful expression of ideas to convey concerns of public interest. It is intended as an alternative to the written DISSERTATION course AR2.

Content:

It should show the students' ability to clearly understand, analyze, reflect upon, synthesize and discuss a chosen topic. The artwork must be accompanied by a brief publication written by the student expressing their motivations and analyses.

TECHNOLOGY STREAM

BUILDING CONSTRUCTION

Course Title: **BUILDING CONSTRUCTION 1**

Semester: I

Code: BC1

Lecture	Tutorial	Studio	Total Hours	Assessment Type	Internal Marks	Jury/Exam Marks	Total Marks	Credits
1	—	3	4	IEE	100	100	200	4

Course Objectives: To introduce students to primary building materials and simple construction techniques as applicable to a low-rise building- three to four storied contemporary building.

Anticipated Learning Outcomes: Develop an understanding of brick bonding, foundation details, external wall section with flat roof and parapet.

Content:

Lectures on historical evolution of building materials and construction methods. Understanding properties and behavior of materials such as brick, stone, sand, lime, cement, mortar and PCC.

Introduction to primary building elements, walls, piers, foundations, roofs, bricks, arches, stone and block masonry their properties and manufacture. Introduction to basic and contemporary flooring and external paving. Understanding of traditional and contemporary waterproofing materials and techniques.

Simple MS section gate design and details.

Suggested Pedagogical Approach:

Studio exercises in brick bonding, foundation details, external wall section for flat roofs (DPC, sill, lintel, roof level, waterproofing, parapet). Introduction to sustainability and energy conservation using cavity walls, rattrap bond etc.

Workshop in brick laying, setting-out, etc. Site visits for exposure to site practices.

Measured drawing of stone construction (may be integrated with Arch. Design studio)

Course Title: **BUILDING CONSTRUCTION 2**

Semester: II

Code: BC2

Lecture	Tutorial	Studio	Total Hours	Assessment Type	Internal Marks	Jury/Exam Marks	Total Marks	Credits
1	—	3	4	IEE	100	100	200	4

Course Objectives: To introduce students to design elements, materials and methods of construction for simple buildings.

Anticipated Learning Outcomes: Understanding construction materials and techniques for simple building elements.

Content: Introduction to **doors, windows, sliding and folding doors and windows in timber.**

Studio exercise on door and window details, fixing of frames.

Introduction to sloping roof and roofing materials -tiles, roofing sheets. Timber and metal trusses and roofing materials and fixing details.

Suggested Pedagogical Approach:

Working Drawing: Fabrication drawing of a door / window with dimensions and specifications.

Details of sloping roof with truss details and fixing details.

Course Title: **BUILDING CONSTRUCTION 3**

Semester: III

Code: BC3

Lecture	Tutorial	Studio	Total Hours	Assessment Type	Internal Marks	Jury/Exam Marks	Total Marks	Credits
1		3	4	IEE	100	100	200	4

Course Objectives: To introduce materials and methods of construction for simple residential buildings both in urban and vernacular contexts.

Anticipated Learning Outcomes: Students should demonstrate their understanding through application in design and detailing of windows, sliding doors, staircases and mezzanines.

Content:

Vernacular building materials such as mud, timber, bamboo, thatch, terracotta tiles and their properties.

Secondary elements such as doors and windows, staircases, mezzanines, show windows, built-in-furniture and cabinetry. Modern fixing devices: industrial fasteners, expandable bolts, chemical fasteners etc.

Steel welding and forging, shuttering, bar bending and concreting, painting and laminating.

Suggested Pedagogical Approach:

Working Drawing - Mezzanine and staircase complete with dimensions and specifications.

Study tour/ site visit to understand vernacular architecture through investigation of materials, techniques and details. Workshops in alternative materials and construction techniques at various research institutions and building centres. Construction site visit for RCC work. Program to be integrated with Architectural Design studio as far as possible.

Course Title: **BUILDING CONSTRUCTION 4**

Semester: IV

Code: BC4

Lecture	Tutorial	Studio	Total Hours	Assessment Type	Internal Marks	Jury/Exam Marks	Total Marks	Credits
1		3	4	IEE	100	100	200	4

Course Objectives: Introducing students to types of false ceilings and partitions in various materials and introduction to various External wall treatments

Anticipated Learning Outcomes: Students should demonstrate their understanding through application in working drawings for an interior space.

Content:

Introduction to **false ceilings** and **partitions** in various materials e.g. Plaster of Paris, Gypsum board, Particle boards, glass, metal, fire rated fabric, and acoustic treatment. To be integrated with the BS2 course on lighting and acoustics in the same semester.

Introduction to laminated and toughened glass. Use of various stainless steel grades for indoor/ outdoor building work.

Introduction to External wall treatments- Dry cladding, Glass curtain walls and structural glazing and the difference between the two. Studio exercise on external wall treatment, detailing curtain wall and structural glazing. To be integrated with Environmental Science-2 in the same semester.

Suggested Pedagogical Approach:

Working Drawing - False ceilings and partitions for an interior space layout.

Course Title: **BUILDING CONSTRUCTION 5**

Semester: V

Course Code: BC5

Lecture	Tutorial	Studio	Total Hours	Assessment Type	Internal Marks	Jury/Exam Marks	Total Marks	Credits
1		3	4	IEE	100	100	200	4

Course Objectives: Introduction to single and multiple basements, advanced waterproofing detailing of atria, skylights, roof gardens, vertical green walls and passive solar design features as related to the Architectural Design studio.

Anticipated Learning Outcomes: Students should demonstrate their understanding through application in working drawing of basements and roof gardens.

Content:

Introduction to the detailing of medium scale commercial / institutional buildings.

Introduction to single and multiple basements, advanced waterproofing techniques and detailed section through basements.

Detailing of atria, sky lights, roof gardens, vertical green walls and any passive solar design features used in architectural design.

Suggested Pedagogical Approach:

Working Drawing 5- Studio exercise in making working drawing of basement, roof gardens.

Course Title: **BUILDING CONSTRUCTION 6**

Semester: VI

Code: BC6

Lecture	Tutorial	Studio	Total Hours	Assessment Type	Internal Marks	Jury/Exam Marks	Total Marks	Credits
1		3	4	IEE	100	100	200	4

Course Objectives: To comprehend the integration of the structural shell, the service core and building skin of a medium/ high-rise building using construction techniques relevant to large-scale projects in the urban context.

Anticipated Learning Outcomes: Ability to configure the service core and external building skin using appropriate materials and building technologies available in the industry with an understanding of energy efficient, time-saving, precision-oriented approaches to quality construction.

Content:

Working details of the service core and building skin of a mid-rise/ high-rise building.

Detailing of Building Skin; innovative architectural detailing with new materials such as plastics, metals, synthetic boards, glass, composite panels etc.

Mass production; transportation, storage and handling of materials; Introduction to pre-stressing, prefabrication and systems building; Jointing, tolerances and modular coordination;

Suggested Pedagogical Approach:

Working Drawing 6 Studio exercise in making working drawing of service core, toilets, pantry, HVAC, fire fighting and the buildingskin.

Course Title: WORKING DRAWINGS

Semester: VII

Code: BC7

Lecture	Tutorial	Studio	Total Hours	Assessment Type	Internal Marks	Jury/Exam Marks	Total Marks	Credits
	—	6	6	IEJ	200	100	300	6

Course Objectives: To produce a complete set of working drawings for a mid-rise/high-rise building showing an understanding of structural systems and building engineering services including electrical, PHE, HVAC, Lifts and escalators, Fire safety etc., Interior and Exterior finishes etc.

Anticipated Learning Outcomes: Ability to organize building design information in a working drawing format suitable for various purposes related to the execution of the project along with an ability to read building working drawings to extract specific information.

Content:

- I. Type of Working Drawings: Schematic Drawings, General Arrangement Drawings, Detail Drawings, Drawings for Statutory Approval, Tender Drawings, Good-for-Construction Drawings, Shop Drawings, As-built Drawings, insertion of purpose-specific information for each type of drawing.
- li. Classification of Drawings for identification coding, Location, Assembly and component drawing, order of precedence in case of discrepancy, legal standing, provenance and authority.
- iii. Cross-referencing graphic details and schedules with other drawings including consultants' drawings and documents.
- iv. Inserting dimensions, specifications and other working instructions
- v. Checking of drawing before release. Archiving of drawing for future retrieval

Suggested Texts and References:*National Building Code 2005**Delhi Building Byelaws, 1983**Delhi Master plan 2021***Course Title: ADVANCED BUILDING TECHNOLOGY**

Semester: IX

Code: BC8

Lecture	Tutorial	Studio	Total Hours	Assessment Type	Internal Marks	Jury/Exam Marks	Total Marks	Credits
	2	---	2	IO	100		100	2

Course Objectives: To expose students to advanced building construction materials and methods and innovative architectural detailing.

