

HUMAN SETTLEMENT



SCHOOL OF ARCHITECTURE

HANDBOOK

B. ARCH

2021-22

VISION OF UNIVERSITY:

To be a globally renowned university.

MISSION OF UNIVERSITY:

To impart quality higher education and to undertake research and extension with emphasis on application and innovation that cater to the emerging societal needs through all-round development of students of all sections enabling them to be globally competitive and socially responsible citizens with intrinsic values.

VISION OF DEPARTMENT:

To be one of the globally renowned architectural schools.

MISSION OF DEPARTMENT:

To impart higher quality education making the students well equipped to face the challenges of the present & future trends in the architectural field enabling them to be globally competitive and socially responsible architects with intrinsic values.

PROGRAM EDUCATIONAL OBJECTIVES (PEOs)

- Should be able to stimulate artistic sensitivity and creative powers. (SKILL)
- Strengthen intellectual growth and the capacity to develop creative and responsible solutions to unique and changing problems. (EMPL)

- Acquire leadership capabilities necessary for the competent practice of architecture and lifelong learning. (ETPR)
- Pursue advanced education, research and development, and other creative and innovative efforts in the field of Architecture. (SKILL).

PROGRAM OUTCOMES (POs):

The B.Arch. program in KL University is designed to meet the Program Outcomes as identified by Council of Architecture (COA). These constitute a superset of program outcomes identified by National Board of Accreditation.

PO1. Ability to gain knowledge of Humanities, Sciences and Architecture and the application of knowledge in practice.

PO2. Use the elements of Architecture and apply basic principles in Architectural Design.

PO3. Identify and solve the social, economical and cultural issues in Architectural Design.

PO4. Ability to apply theoretical knowledge to achieve Architectural Design solutions.

PO5. Recognize the ethical and professional responsibilities and the norms of Architectural practice.

PO6. Ability to research, review, comprehend and report technological developments happening in the field of Architecture.

PO7. Communicate effectively and work in interdisciplinary groups according to the project scale.

PO8. To guide the Building construction workforce in the right direction.

PO9. Ability to understand the real-life situation in converting the On-paper design to On-site design of Architectural Practice.

PO10. To make the student design aesthetically pleasing, structurally viable buildings and encourage technological advancements in the building construction industry.

PROGRAMME SPECIFIC OUTCOMES (PSOs)

PS01: Ability to enhance creative design skills in attaining design solutions in architecture.

PS02: To understand the design complexity of the designed structure and use appropriate building construction techniques and technology for the particular structure

MAPPING OF PEOs WITH MISSION STATEMENT:

S.No	Description of PEOs	Key Components of Mission		
		M1	M2	M3
		Impart quality higher education and research, taking into consideration the local and national scenario of architecture profession.	To make the students well equipped to face the challenges of the present and future trends in the architectural field.	Enabling them to be globally competitive, with a perspective of global trends and practices in architecture and designing fraternity.
PEO1	Demonstrate a breadth of Artistic sensitivity and creative powers.	✓		
PEO2	Intellectual growth and the capacity to develop creative and responsible solutions to unique and changing problems		✓	
PEO3	Leadership capabilities necessary for the competent practice of architecture and lifelong learning		✓	✓
PEO4	Pursue advanced education, research and development, and other creative and innovative efforts in the field of Architecture.	✓		

PROGRAM ARTICULATION MATRIX

S. No	Course Code	Course Name	Category	L	T	P	S	C	PO										PSO					
									1	2	3	4	5	6	7	8	9	10	1	2				
1	21AR1101	Theory of Architecture	PC	3	0	0	0	3	2			2		2										2
2	21AR1103	Building Materials - I	BSAE	2	0	0	0	2				1	1		2		2	2						2
3	21AR1204	Mechanics of Structures - I	BSAE													2		2	2					2
4	21AR1206	Building Materials - II	BSAE	2	0	0	0	2				1			2		2							2
5	21AR2107	Mechanics of Structures - II	BSAE	3	0	0	0	3							2		2	2						2
6	21AR1209	Climate Responsive Architecture	BSAE	3	0	0	0	3					1		2		2							2
7	21AR2210	Design of Structures - I	BSAE	3	0	0	0	3							2		1	2	2					
8	21AR2211	Building Services - I	BSAE	3	0	0	0	3				1			2		1	2	2					
9	21AR3114	Design of Structures - II	BSAE	3	0	0	0	3							2		1	2	2					
10	21AR3115	Building Services - II	BSAE	3	0	0	0	3				1			2		1	2	2					
11	21AR3219	Building Services - III	BSAE	3	0	0	0	3				1			2		1	2	2					