Anticipated Learning Outcomes: By the end of the course students should be aware of latest materials and building technologies, structural systems, services and utilities available and in use in the construction industry with a fair idea of their environmental performance.

Content:

- i. Study of advanced building construction methods and innovative architectural detailing with new materials such as plastics, metals, synthetic boards, glass, composite panels etc. embodied energy and operational energy components, Sustainability, GRIHA-rated practices
- ii. Introduction to pre-stressing, prefabrication and systems building, Prefabrication, Jointing, tolerances and modular coordination. Industrialized mass housing construction systems, pre-plugged buildings, self-healing and bionic buildings
- iii. Mass production, transportation, storage and handling of materials. Characteristics, performance and application of mechanized construction equipment.
- iv. Intelligent Buildings, IT-enabled security, access and internal communication, Integrated Building Management Systems

THEORY OF STRUCTURES

Course Title: **THEORY OF STRUCTURES1**

Semester: I

Code: ST1

Lecture	Tutorial	Studio	Total Hôurs	Assessment Type	Internal Marks	Jury/Exam Marks	Total Marks	Credits
2	-	2	4	IEE	100	100	200	4

Course Objectives: Introducing simple structural concepts and behavior of structural elements. **Anticipated Learning Outcomes:** Understanding of concepts taught in the semester through simple numerical calculations and models;

Content:

Concept of direct force mechanism in structures, tension and compression; Equilibrium of forces, concept of strut and tie; composition and resolution of forces.

Visualizing of loads as forces, response as deformation; Stress and Strain, Hooke's Law. Concept of Euler's load, phenomena of buckling, short and long columns.

Centre of Gravity and moment of inertia for various shapes and sections.

Laboratory testing of Hooke's law, study of models using struts, ties and membranes only. Studies of load-bearing construction through sketches and models.

Course Title: **THEORY OF STRUCTURES 2**

Semester: II

Code: ST2

Lecture	Tutorial	Studio	Total Hours	Assessment Type	Internal Marks	Jury/Exam Marks	Total Marks	Credits
2	-	2	4	IEE	100	100	200	4

Course Objectives: To understand simple structural concepts and behaviour

Anticipated Learning Outcomes: to demonstrate an understanding of concepts taught during the semester through simple calculations and models.

Content:

Concept of direct force and bending mechanism with the help of scale models. Concept of force applied as displaced from the point of support.

Bending moment and shear force. Understanding the behaviour of homogeneous material under direct and bending forces.

Theory of simple bending and principles of super-position, distribution of shear and bending stress. Beam as a structural element. Design of steel and timber beams.

Compound stresses as response to a set of applied forces. Analysis and design of masonry structures

Course Title: **THEORY OF STRUCTURES 3**

Semester: III

Code: ST3

Lecture	Tutorial	Studio	Total Hours	Assessment Type	Internal Marks	Jury/Exam Marks	Total Marks	Credits
2	-	2	4	IEE	100	100	200	4

Course Objectives: Introducing complex structural concepts and behaviour

Anticipated Learning Outcomes: Understanding of concepts taught during the semester through simple calculations and models.

Content:

- i. Introduction of wind and seismic forces as per IS: 1893, IS: 4326 and IS; 875. Understanding the behaviour of heterogeneous material under direct force and bending forces.
- ii. Theory and application of working stress method and limit state design.

- iii. Design of RCC beams, columns, slabs. Introduction to pre stressed concrete structures.
- iv. Laboratory testing of concrete samples and RCC beams, study of structural behavior with the help of scale models.

Course Title: **THEORY OF STRUCTURES 4** Semester: IV Code: ST4

Lecture	Tutorial	Studio/	Total Hours	Assessment Type	Internal Marks	Jury/Exam Marks	Total Marks	Credits
2	-	2	4	IEE	100	100	200	4

Course Objectives: To understand complex structural concepts and behaviour

Anticipated Learning Outcomes: to demonstrate an understanding of concepts taught during the semester through simple calculations and models.

Content:

Design and drawings of simple trusses, beams and columns in steel and timber, riveted and bolted joints. Laboratory studies in truss design and model formation.

Where ever possible structural behavior to be studied with the help of scale models.

Course Title: **THEORY OF STRUCTURES 5** Semester: V Code: ST5

Lecture	Tutorial	Studio	Total Hours	Assessment Type	Internal Marks	Jury/Exam Marks	Total Marks	Credits
2	-	2	4	IEE	100	100	200	4

Course Objectives: To understand complex structural concepts and behaviour

Anticipated Learning Outcomes: to demonstrate an understanding of concepts taught during the semester through simple calculations and models.

Content:

Concept of structural indeterminacy and its application in structural system development; analysis and design of continuous beams in RCC and steel; retaining walls and forces.

Soil mechanics and foundation engineering. Soil exploration, soil classifications, soil bearing capacity, types of foundations (shallow and deep).

Course Title: **THEORY OF STRUCTURES 6** Semester: VI Code: ST6

Lecture	Tutorial	Studio	Total Hours	Assessment Type	Internal Marks	Jury/Exam Marks	Total Marks	Credits
1		3	4	IEE	100	100	200	4

Course Objectives: To understand complex structural concepts and behavior

Anticipated Learning Outcomes: to demonstrate an understanding of concepts taught during the semester through simple calculations and models.

Content:

Principal considerations for structural analysis. Methods of analysis for frames, concept of composite structures.

Behaviour of structures under wind and seismic loads, concept of earthquake resistant design criteria and wind loads. Concept of long span Girders.

Wherever possible structural behaviour to be studied with the help of scale models.

BUILDING SERVICES

Course Title: **WATER, WASTE & SANITATION**

Semester: III

Code: BS1

Lecture	Tutorial	Studio	Total Hours	Assessment Type	Internal Marks	Jury/Exam Marks	Total Marks	Credits
2			2	IEE	50	50	100	2

Course Objectives: To acquaint students with the principles of water supply and drainage, standards and codes, and design considerations for plumbing systems in buildings.

Anticipated Learning Outcomes: Ability to estimate water demand and draw plumbing layouts, drainage and sewage networks for simple residential buildings

Content:

Water Supply: Introduction to water resources; collection, processing, distribution and storage of water; calculation of water demand and consumption; sizing of storage tanks and water quality standards for code compliance, importance of water conservation

Water Distribution: Service connections and systems of hot and cold water supply; plumbing networks; sanitary fixtures, fittings, valves and pipes, dual-plumbing systems.

Wastewater systems: Systems and components for sewage and stormwater drainage; wastewater treatment systems and septic tanks; building and site planning for water drainage and sewage disposal; water harvesting and water recycling; solid waste collection, segregation and disposal.

Suggested References:

Rangwala, P.B., *Water Supply and Sanitary Engineering (Environmental Engineering)*

Modi, P.N., *Water Supply Engineering*

Ratnayaka, D., Twart, A. C., & Brandt, M. J. ,1996. *Water Supply*.

Shah, C,S., *Water Supply and Sanitation*.

National Building Code, 2015, Bureau of Indian Standards

Course Title: **ELECTRIFICATION, LIGHTING & ACOUSTICS**

Semester: IV

Code: BS2

Lecture	Tutorial	Studio	Total Hours	Assessment Type	Internal Marks	Jury/Exam Marks	Total Marks	Credits
2			2	IEE	50	50	100	2

Course Objectives: To familiarize students with the electrical, lighting, acoustic, systems of a building including the design aspects associated with their performance.

Anticipated Learning Outcomes: Ability to workout electrical networks for a simple building, determine general lighting and acoustic requirements and performance for a space.

Content:

Electricity: Electrical distribution and safety systems in buildings; fixtures, equipment, and appliances; electrical circuitry and internal wiring; electrical loads, peak demand, operational costs;

Communication: Intercoms, Wi-Fi, broadband data cabling, and CCTV systems

Lighting: Lighting principles, luminance and glare; lighting systems and types of luminaires; lighting design and layouts; architectural lighting and special effects; integration with day-lighting and energy conserving strategies; introduction to lighting design software;

Acoustics: Basic concepts of sound and acoustics; sound insulation and transmission; absorption, reverberation, noise control and attenuation; acoustical requirements for different space types and design planning; site planning for noise control; exposure to acoustics design software.

Suggested References:

National Building Code, 2015, Bureau of Indian Standards

Salvan, George S., *Architectural Utilities 3: Lighting & Acoustics*

Barron, M., *Auditorium Acoustics and Architectural Design; Taylor & Francis*.

Harold, B.M. & Lewis G.F., *Acoustics for Architects; Reinhold*

Sage, Russell. *The Architecture of Light: Architectural Lighting Design Concepts & Techniques*.
Koenigsberger, Ingersoll, & Mayhew. *Manual of Tropical Housing and Building*

Course Title: HVAC, MECHANISED MOBILITY & FIRE SAFETY Semester: V Code: BS3

Lecture	Tutorial	Studio	Total Hours	Assessment Type	Internal Marks	Jury/Exam Marks	Total Marks	Credits
2			2	IEE	50	50	100	2

Course Objectives: To acquaint students with the systems for air-conditioning, fire safety, and mobility, codes relevant to them, and incorporation of the systems in building design.

Anticipated Learning Outcomes: Ability to workout HVAC loads and space requirements for equipment; interpret and depict fire safety requirements in design & drawings, estimate lift numbers and lobby sizes, incorporate parking systems in project planning.

Content

Air-conditioning: Principles and components of mechanical ventilation and air-conditioning systems; calculation based on design conditions and system sizing, design considerations for chiller rooms, cooling plants, AHUs; integration with natural ventilation, and other energy conserving technologies.

Fire Safety: Fire sources, spreading, and growth decay curve; material fire response and fire retardant materials; fire hydrants, fire escapes, refuge areas, fire tender access; smoke detector, alarm, and sprinkler systems; representation of fire considerations in drawings.

Mobility Systems: Lifts, escalators, conveyors, and travolators; sizing of space for lifts and other mobility systems; construction and installation; design and operation of automated parking systems,

Suggested References:

ASHRAE Fundamentals Handbook, 2013

National Building Code, 2015, Bureau of Indian Standards

Bangash, M.Y.H. & Bangash, T., 2007. *Lifts, Elevators, Escalators and Moving Walkways /Travelators*.

Course Title: SUSTAINABLE SERVICES & GREEN BLDGS. Semester: VI Course Code: BS4

Lecture	Tutorial	Studio	Total Hours	Assessment Type	Internal Marks	Jury/Exam Marks	Total Marks	Credits
2	-----	-----	2	IEE	50	50	100	2

Course Objectives: To develop an advanced understanding of sustainability through exposure to resource conservation strategies as well as and their integration and management at the building and large development level.

Anticipated Learning Outcomes: Students should be able to conduct preliminary resource audits, understand sustainable and resource efficient integration systems and services, prepare green rating checklists and relevant documentation for projects.

Content

Resource Management: Energy, water, and waste audits; operations and maintenance; post occupancy surveys and reviews; building benchmarking.

Sustainability: Social, economic and environmental impacts; sustainable systems and utilities; their integration and management at building and site levels, introduction to smart cities.

Green Ratings: Sustainability rating criteria and checklists; documentation for design credits; tool-kits and compliance checks and forms; concept stage energy modelling and simulation.

Suggested References:

GRIHA Volume-1 Introduction to National Rating System, Adarsh

GRIHA Manual Volumes 2-4, Adarsh

GRIHA for Large Developments, Adarsh

Chapter 11, National Building Code by BIS

ENVIRONMENT STUDIES

Course Title: **ENVIRONMENTAL STUDIES (UGC)**

Semester: I

Code: ES1

Lecture	Tutorial	Studio	Total Hours	Assessment Type	Internal Marks	Jury/Exam Marks	Total Marks	Credits
2			2	IEE	50	50	100	2

Course Objectives: To bring about awareness of a variety of environmental concerns and to create a pro-environment attitude and behavioral pattern in society based on sustainable lifestyles.

Anticipated Learning Outcomes: Awareness of a wide range of environmental concerns and ability to act at their own level to protect the environment we all live in.

Content:

Unit 1: Multidisciplinary nature of environmental studies

Unit 2: Natural Resources: Renewable and non-renewable resources

Unit 3: Ecosystems

Unit 4: Biodiversity and its conservation

Unit 5: Environmental Pollution

Unit 6: Social Issues and the Environment

Unit 7: Human Population and the Environment

Unit 8: Fieldwork

Suggested References:

Barucha, E., 2004. *Text Book Of Environmental Studies For Undergraduate Courses*. UGC Univ. Press

Joseph, Benny, 2005. *Environmental Studies*. Tata McGraw Hill

Kaushik, A. and Kaushik, C.P., 2010. *Basics of Environment and Ecology*. New Age Int. Publishers

Agarwal, K.C., 2001. *Environmental Biology*. Nidhi Publ. Ltd. Bikaner

Brunner, R.C., 1989. *Hazardous Waste Incineration*. McGraw Hill

Course Title: **CLIMATE-RESPONSIVE DESIGN PRINCIPLES**

Semester: II

Code: ES2

Lecture	Tutorial	Studio	Total Hours	Assessment Type	Internal Marks	Jury/Exam Marks	Total Marks	Credits
2		-	2	IEE	50	50	100	2

Course Objectives: Understanding the elements of climate and how architecture responds to them architecture in order to develop bioclimatic design in buildings.

Anticipated Learning Outcomes: Ability to interpret climatic data for design, understanding sun path diagrams, shadow angles, daylight factors, read wind charts and assess volume of natural ventilation

Content:

Climate factors: Elements of climate, climatic types and patterns, climatic data, measurement and units; characteristic influences on vernacular buildings; climate analysis software

Solar control: Solar geometry and sun path; site planning and solar envelopes; building massing and open space exposure; types of shading devices for building fenestration; shading design software.

Daylight design: Principles of day-lighting, architectural integration in different building types; daylight quality; sky view factor and daylight factor; daylight design software.

Bioclimatic Design standards; Building byelaws related to day-lighting and natural ventilation

Suggested References:

Givoni, B., *Man Climate and Architecture*

Krishan, A., *Climate Responsive Architecture*.

Olgyay & Olgyay, *Design with Climate*,

Koenigsberger, Ingersoll, & Mayhew, *Manual of Tropical Housing and Building*,

Lam, W., *Sunlighting as Formgiver for Architecture*. Van Nostrand Reinhold Company

Baker, N. & Steemers, K., *Daylight Design of Buildings*

Course Title: **SITE PLANNING AND LANDSCAPING** Semester: III

Code: ES3

Lecture	Tutorial	Studio	Total Hours	Assessment Type	Internal Marks	Jury/Exam Marks	Total Marks	Credits
2			2	IEE	100	-	100	2

Course Objectives: Introducing the relationship between the built and the un-built environment and principles of sustainable site planning;

Anticipated Learning Outcomes: Ability to analyze ecological and geomorphological characteristics of a site; use site analysis information to propose appropriate site planning and landscape design.

Content:

Site analysis: Site analysis with respect to topography and existing features; slopes, drainage; soil types and layers; sensitive areas and natural ecosystem; vegetation and tree survey etc.

Landscape design: Landscape principles and design elements; historical overview of garden design; principles of landscape construction; Introduction to planting design and plant selection.

Green Practices: Soil protection during and after construction; reduction of hard paving and circulation areas; water efficient landscaping; design to include existing site features.

Suggested Texts and References:

McHarg, Ian, *Design With Nature*.

Laurie M., 1986. *An Introduction to Landscape Architecture*. Elsevier.

Hubbard H.V., *An Introduction to Landscape Design*.

Bose & Chowdhary, 1991 *Tropical Garden Plants in Colour*. H&A Publishers, Calcutta.

Clifford O, *History of Garden Design*.

Root, James B., *Fundamentals of Landscape and Site Planning*

Lynch, Kevin, 1962. *Site Planning*. The MIT Press, Cambridge.

Krishen, Pradip. 2006. *Trees of Delhi*. Dorling Kindersley.

GRIHA Manual Volumes 2-4. Adarsh

Course Title: **LOW-ENERGY PASSIVE DESIGN**

Semester: IV

Code: ES4

Lecture	Tutorial	Studio	Total Hours	Assessment Type	Internal Marks	Jury/Exam Marks	Total Marks	Credits
2	—		2	IEE	50	50	100	2

Course Objectives: To understand the operation of passive systems of environmental control in buildings and their impact on the performance of the interior space and comfort of the occupant.