S. No	Course Code	Course Name	Category	L	T	P	S	C	PO										PSO		
									1	2	3	4	5	6	7	8	9	10	1	2	
12	21AR4123	Building Services - IV	BSAE	3	0	0	0	3			1			2	1	2	2				
13	21AR2137	Building Construction - I	BSAE	0	4	0	0	6				2		2	2	2	2			2	2
14	21AR2240	Building Construction - II	BSAE	0	4	0	0	6				2		2	2	2	2				
15	21AR3143	Building Construction - III	BSAE	0	4	0	0	6				2		2	2	2	2				
16	21AR3246	Building Construction - IV	BSAE	0	4	0	0	6				2		2	2	2	2				
17	21AR4125A	Advanced Building Techniques	PE	0	0	4	0	2		2	1										
18	21AR4125B	Architecture Photography	PE	0	0	4	0	2													
19	21UC0009	Ecology & Environment	BSAE	2	0	0	0	2						1						1	
20	21AR4226	Building Construction and Management	PAECC	3	0	0	0	3			1			2	1	2	2				2
21	21AR5228	Architecture Professional Practice	PAECC	3	0	0	0	3	1		2		2		2						

S. No	Course Code	Course Name	Category	L	T	P	S	C	PO										PSO					
									1	2	3	4	5	6	7	8	9	10	1	2				
33	21AR42 29A	Urban Design	PE	2	0	0	0	2		1						2								
34	21AR42 29B	Transportation Planning	PE	2	0	0	0	2																
35	21AR11 52	Architectural Drawing - I	PC	0	0	6	0	3								2	2		2	1	1			
36	21AR11 53	Architectural Design Studio -I (Basic Design)	PC	0	8	0	0	2	1		2		2			2		2	2	2	1			
37	21AR12 54	Model Making Workshop	PC	0	0	4	0	2							2	2	2					1	2	
38	21AR12 56	Architectural Drawing - II	PC	0	0	4	0	2								2	2		2					
39	21AR12 57	Architectural Design Studio -II	PC	0	8	0	0	2	1		2		1						2					2
40	21AR21 38	Architectural Design Studio -III	PC	0	8	0	0	2	1		2		1						2	2	2			
41	21AR22 41	Architectural Design Studio -IV	PC	0	8	0	0	2	1		2		1						2	2	2			
42	21AR31 44	Architectural Design Studio -V	PC	0	8	0	0	2	1		2		1						2	2	2			
43	21AR31 18A	Interior Design	PE	0	0	4	0	2		1		1			2				2	2	2			

S. No	Course Code	Course Name	Category	L	T	P	S	C	PO										PSO			
									1	2	3	4	5	6	7	8	9	10	1	2		
		Studio																				
44	21AR31 18B	Furniture Design Studio	PE	0	0	4	0	2	1	1	1	2	2									
45	21AR32 22A	Landscape Design Studio	PE	0	0	4	0	2		1		1			2				2	2	2	
46	21AR32 22B	Modular Construction Studio	PE	0	0	4	0	2														
47	21AR32 47	Architectural Design Studio -VI	PC	0	8	0	0	2	1		2		1						2	2	2	
48	21AR41 50	Architectural Design Studio -VII	PC	0	1	0	0	5	1		2		1						2	2	2	
49	21AR42 53	Urban Design Studio	PC	0	8	0	0	2	1		1				2				2	2	2	
50	21AR52 55	Architectural Thesis	PC	0	1	0	0	8	1		2		2				1		2	2	2	
51	21AR22 13	Contemporary Indian Architecture	PC	2	0	0	0	2	2			2	2	2	2				2			1
52	21AR31 16	Contemporary Western Architecture	PC	2	0	0	0	2	2			2	2	2	2				2			1
53	21AR31 17A	Vernacular Architecture	PE	2	0	0	0	2	2			2	2	2	2				2			1

S. No	Course Code	Course Name	Category	L	T	P	S	C	PO										PS				
									1	2	3	4	5	6	7	8	9	0	1	2			
	OD3																						
77	21GN4 OD6	NSS - 3	OE																				

ACADEMIC REGULATIONS

This document supplements the KLEF rules and regulations to provide assistance to all B.ARCH students. It is required that every individual has to abide by these regulations.

Note: The regulations stated in this document are subject to change or can be relaxed / modified without prior notice at the discretion of the Hon'ble Vice Chancellor.

TERMINOLOGY

Academic Council: The Academic Council is the highest academic body of the University and is responsible for the maintenance of standards of instruction, education and examination within the University. Academic Council is an authority as per UGC regulations and it has the right to take decisions on all academic matters including academic research.