Anticipated Learning Outcomes: Students should be able to: plot comfort parameters for a location on a psychrometric chart, estimate thermal performance of a building envelope, and propose a passive design strategy for space conditioning of a building.

Content

Human Comfort: Thermal comfort and heat balance; comfort scales and bioclimatic/psychrometric chart; thermal comfort standards; adaptive factors and clothing insulation. Natural ventilation

Building Insulation: Building heat exchange; u-values for wall, roofs, and fenestration; envelope insulation and thermal mass performance; glazing solar heat gain coefficient and visible transmittance. Wind passage through the building skin, wind speed and temperature attenuation.

Passive Strategies: Passive heating and cooling strategies; courtyards and placement of openings; stack and wind assisted natural ventilation; role of landscaping and water elements.

Course Title: ENERGY-POSITIVE ACTIVE DESIGN Semester: V

Code: ES5

Lecture	Tutorial	Studio	Total Hours	Assessment Type	Internal Marks	Jury/Exam Marks	Total Marks	Credits
2	—	-----	2	IO	100	-	100	2

Course Objectives: To understand global environmental concerns and how these can be addressed through building design and active systems integration for sustainability.

Anticipated Learning Outcomes: Ability to apply relevant codes for energy and environment, ascertain approximate renewable energy feasibility on projects, and configure systems integration for energy conservation.

Content:

Energy conservation: Energy crisis and global initiatives; India's climate change agenda and developmental plans; guidelines and regulatory mechanisms; embodied energy, carbon emissions.

Renewables: Solar, wind, geothermal energy; biomass and waste to energy systems; combined heat and power and district cooling; architectural implications of renewable energy systems.

Intelligent systems: Introduction to intelligent buildings; building automation, sensors and controllers; building management systems; introduction to smart grids.

Suggested References:

National Action Plan for Climate Change, Prime Minister's Office, Govt. of India

Chapter 11, National Building Code by BIS

Energy Conservation Building Code, 2007, BEE

Jenkins, Renewable Energy Systems.

ARCHITECTURAL PRACTICE

Course Title: **MODEL MAKING AND WORKSHOP**

Semester: I

Code: AP1

Lecture	Tutorial	Studio	Total Hours	Assessment Type	Internal Marks	Jury/Exam Marks	Total Marks	Credits
		3	3	IO	100		100	

Course Objectives: Introduce different techniques of model making in various materials and basic processes for fabrication and assembly of simple building components

Anticipated Learning Outcomes: Ability to make true scale models of architectural designs, manually and mechanically and familiarity with carpentry, joinery, smithy and moulding with different materials and techniques.

Content:

- i. Use of standard materials in model making- paper, boxboard, thermocol, foamcore board, wood, acrylic etc., use hand tools and hand-held power tools, innovative representational mimicry.
- ii. Model making techniques like surface development, paper folding, origami, hand cutting laser cutting and 3D printing etc. Making of block models and detail models.
- iii. Simple workshop practice with machines like circular saw, lathe, sander, jig, airbrush etc. To be coordinated with the Architectural Design, Basic Design & Visual Arts and Building Construction studios

Suggested Pedagogical approach:

Practical exercises related to making models of simple buildings, furniture and everyday objects; fabrication of full size mock-up or prototype of an actual building component such as a doorjamb, baluster, or luminaire.

Course Title: **SURVEYING AND LEVELLING**

Semester: II

Code: AP2

Lecture	Tutorial	Studio	Total Hours	Assessment Type	Internal Marks	Jury/Exam Marks	Total Marks	Credits
		3	3	IO	100	-----	100	2

Course Objectives: Introduce principles of topographical survey and their application

Anticipated Learning Outcomes: Working knowledge of manual and digital surveying techniques, ability of demarcating features and setting out a simple building on site.

Content:

- i. Importance of surveying, principles and types of surveying and leveling.
- ii. Use of traditional surveying techniques and modern techniques like Total Station to measure distances and co-ordinate location of features like trees, cable lines, culverts, wells, benchmarks etc.
- iii. Understanding topography, spot levels and contours and preparation of contour maps.
- iv. Introduction to GIS and Differential Global Positioning System (DGPS).

Site demarcation and setting out of a simple building on the site.

To be coordinated with the Architectural Design studio exercise.

Suggested Texts and References:

- Punia, B.C. et.al. 2005. *Surveying Vol.1,2,3*, Laxmi Publ.(Pvt.) Ltd., New Delhi.
 Duggal, S.K., 2004. *Surveying Vol.1&2*. Tata McGraw Hill Pub. Co. Ltd. New Delhi.
 Subramanian, R. 2012. *Surveying and Leveling*. Oxford Univ. Press, New Delhi.
 Aror, K.R., 2004. *Surveying Vol. 1,2,3*. Standard Book House, N. Delhi.
 Chandra, A.M., 2002. *Plane Surveying*. New Age International Pvt. Ltd., New Delhi.

Course Title: **ESTIMATING & COSTING**

Semester: V

Code: AP3

Lecture	Tutorial	Studio	Total Hours	Assessment Type	Internal Marks	Jury/Exam Marks	Total Marks	Credits
1	-	2	3	IEE	100	50	150	3

Course Objectives: Introduce the concept of quantification of building materials and process to derive estimated costs of works as per standard procedures.

Anticipated Learning Outcomes: Ability to take off quantities from drawings for preliminary and detailed estimates, analyze rates and prepare cost estimates for a small building project.

Content:

- i. Area Calculation: Calculation of plinth area, floor area, carpet area and circulation area,
- ii. Types of estimates: Preliminary estimates- plinth area rates and cost indices, Detailed estimate- modes of measurement, taking off quantities from drawings manually and through BIM software, Bill of Quantities (BOQ) and Bill of Materials (BOM)
- iii. Rate analysis: Deriving rates for items from labour and material costs based on CPWD Schedule of Rates, scheduled and non-scheduled items, Establishing market rates.

Suggested Pedagogical approach:

Studio exercises related to Quantity Surveying for a small building project using Standard CPWD PAR methods, and compilation of a Preliminary Estimate

Course Title: **SPECIFICATIONS & CONTRACTS**

Semester: VI

Code: AP4

Lecture	Tutorial	Studio	Total Hours	Assessment Type	Internal Marks	Jury/Exam Marks	Total Marks	Credits
1	-	2	3	IEE	100	50	150	3

Course Objectives: Introduce the concept of material and performance specifications for describing works for effective building contracts.

Anticipated Learning Outcomes: Ability to prepare general and detailed specifications and a contract for a small building project.

Content:

- i. Methods of specification writing, Accuracy of description of items of work, typical space for building works, implications of variations and incomplete specification's impact on building costs.
- ii. Types of contracts, tenders, relative merits, components of a contract, general conditions and special conditions, commercial terms.

Suggested Pedagogical approach:

Studio exercises related to specifications for a small building project using Standard CPWD methods, detailed specifications, general and special conditions and compilation of a tender document

Suggested Texts andReferences:

Birdie G.S., 2005, *Text Book of Estimating and Costing (Civil Engineering)* Dhanpat Rai Publishing

Chakraborty M., *Estimating, Costing, Specification and Valuation*

Dutta, B.N. 1998. *Estimating and Costing in Civil Engineering*. 24th edition, UBSPD Ltd. Rangwala,

CPWD- *Standard Schedule of Rates* (latest edition)

CPWD- *Specifications* (latest edition)

CPWD- *Rate Analysis* (latest edition)

Course Title: **PROJECT MANAGEMENT** Semester: VII

Course Code: AP5

Lecture	Tutorial	Studio	Total Hours	Assessment Type	Internal Marks	Jury/Exam Marks	Total Marks	Credits
1	-	2	3	IEE	100	50	150	3

Course Objectives: introduce students to the construction industry practices and project management techniques needed for coordinating building projects professionally.

Anticipated Learning Outcomes: Ability to use project management software and quantitative methods in project definition, administration of contracts, billing and verification, monitoring quality at site and participating in preparation of Detailed Project Report.

Content:

- i. Project planning, feasibility studies, project report, project financing, project organization, process and structure, personnel selection, role and responsibilities of the project manager.
- ii. Site investigations, layout, site organization, networking techniques, PERT/CPM, LOB, MS Project, time cost analysis.
- iii. Resource management and value engineering-methods of material/ labour estimation, resource scheduling and leveling, construction equipment types and applications.
- iv. Project monitoring and cost control, manpower management, safety and labour issues.

Suggested Pedagogical approach:

Studio exercises on preparing a project schedule; writing site inspection reports for MIS, sample correspondence for notices to contractors, work-orders, presentations for review meetings etc.

Suggested Texts and References:

- O'Brien, J.J. and Plotnick, F.L., 2009. *CPM in Construction Management*. McGraw Hill Professional
- Pumma, B.C. and Kandelwal, K.K., 2006. *Project Planning and Control with PERT and CPM*. Laxmi Publications (P) Ltd. New Delhi.
- Chitkara, KK, 2004. *Construction Project Management: Planning, scheduling and Controlling*. Tata McGraw Hill Education.
- Callahan, M.T., Quackenbush, D.G. and Rowings, J.E., 1992. *Construction Project Scheduling*. McGraw Hill.

Course Title: **PROFESSIONAL PRACTICE**

Semester: IX

Code: AP6

Lecture	Tutorial	Studio	Total Hours	Assessment Type	Internal Marks	Jury/Exam Marks	Total Marks	Credits
1	-	2	3	IEE	100	50	150	3

Course Objectives: Introduce the profession of architecture, the role of professional and statutory bodies, industry associations and guilds, code of conduct, regulations for practicing architecture, running of an architect's office and applicable laws, rules and regulations, pitching for projects and applying for jobs.

Anticipated Learning Outcomes: Students should become familiar with legislations applicable to architects, procedures for engagement in architectural services, aspects of setting up and being part of an architectural office, including proficiency in communication for conducting everyday business.

Content:

- i. Architect's Act 1972, Role of Council of Architecture in registration of Architects, regulating standards of practice of architects.
- ii. Role of an Architect in a multidisciplinary team: Code of Conduct, Scope of work and services, Conditions of Engagement, Procedures for engagement of an architect by government agencies, Architectural competitions. CVC guidelines, MOF guidelines.

iii. Practicing Architecture: Setting up of an office and managing it, billing, accounting; Relationship with client, employees, associates, consultants, contractors, and supplier. Presentation, documentation, IT practice, project delivery methods, Supervision for ensuring compliance of relevant laws by client and contractor, liability of an Architect, professional indemnity, Consumer Protection Act, Copyright Act.

iv. Business correspondence including letters, emails, job applications, interviews and discussions. Professional ethics related to different media, memorandums and office orders,

Course Title: **PROFESSIONAL PRACTICE** Semester: X

Course Code: AP7

Lecture	Tutorial	Studio	Total Hours	Assessment Type	Internal Marks	Jury/Exam Marks	Total Marks	Credits
1		2	3	IEE	100	50	150	3

Course Objectives: Introduce the architects' role in tendering for works, valuation, easement, arbitration and impact of WTO and GATT on professional practice, and to equip them for international architectural practice.

Anticipated Learning Outcomes: Familiarity with the procedures for tendering, arbitration, valuation of works and real estate and aspects of international practice. Proficiency in preparation of projects proposals and presentations for procuring projects.

Content:

- i. Tendering procedure: Contracts and agreements, Tender, negotiations and award of work.
- ii. Arbitration: Mediation, Reconciliation and Arbitration.
- iii. International Practice: Conflict with Architects Act, NBC, State/LSG laws, Company law. Comparative study of Architects Act of other countries, other professional Acts. Foreigners practicing in India, opportunities for Indian Architects abroad, international collaboration, Mutual recognition of registration, qualification under Architects Act, GATT, WTO.
- iv. Project proposals, project reports, presentations and conference papers

Suggested Texts and References:

- Apte, V.S. 2008. *Architectural Practice and Procedure*. Padmaja Bhide, Pune
- Piotrowski, A. and Williams, J., 2001. *The Discipline of Architecture*. Univ. of Minnesota Press.
- Nanavati, Roshan, 1984. *Professional Practice*. Lakhani Book Depot, Mumbai
- Scott, J.J., 1985. *Architects Practice*, Butterworth, London
- COA 2013. *Handbook of Professional Documents*. Council of Architecture.
- AIA- *Guidelines for Professional Practice*
- RIBA - *Handbook on Practice of Architecture*
- Eldred, G.W. 2008. *The Beginner's Guide to Real Estate Investing*. John Wiley & Sons.
- Rangwala, S.C. *Valuation of Real Properties*. Charottar Publications.
- Raman, M., Sharma, S *Technical Communication: Principles and Practice*, 2nd Edition by

HUMANITIES STREAM

HISTORY OF ARCHITECTURE

Course Title: **HISTORY OF ARCHITECTURE-1** Semester: II Course Code: HOA1

Lecture	Tutorial	Studio	Total Hours	Assessment Type	Internal Marks	Jury/Exam Marks	Total Marks	Credits
2	-----	-----	2	IO	100	-	100	2

Course Objectives: Introduce the evolution of architecture alongside the culture of early civilizations.

Anticipated Learning Outcomes: Understanding of the socio-cultural and religious characteristics of civilizations to appreciate their architectural developments across a timeline.

Content:

- i. Cross-cultural understanding of factors influencing early settlement and built form, Indus Valley Civilization and the early Aryan architecture of the Ganga basin, Vedic principles of planning. Architecture of Egypt, West Asia (Mesopotamia, Assyria, neo-Babylon and Persia), China, Pre-Columbian America, Greece (Aegean to Hellenistic times) and Rome
- ii. Inception and development of Buddhist architecture in India and overview of developments in South East Asia, Japan, China and the Silk Route.

Course Title: **HISTORY OF ARCHITECTURE-2** Semester: III Course Code: HOA2

Lecture	Tutorial	Studio	Total Hours	Assessment Type	Internal Marks	Jury/Exam Marks	Total Marks	Credits
2		---	2	IO	100	-	100	2

Course Objectives: Introduce the historic evolution of a temporal building typology through the exhaustive study of a specific type, viz., religious architecture from across the world.

Anticipated Learning Outcomes: Understanding of the factors that influence the evolution of early forms of the Hindu temple, Christian church and Islamic mosque in India and abroad, and the architectural characteristics and features of each type.

Content:

- i. Inception and development of the early Hindu temple form with reference to Vedic and Buddhist planning principles and design elements; Development of regional styles and manifestations thereof; Evolution of temple complexes and temple towns; Overview of Hindu architecture in Burma, Cambodia, Indonesia, Nepal, Sri Lanka and Thailand.
- ii. Inception and development of the early Christian church form; Overview of Christian Architecture of Europe during the Early Christian, Byzantine, Romanesque, and Gothic periods.
- iii. Advent of Islam in the Middle East and the first mosque at Mecca. Overview of Islamic Architecture of Iran, Central Asia, Egypt and the Maghreb till 1200 AD through selected examples.

Course Title: **HISTORY OF ARCHITECTURE-3**

Semester: IV

Course Code: HOA3

Lecture	Tutorial	Studio	Total Hours	Assessment Type	Internal Marks	Jury/Exam Marks	Total Marks	Credits
2	-----	-----	2	IO	100	-	100	2

Course Objectives: Develop the understanding of evolution of a temporal building typology through the exhaustive study of a specific type, viz., religious architecture from across the world.

Anticipated Learning Outcomes: Ability to distinguish place- and period-specific architectural styles of religious architecture in India, Europe, West Asia and the Far East.

Content:

- i. The advent of Islamic Architecture into India and its impact on structural and construction systems; Influences of Islamic ideas on secular and religious architecture in India; Initiation and development of the mosque, tomb and fort typologies in the Sultanate period.
- ii. Regional styles of Punjab, Jaunpur, Gujarat, Malwa, Bijapur, Golkonda, Bengal, and Kashmir; The Mughal period and the flowering of Indo-Islamic Architecture in the India sub-continent.
- iii. Renaissance in Florence and the reasons thereof; Counter-reformation; the Baroque movement and its impact on Architecture and other Visual Arts. Renaissance and Baroque Architecture of Italy and in other parts of Europe.
- iv. Islamic Architecture of Iran, Central Asia, Egypt and Turkey from 1200-1500 AD
- v. Religious architecture of China, Japan and Korea from 1200-1500

Course Title: **HISTORY OF ARCHITECTURE-4** Semester: V

Course Code: HOA4

Lecture	Tutorial	Studio	Total Hours	Assessment Type	Internal Marks	Jury/Exam Marks	Total Marks	Credits
2			2	IO	100	-	100	2

Course Objectives: Introduce the impact of growing international trade, industrialization and colonization on the architecture of India, Europe and America and preface the Modern movement.