Academic Year: It is the period necessary to complete an actual course of study within a year. It comprises of two consecutive semesters i.e., Even and Odd semester.

Audited Course: It is a course of study which has zero credits and has a "Satisfactory" or a "Unsatisfactory" grade.

Backlog Course: A course is considered to be a backlog course if the student has obtained a failure grade (F).

Basic Sciences: The courses of foundational nature in the areas of Mathematics, Physics, Chemistry, Biology etc., are offered in this category.

Betterment: Betterment is a way that contributes towards improving the students' grade in any course(s). It can be done by either (a) re-appearing or (b) re-registering for the course.

Board of Studies: Board of Studies (BOS) is an authority as defined in UGC regulations, constituted by Vice Chancellor for each of the department separately. They are responsible for curriculum design and update in respect of all the programs offered by a department.

Branch of Study: It is a branch of knowledge, an area of study or a specific program (like Civil Engineering, Mechanical Engineering, Electrical and Electronics Engineering etc.)

Certificate course: It is a course that makes a student gain hands-on expertise and skills required for holistic development. It is a mandatory, non-credited course for the award of degree.

Change of Branch: Change of branch means transfer from one's branch of study to other.

Compulsory course: Course required to be undertaken for the award of the degree as per the program.

Course: A course is a subject offered by the University for learning in a particular semester.

Course Handout: Course Handout is a document, which gives complete plan of the course. It contains the details of the course viz. Course title, Course code, Pre-requisite, Credit structure, team of instructors, Course objectives, Course rationale, Course Outcomes and the relevant syllabus, textbook(s) and reference books, Course delivery plan and session plan, evaluation method, chamber consultation hour, course notices and other course related aspects. In essence, course handout is an agreement between students (learners) and the instructor.

Course Outcomes: The essential skills that need to be acquired by every student through a course.

Credit: A credit is a unit that gives weight to the value, level or time requirements of an academic course. The number of 'Contact Hours' in a week of a particular course determines its credit value. One credit is equivalent to one lecture hour per week or two hours per week of tutorials/ self-learning/ practical/ field work during a semester.

Credit point: It is the product of grade point and number of credits for a course.

Credit Transfer: The procedure of granting credit(s) to a student for course(s) undertaken at another institution.

Cumulative Grade Point Average (CGPA): It is a measure of cumulative performance of a student over all the completed semesters. The CGPA is the ratio of total credit points secured by a student in various courses in all semesters and the sum of the total credits of all courses in all the semesters. It is expressed up to two decimal places.

Curriculum: Curriculum incorporates the planned interaction of students with instructional content, materials, resources, and processes for evaluating the attainment of Program Educational Objectives.

Degree: A student who fulfills all the Program requirements is eligible to receive a degree.

Degree with Specialization: A student who fulfills all the Program requirements of her/his discipline and successfully completes a specified set of Professional elective courses in a specialized area is eligible to receive a degree with specialization.

Department: An academic entity that conducts relevant curricular and co-curricular activities, involving both teaching and non-teaching staff and other resources.

Detention in a course: Student who does not obtain minimum prescribed marks in continuous in-semester evaluation and /or minimum prescribed attendance in a course shall be detained in that particular course.

Dropping from the Semester: A student who doesn't want to register for the semester should do so in writing in a prescribed format before commencement of the semester.

Elective Course: A course that can be chosen from a set of courses. An elective can be Professional Elective, Open Elective, Management Elective and Humanities Elective.

Building Sciences and Applied Engineering: The courses belonging to basic evolutionary aspects of Building engineering from Building Materials, Building Construction, Climatology, Building Services, Surveying and Leveling.

Evaluation: Evaluation is the process of judging the academic work done by the student in her/his courses. It is done through a combination of continuous in-semester assessment and semester end examinations.

Grade: It is an index of the performance of the students in a said course. Grades are denoted by alphabets.

Grade Point :It is a numerical weight allotted to each letter grade on a 10 - point scale.

Humanities Elective: A course offered in the area of Liberal Arts.

Industrial Training: Training program undergone by the student as per the academic requirement in any company/firm. It is a credited course.

Industrial Visit: Visit to accompany/firm as per the academic requirement.

In-Semester Evaluation: Summative assessments used to evaluate student learning, acquired skills, and academic attainment during a course.

Make-up Test: An additional test scheduled on a date other than the originally scheduled date.

Management elective: A course that develops managerial skills and inculcates entrepreneurial skills.