Anticipated Learning Outcomes: Ability to discern Western and Indian influences in Colonial architecture in India, the impact of the Industrial revolution on architecture and city planning leading up to the establishment of trans-national paradigms of modern habitation.

Content:

1. Colonial Architecture in India; Early buildings of the Dutch, Portuguese and the English in various parts of India; Inception and growth of Madras, Calcutta and Bombay. Growth and development of the bungalow, the hill station, the cantonment and the residency in response to the perceived needs of the British in India; Indo-Saracenic Architecture of the Indian sub-continent; The making of New Delhi.
- ii. The Industrial revolution and its impact on Europe; Initiation of modern architecture and town planning. Overview of the Modern Movement, the International Style, Post-Modern Movement and Critical Regionalism with the help of selected examples of master-architects of the period.

Lecture	Tutorial	Studio	Total Hours	Assessment Type	Internal Marks	Jury/Exam Marks	Total Marks	Credits
2	-----	-----	2	IO	100	-	100	2

Course Objectives: Introduce the initiation and development of Modern Architecture in the sub-continent and contemporary architecture in India and the world.

Anticipated Learning Outcomes: Ability to understand the role of societal developments as a predicators of change in architectural paradigms through the study of Modern Architecture in the sub-continent and contemporary architecture of India and the world

Content:

- i. The initiation and development of Modern Architecture in the sub-continent. Critical Regionalism revisited in the context of the sub-continent.
- ii. Impact of globalization, energy crisis and climate change on architecture.
- iii. Overview of post independence architecture with the help of selected examples of master-architects of the period.
- iv. Contemporary world architecture to include notions of the Post-modern City, De-construction, Globalization, Post-modern Tradition, Revisiting of Tradition, Cradle to cradle Design, Post-modern Ecology etc. through selected examples.

Suggested Texts and References:

- Asher, Catherine, 2001. *Architecture of Mughal India*. Cambridge Univ. Press
- Bhatt, V. & Scriver, P., 1990. *After the Masters: Contemporary Indian Architecture*. Mapin Publishing
- Brown, Percy, 2010. *Indian Architecture: Buddhist and Hindu Period*. DB Taraporevala & Sons
- Brown, Percy, 1983. *Indian architecture: Islamic period*. DB Taraporevala & Sons
- Chopra P.M., 2000. *Monuments of the Raj*. Arya Book Depot.
- Copplestone, T. & Lloyd, S., 1971. *World Architecture: An Illustrated History*. Verona Printed, London
- Crouch, Dora P., 1985 *History of architecture: Stonehenge to Skyscrapers*. McGraw Hill London.
- Davis, Philips, 1985. *British Architecture in India 1660-1947 Splendours of the Raj*. Murray
- Desai Madhavi, Lang Jon, 1997. *The Search for identity-India 1880-1980 Architecture and Independence*. Oxford Univ. Press
- Fiske. & Edgell, G. H., 2012. *A History of Architecture*. Harper & Brothers, New York,
- Fletcher, Sir Banister, 2012. *A History of Architecture*. Cruickshank, D., Ed. CBS Publishers, New Delhi
- Frampton, Kenneth 1994. *Modern Architecture: A Critical History*. Thames & Hudson, London
- Hd'ttstien, M & Delius, P., eds., 2000. *Islam: Art and architecture*. Konemann, Paris
- Grover, Satish, 2003. *Buddhist and Hindu Architecture in India* 2nd edition. CBS Publishers, New Delhi.
- Grover, Satish, 2002. *Islamic Architecture in India*. CBS Publishers, New Delhi
- Juneja, Monica, ed. 2001. *Architecture in Medieval India: Forms, Contexts, and Histories*. Permanent Black, New Delhi.
- Metcalf, Thomas 1980. *An Imperial Vision*. Faber & Faber
- Mitchell, G., 1978. *Architecture of the Islamic World-its history & social meaning*. Thames & Hudson, London
- Pevsner, Nikolaus, 1960 *Pioneers of Modern Design*, Penguin Books
- Tadgell, Christopher, 1994. *The History of Architecture in India*. Phaidon Press, London
- Tillotson, G.H.R., ed. 2013. *Paradigms of Indian Architecture: Space and Time in Representation and Design (SOAS Collected Papers on South Asia, 13)*. Routledge Publishers, New York.
- Tillotson, G.H.R., 1989. *The Tradition of Indian Architecture: Continuity, Change, and the Politics of Style since 1850*. Yale University Press
- Unwin, Simon, 2010, *Twenty Buildings Every Architect Should Understand*. Routledge, New York
- Watkin, David, 2005. *A History of Western Architecture*, 4th edition Laurence King, London.

THEORY OF DESIGN

Course Title: **HUMAN SETTL. & VERNACULAR ARCH.** Semester: I Code: TOD1

Lecture	Tutorial	Studio/	Total Hours	Assessment Type	Internal Marks	Jury/Exam Marks	Total Marks	Credits
2	—		2	IO	100		100	2

Course Objectives: Introduce traditions of building structures for habitation, made without the intervention of professional architects.

Anticipated Learning Outcomes: Familiarity with simple ways of building and settling a community that related to local customs, social systems, climate, available materials and construction methods.

Content:

- i. Vernacular architecture including primitive or aboriginal architecture; indigenous architecture; ancestral or traditional architecture; folk, popular, or rural architecture;
- ii. Ethnic architecture or ethno-architecture; informal architecture; the so-called "anonymous architecture" or "architecture without architects;" and even "non-pedigree" architecture

Course Title: **SOCIOLOGY & CULTURE** Semester: II Code: TOD2

Lecture	Tutorial	Studio	Total Hours	Assessment Type	Internal Marks	Jury/Exam Marks	Total Marks	Credits
2	--- ----	—	2	IO	100	-----	100	2

Course Objectives: Introduce the social dimension of architecture as an aspirational response to cultural and economic realities of a community

Anticipated Learning Outcomes: ability to understand basic sociological concepts and learn their applications in space planning and architectural design

Content:

- I. Sociology, Economics And Culture-sociology and its uses in human settlement studies, socio-cultural processes, socio economic parameters in community planning
- II. Society And Architecture: relationship of sociology with architecture impact of house form and culture, socio cultural transformation through ages and impacts on built environment; social identity and architectural relevance. Contribution of society, social structure and culture on the development of vernacular architecture, design approaches with social perspective
- III. Urbanization And Social Stratification- urbanization, rural urban continuum, urban growth, impact on society and urban area, social aspects of housing, territoriality and neighborhood, impact of socio economic parameters on built form, slum and squatter settlements.

Suggested Texts and References:

- Oliver, P., ed. 1997. *Encyclopedia of Vernacular architecture of the World Vol. 1-3*, CUP, Cambridge.
- Rappaport, Amos, 1969. *House Form & Culture*. Prentice Hall Inc.
- Brunskill, R.W., 1987. *Illustrated Handbook on Vernacular Architecture*.
- Pamar, V.S, 1989. *Haveli: Wooden Houses & Mansions of Gujarat*. Mapin Pub. Ahmedabad.
- Jain, Kulbhushan 1992. *Mud Architecture of the Indian Desert*, Aadi Centre, Ahmedabad.
- Fathy, Hassan 2000. *Architecture for the Poor: An Experiment in Rural Egypt*. Univ. of Chicago Press.
- Rudofsky, Bernard, 1964. *Architecture without Architects*. . Museum of Modern Art, NY.
- Heath, K., 2009. *Vernacular Architecture & Regional Design - Cultural Processes & Environmental Responses*, Architectural Press, London.
- Bhatia, Gautam, 1981. *Laurie Baker: Life, Works & Writings*. Viking/ HUDCO, New Delhi.
- Sachdeva, DR. *An Introduction to Sociology*. Vidya Bhushan, Kitab Mahal
- King, Anthony D. 1980. *Building and Society*, Routledge Kegan & Paul.

Course Title: **DESIGN METHODOLOGY** Semester: V Code: TOD3

Lecture	Tutorial	Studio	Total Hours	Assessment Type	Internal Marks	Jury/Exam Marks	Total Marks	Credits
2	—		2	IO	100	-----	100	2

Course Objectives:

Anticipated Learning Outcomes:

Content:

i. Design as a multi-variant problem solving process.