Mini project: Mini Project is a credit-based course that a student has to undergo during his/her academic term, which involves the student to explore in a discipline belonging to their research interest within their program area.

Open Elective :This is a course of interdisciplinary nature. It is offered across the University for all programs.

Over loading : Registering for more number of credits than normally prescribed by the Program in a semester.

Practice School :It is a part of the total program and takes one full semester in a professional location, where the students and the faculty get involved in finding solutions to real-world problems. A student can choose Project/Practice School during his/her 7th or 8th semester of his/her Academic Year to meet the final requirements for a degree.

Pre-requisite :A course, the knowledge of which is required for registration into higher level course.

Professional Core :The courses that are essential constituents of each engineering discipline are categorized as Professional Core courses for that discipline.

Professional Elective :A course that is discipline centric. An appropriate choice of minimum number of such electives as specified in the program will lead to a degree with specialization.

Program :A set of courses offered by the Department. A student can opt and complete the stipulated minimum credits to qualify for the award of a degree in that Program.

Program Educational Objectives :The broad career, professional, personal goals that every student will achieve through a strategic and sequential action plan.

Project :Course that a student has to undergo during his/her final year which involves the student to undertake a research or design, which is carefully planned to achieve a particular aim. It is a credit based course.

Project based STUDIO :Project Based STUDIO is a student-centric learning methodology that involve students in design, problem-solving, decision making, and investigative activities; gives students the opportunity to work in teams, over extended periods of time; and culminate in realistic products or presentations

Re-Appearing : A student can reappear only in the semester end examination for the Theory component of a course, subject to the regulations contained herein.

Registration :Process of enrolling into a set of courses in a semester/ term of the Program.

Re-Registering :A student desiring to repeat a course is permitted to do so, subject to the regulations contained herein.

Semester: It is a period of study consisting of 15 to 18 weeks of academic work equivalent to normally 90 working days including examination and preparation holidays. The odd Semester starts normally in July and even semester in December.

Semester End Examinations: It is an examination conducted at the end of a course of study.

Single Section Course: Course taught for a single section.

Social Service: An activity designed to promote *social* awareness and generate well-being; to improve the life and living conditions of the society.

Student Outcomes: The essential skill sets that need to be acquired by every student during her/his program of study. These skill sets are in the areas of employability, entrepreneurial, social and behavioral.

Substitution of Elective course: Replacing an elective course with another elective course as opted by the student.

Summer term: The term during which courses are offered from May to July. Summer term is not a student right and will be offered at the discretion of the University.

Term Paper: A 'term paper' is a research report written by students that evolves their course based knowledge, accounting for a grade. Term paper is a written original research work discussing a topic in detail. It is a credit based course.

Under-loading: Registering for lesser number of credits than normally prescribed by the Program in a semester.

Withdraw from a Course: Withdrawing from a Course means that a student can drop from a course within the first two weeks of the odd or even Semester (deadlines are different for summer sessions). However s/he can choose a substitute course in place of it by exercising the option within 5 working days from the date of withdrawal.

CHAPTER1

ELIGIBILITY CRITERIA FORADMISSION INTO B.ARCH.PROGRAMS

No candidate shall be admitted to architecture course unless she/ he has passed an examination at the end of the 10+2 scheme of examination in Physics, Chemistry & Mathematics and also at least 50% marks in aggregate of the 10+2 level examination or passed 10+3 Diploma Examination with Mathematics as compulsory subject with at least 50% marks in aggregate.

Candidates must also have a valid NATA (National Aptitude Test in Architecture) score conducted by Council of Architecture (COA) or JEE Mains Paper II score.

CHAPTER2

ACADEMIC INSTRUCTIONS

2.1 GENERAL BEHAVIOUR

- a. Students should speak in English only while on campus with the faculty or among themselves.
- b. Students are expected to wish/greet all senior officials of the KLEF with due respect.
- c. Students should be courteous and polite in dealing with all Faculty & staff.
- d. Students should maintain silence and/or speak in a soft voice in and around the classrooms, library, laboratories, and offices of the Deans, Program Chairs, Senior Officials, faculty rooms and corridors of academic buildings. It must be noted that shouting, talking in loud voice or in chorus, using indecent, abusive and discourteous language anywhere within the institution premises are considered serious acts of indiscipline and are punishable.
- e. Students should not loiter during the free time in the university campus.
- f. Students should not issue any public or press statement, send letters to editors, government, public servants or notaries without prior permission and approval of the Registrar of KLEF in writing.
- g. Students should keep the status, dignity, prestige and reputation of KLEF high and not engage in anything that might directly or indirectly undermine the standing of the institution.
- h. Students must always adhere to a prescribed/decent dress code befitting the dignity of a technical/professional student within the campus.
- i. Ragging of any student is a serious act of indiscipline and has been totally banned by the Hon'ble Supreme Court of India. A student found involved in any form of ragging, verbal or physical, inside or outside the institutional campus, hostels, or buses shall be treated as per the anti-ragging rules of the KLEF.
- j. Students must not be involved in quarreling or fighting or any indecent verbal or physical activity among themselves, or with staff and faculty or visitors. Direct or indirect involvement in any such activity will be considered as serious breach of discipline and strict disciplinary action will be taken against the students that engage in such activities.
- k. Students are not allowed to sit on the steps, boundary walls on the higher