Synthesizing a Design Brief, Schedule of area requirements, qualitative attributes of spatial components, Carrying out case studies, comparing and analyzing data, collating design related insights in useable format, defining design goals, formulating design strategies

Course Title: **ARCHITECTURAL THEORIES** Semester: VI Code: TOD4

Lecture	Tutorial	Studio	Total Hours	Assessment Type	Internal Marks	Jury/Exam Marks	Total Marks	Credits
2	—	-----	2	IO	100	-----	100	2

Course Objectives: The focus of the course will be on understanding the main theoretical concepts in modern architecture. Key theoretical paradigms, methodologies and modes of enquiries will be introduced.

Anticipated Learning Outcomes: Ability to comprehend some of the main theoretical moorings of 20^h and 21st century in architecture, analyze built works and critically examine the ideas and view of practice they represent as a precursor to shaping one's own design approach.

Content:

- i. Theory and criticism, theories in relation to practice, writing and theory as design tools in professional practice, Theory as a basis of the student's personal philosophy as an architect.
- ii. Critical reading and writing skills form an important component of the course. Ideas of the late 20^h century architects Henri Lefebvre, Robert Venturi, Aldo Rossi, Bernard Tschumi, Peter Eisenman, Martin Heidegger, Juhani Pallasma, Alvaro Siza, and Charles Correa
- iii. Themes that have informed 20th century architecture and urbanism: History and historicism, Type and typology, The nature of the site/ The constructed site, Tectonic and the Constructed object, Modernism, Structuralism, Deconstruction, Phenomenology, Post Modernism,

Suggested Texts and References:

Heidegger, M., 1993. *Building Dwelling rhinking*. Basic Writings. Harper Collins

Mallgrave, H. F. & Goodman, D., (2011) *An Introduction to Architectural Theory: 1968 to the Present*. Wiley Blackwell.

Mallgrave, H. F., (ed.) 2005. *Architectural Theory Vol.1: An Anthology from Vitruvius to 1870*.

Mallgrave, H.F., (ed.) 2008. *Architectural Theory Vol.2: An Anthology from 1871 to 2005*.

Otis, Enn (2010) *Decoding TheorySpeak: An Illustrated guide to Architectural Theory*. Routledge

Tschumi, Bernard (ed.), 2004. *The State of Architecture at the Beginning of the 21st Century*. Monacelli

Tschumi, Bernard 1994. *Architecture and Disjunction*. MIT Press. Cambridge Mass.

Venturi, Robert, 1966. *Complexity and Contradiction in Architecture*. MoMA, New York.

Lefebvre, H., 1991. *The Production of space*. Oxford, UK

Pallasma, Juhani, 2005. *The Eyes of the Skin: Architecture and the Senses*. Wiley Academy,

Course Title: **SUSTAINABLE URBAN HABITAT** Semester: VI Code: ES6

Lecture	Tutorial	Studio	Total Hours	Assessment Type	Internal Marks	Jury/Exam Marks	Total Marks	Credits
2	-----		2	IO	100		100	2

Course Objectives: Introduce urban housing problems, their causes and discover solutions thereof.

Anticipated Learning Outcomes: Ability to comprehend housing as a key component of urban habitat, closely linked to urban infrastructure and urban economy, to connect emerging concepts in environment studies with human needs towards more sustainable paradigms for mass housing.

Content:

- i. Shelter, housing form, Census of India definitions, Housing policies, demand and supply, housing shortage, income and affordability, poverty and slums, green housing, green rating
- ii. Social and Economic Dimensions- social security, role of housing in family and community well-being, status and prestige, safety, crime and insecurity, deprivation and social vulnerability, ghetto-ism, gender issues, housing and the elderly.
- iii. Neighbourhood as a major constituent of the City Plan, Traditional and modern approaches to neighbourhood planning, planning and design standards for area distribution, density, development controls and building byelaws, UDPFI guidelines, NBC provisions,
- iv. Sustainable Infrastructure for neighbourhoods, Transit-oriented development, Mass Solar Energy generation, Smart Energy and water conservation, Recycling of Waste. Net-Zero communities

Suggested Texts and References:

Introduction to Housing, HERA (Author) Prentice Hall (2005)

Davis, Sam. *The Architecture of Affordable Housing*.

Marcus, C. C., *Housing As if People Mattered: Site Design Guidelines for Medium-density Housing* Clapham D., Clark, W.A.V., 2012. *The Sage Handbook of Housing Studies*. Sage, London.

Levitt, David & Levitt, Bernstein, 2010. *The Housing Design Handbook*. Routledge, New York.

Ferre, A. and Salij, T.H., .2010. *Total housing: Alternatives to Urban Sprawl*. Actar, New York.

Course Title: **URBAN DESIGN STUDIES** Semester: IX Code: TOD6

Lecture	Tutorial	Studio/	Total Hours	Assessment Type	Internal Marks	Jury/Exam Marks	Total Marks	Proposed Credits
2		-- --	2	IO	100	----	100	2

Course Objectives: Introduce basic concepts of urban design, reading the city, understanding urban issues with the intent of resolving the interface of buildings with each other and with the urban space they help to define between them.

Anticipated Learning Outcomes: Ability to comprehend architecture at the urban scale, understand the problematic issues in a given urban area after a methodical analysis and contemplate possible urban design solutions that will guide built-form and open-space morphology.

Content:

- i. Developing student consciousness to understand the urban scale.
- ii. Developing an understanding of factors effecting built and open spaces at urban scale and methods to perceive, record and analyze them.
- ii. Techniques to understand movement systems, activity patterns, visual and physical linkages. Studying land use, building uses, social, physical and perceptual context and behaviour. User patterns, perceptions and behaviour.

Suggested Texts and References:

Jonathan Barnett, *An Introduction to Urban Design*

Larice & Macdonald (ed) 2013. *The Urban Design Reader*. 2nd edition. The Routledge Urban Reader Series, Routledge

Watson et.at. 2003. *Time Saver standards for Urban Design*. McGraw Hill, New York.

RESEARCH STREAM

Course Title: **PROFESSIONAL COMMUNICATIONS 1** Semester: I Code: PC1

Lecture	Tutorial	Studio	Total Hours	Assessment Type	Internal Marks	Jury/Exam Marks	Total Marks	Credits
		3	3	IO	150	-	-	NC

Course Objectives: Introduce basis language skills for oral professional communication that enables effective conversation in the classroom and courteous but forceful participation in conferences and seminars, both as audience and for diverse audiences.

Anticipated Learning Outcomes : Students should be able to speak and understand spoken English to carry out a meaningful conversation on topics related to Architecture, particularly in the Studio.

Course Contest :

- i. Importance of conversation, definition, process and feedback in communication, cultural influences as barriers to effective communication, features of effective communication
- ii. Type of communication, Listening and responding, Live, Tele - and Video-conferencing as a media of modern communication, ethics related to various forms of communications.
- iii. Planning and conducting conversations, interviews, preparation and rehearsal of oral statements for presentations, body language, effective listening, telephonic communication.

Course Title: **PROFESSIONAL COMMUNICATIONS 2** Semester: II Code: PC2

Lecture	Tutorial	Studio	Total Hours	Assessment Type	Internal Marks	Jury/Exam Marks	Total Marks	Credits
		3	3	IO	150	-	-	NC

Course Objectives: Introduce the concept of tonality of the written word as a basic value for selection of terms and their composition in non-spoken forms of professional communication.

Anticipated Learning Outcomes : Students should be able to write and understand written English to facilitate reading of Architectural texts and reference and composition of text to convey their ideas.

Content :

- i. Dimensions of communication (Formal and Informal, upward, downward etc.)
- ii. Types of professional communication, Letters, E-mail, Short messages, reports
- iii. Planning, composing, and writing, Guide to effective writing.
- iv. Writing a short Research Paper. This exercise is to be followed up continually in all IO courses throughout the program wherein students are assigned to write a paper on a particular topic related to the course as decided by the subject teacher concerned. This may include reportage of readings, site visits, field trips, conversations with experts and public, etc.

Suggested References :

Raman, M. & Sharma, S., Technical Communication : Principles and Practice, 2nd Ed.

Market, Mike, 2012. Technical Communication

Rizvi, M. Ashraf, Effective Technical Communication,

Anderson, Paul V., Technical Communication : A Reader- Centred Approach, 6 Ed.

Course Title: ARCH. RESEARCH -SEMINAR

Semester: VII

Code:AR1

Lecture	Tutorial	Studio	Total Hours	Assessment Type	Internal Marks	Jury/Exam Marks	Total Marks	Credits
1	4		5	IEJ	150	100	250	5

Course Objectives: Introduce through group research into a topic of architectural significance, a range of research methodologies and critical appraisal skills and enable students to present the conclusions drawn to an informed live audience.

Anticipated Learning Outcomes: Ability to source information a chosen topic, clearly understand, collate, analyze, reflect upon it by means of a strategic discussions within the research group synthesize research outcomes in a well-documented research paper and seminar presentation using multimedia techniques; Ability to effectively participate in seminars as a member of the audience.

Content:

The Seminar Coordinators will select a theme for the semester relating to issues in architecture and planning. Students will conduct research in groups on the topic of their choice within the larger theme. The research may involve both secondary and primary data from field studies. The research will be presented in the form of a seminar presentation, followed by a paper of publishable quality. Overall supervision will be provide by the Seminar Coordinators from the internal faculty and each group will be guided for the research work by internal faculty/ external experts.

Course Title: ARCH. RESEARCH - DISSERTATION Semester: IX

Code: AR2

Lecture	Tutorial	Studio	Total Hours	Assessment Type	Internal Marks	Jury/Exam Marks	Total Marks	Credits
1	4	-----	5	IEJ	150	100	250	5

Course Objective: Develop through individual research into a topic of architectural significance, for proficiency in a range of research methodologies and critical appraisal skills enabling the student to write an original paper documenting the process and its conclusions.

Anticipated Learning Outcomes: The product is an illustrated essay of about 8000 -10,000 words which demonstrates the students' ability to clearly understand, analyze, reflect upon, synthesize and discuss a chosen topic.

Content:

The dissertation is a guided piece of research undertaken by the students individually on a subject of their choice, considered to be within the realm of Architecture and Planning. Students will demonstrate the ability of systematic information gathering, analysis and synthesis of information in a clear and reflective way. Overall supervision will be provide by the Dissertation Coordinators from the internal faculty and individual guidance will be provided for the research work by internal faculty/ external experts

Suggested Texts and References:

- Andrews, Richard (2005), *Research Questions*, Continuum-Viva.
 Booth, W.C. (2008), *The Craft of Research*, 3rd edition, The University of Chicago Press.
 Crouch, C. & Pearce, J. (2012), *Doing Research in Design*, Berg Publishers: London, New York.
 Groat, Linda (2002), *Architectural Research Methods*, John Wiley & Sons Inc., New York
 Zeisel, John (2006), *Inquiry by Design*, W.W.Norton & Company, New York, London.

Course Title: **ELECTIVE**

Semester: III-IX

Code: EL1-8

Lecture	Tutorial	Studio	Total Hours	Assessment Type	Internal Marks	Jury/Exam Marks	Total Marks	Credits
2	-----	-----	2	IO	100	-----	100	2

Students must select minimum one elective from each group and a total of eight electives through the entire course. The electives topics proposed are indicative only - more topics under each stream may be offered depending upon faculty expertise and availability. Students shall be allowed the option of Crossover Electives in Semester VII and IX.

Some subjects may be offered only to students of certain semesters and not to others, though the priority will be to offer the subjects to as many students of different semesters as possible, vertically. Electives will be a way to participate in ongoing Research and Consultancy projects in the school.

The choice of electives for any student may depend on certain minimum eligibility threshold that may be prescribed for certain subjects by the concerned faculty, such as a certain level proficiency in language, mathematics, graphic or computer skills, etc.. Some subjects may be open to a student only upon having passed another qualifying elective or core subject.

Group 1- HUMANITIES

An Appreciation: Art consciousness, Aesthetic perception, symbolism, expression, style, fashion, appropriateness and values; Critical appraisal of examples from the visual and performing arts; Art through the ages, architecture as art.

Theory Of Settlements: The city as an architectural form and an expression of the vitality of a civilization; Comparative study of the origin and growth of settlements; Principles of settlement planning in ancient Greece, Rome and India; Medieval towns in Europe and India; Renaissance city planning; Colonial urbanization; The Industrial Revolution; planning theories of the 19th century.

New City Planning: On-the-spot study of an existing settlement; Contemporary problems of settlements; Current theories on physical planning of new towns and cities; Environmental impact of planned and unplanned growth, regional linkages.

Behavioral Studies: Behavioral patterns and user experiences, physiological and psychological aspects, environmental perception and interaction, expression and symbolism, design and technology.

Architectural Photography: Photographical equipment and instruments, old and new technology, colour and composition, special effects and use of software.

Architectural Journalism: Media and publishing, writing for print and web, conferences and seminars, reporting and interviews, travel and networking.

Gender & Architecture: Cultural anthropology, gender studies and evolutionary theories, feminism and space, analytical discourses in architecture and urban design, representation and interpretation.

Group 2- ENVIRONMENT STUDIES

Environmental Impact Assessment: Environmental consequences of building projects, sensitive projects and large developments, impact areas and assessments, prediction and mitigation of negative impacts, administrative procedures and clearances.

Advanced Solar Design: Sun path analysis, shading design and geometrical performance, software tools and modeling, materials and energy performance.

Renewable Energy Systems: Building Energy performance and codes, Energy integration and management, renewable energy contribution and zero energy buildings, system types and calculations, cost and embodied energy considerations

Energy Simulation: Building heat transfer, building envelope and design properties, internal gains and occupancy inputs, simulation software requirements and modeling.

Cities And Climate Change: impact Of climate change and strategic standpoints, developmental considerations and visions, city planning and sustainability, social and environmental initiatives, carbon neutral planning for new and existing cities.

Group 3- TECHNOLOGY

Facade Engineering: Types of facade systems, materials and cladding, design, structural, environmental, and construction considerations, facade materials and performance, methods of manufacturing and installation.

Disaster Management: Natural and Manmade Disasters like cyclones and earthquakes, risk assessment and strategic planning, Emergency management and software systems, Shelter design, materials, transportation, assembly and disassembly.

Long Span Structures: Long span roofs and cantilevers, efficient structural systems and calculations, building types and design expression.

Tall Buildings: High-rise in the context of Urban Densification and social change, structural design, multi-use planning, fire and safety, vertical transportation, environmental systems, construction management, vertical landscaping.

Modular Coordination: Building efficiency, economics and management, modular systems and prefabricated elements, mass production, standardization and assembly.

Group 4-DESIGN SPECIALIZATIONS

Industrial Design:

Architectural Conservation: History and Theory of Conservation, World Heritage, Building Analysis, Design Intervention, Conservation Technology and Building Repair and Preservation, Planning Regulations.

Ecology And Landscape: Landscape Design History, Plants and Horticulture, Construction and Site Engineering, Drawing representation,

Urban Planning: History/theory of urban planning, physical planning and design, urban statistics, land use and planning law, urban economics, and planning practice, urban transportation.

Hospital Design: Healthcare facilities design and planning, hospital design standards and regulations, patient-centered healthcare environment, use of evidence-based research to improve a healthcare environment

Campus Planning: Principles of campus design, master-plan design and preparation, accommodation and expansion site planning and landscaping, green rating for campuses and large developments, transportation and parking,

Interior Design: Anthropology and technology related to interior architecture and design, furniture, lighting, materials, and products, software techniques and professional practice.

Furniture Design:

User Interface for Smart Cities:

Lighting of Historic Landscapes:

Group 5-EMERGING AREAS

Digital Architecture: Introduction to emergent areas within architecture, utilization of computer as an explorative tool for design and manufacturing, contemporary digital systems and technique-based design propositions.

Advanced Building Technology: Exploration of new building materials, design development with spatial, material, organizational and manufacturing considerations, physical and simulation models.

Geographic Information Systems: Elements of Geographic Information Systems (GIS), analysis of spatial information, real-world applications, map creation and analysis.

Real Estate Management: Fundamentals of Real Estate Business, Real Estate Law, Land Acquisition and Management Real Estate Entrepreneurship and marketing.

Parametric Design: Introduction to Parametric Design, Generative modeling, application to product design, architecture, landscape, digital fabrication, creation of physical and digital parametric models using as main tools Grasshopper for Rhino etc.

Bio-mimicry In Design: introduction to natural forms (morphology) and processes (bio-mimicry) through observation, drawing, and research, application knowledge to designed products, spaces and architecture.

Urban Resilience

Disaster Risk Management

Group 6- PROFESSIONAL PRACTICE

Management Information Systems

Architectural Entrepreneurship

Design Outreach Program