floors of any building, or engage in gossiping, making noise or any other such activity.

2.2 KLEF WORKINGHOURS

KLEF operates between 9.00AM to 5:15 PM on all week days.

2.3 LECTURE CLASS ENVIRONMENT

The institute is a community of learners. Students have a responsibility of creating and maintaining an environment that supports effective learning to receive effective instructions in classrooms, laboratories. KLEF expects students to conduct themselves in an orderly and cooperative manner by adhering to University Rules & Regulations.

2.4 STUDIO ENVIRONMENT

A conducive learning environment in the STUDIO is essential and the students are advised to follow the guidelines mentioned below:

- a. Always listen carefully to the faculty especially for the safety precautions to take in the laboratories. Accidents resulting in injuries may occur if precautions are not taken.
- b. Eating in laboratories is strictly prohibited.
- c. Proper dress code is to be followed as prescribed by faculty in each lab.
- d. Students should familiarize themselves with the location of all safety equipment which may be available.
- e. Follow evacuation procedures quickly and quietly, if needed.
- f. Students should always conduct themselves in a responsible and cautious manner. Risky behaviors such as pushing, running, jumping etc., are unwarranted.
- g. Only materials required to complete and record the experiment instructions, (e.g. pencils or graph paper, etc.) should be brought into the STUDIO.
- h. Equipment must be carefully handled to prevent breakage or damage, otherwise appropriate penalties/disciplinary-action may be levied/imposed.
- i. Lab station must be cleaned prior to leaving a lab.
- j. Any accident, no matter how small or big, must be reported to the concerned

faculty immediately.

- k. Can go and make use of CAD Lab, Material Museum, Model Making and Climatology Lab

2.5 REGISTRATIONPROCESS

For every course, the student must undertake the registration process prior to commencement of the course-work, based on the following conditions;

- a. Registration into a course will be permitted only for such courses, which are offered by KLEF in that semester.
- b. A student must clear the pre-requisite(s) if any, to register in to a course.
- c. KLEF reserves the right to register.
- d. Registration for add/drop/change of a course will be permitted only within one week from the scheduled date of commencement of classes.
- e. Students can register up to a maximum of 37 credits of their choice in a semester to meet their program requirements.
- f. Students, who wish to register for additional credits through Overloading or less credits through under loading, must seek prior permission from Dean-Academics.
- g. KLEF reserves the right to withdraw within one week of the commencement of the semester any elective course offered, if adequate number of students have not registered or for any other administrative reasons. In such cases, the students are permitted to register for any other elective course of their choice provided they have fulfilled the eligibility conditions.
- h. KLEF reserves the right to cancel the registration of a student from a course or a semester or debar from the degree on disciplinary / plagiarism grounds.
- i. A student is solely responsible to ensure that all conditions for proper registration are satisfied. If, there is any clash in the timetable, it should be immediately brought to the notice of the Academic coordinator for necessary corrective action. The registration may be cancelled for a course or the entire semester either by KLEF if any irregularity is found at a later stage.

CHAPTER 3 - B.ARCH. PROGRAM

3.1 B .ARCH DEGREE REQUIREMENTS

For the award of B.Arch. degree a student must successfully:

- a. Earn minimum of 274 credits, as stipulated in the curriculum of the respective program
- b. Complete all the mandatory courses (University Core, College Core and Departmental Core) as prescribed in the curriculum of the respective department.
- c. Acquire a minimum of 35 credits through Professional Elective Courses.
- d. Acquire 12 credits through open elective courses.
- e. Complete one management elective and one foreign language elective.
- f. Acquire a minimum of 20 credits through term-paper/project/ practice school/ internship.
- g. Have participated in social service activities for a minimum duration of 40 hours.
- h. Have obtained a minimum CGPA of 5.25 at the end of the program.
- i. The Architecture Program shall be completed in a maximum period of 8 years which includes deceleration period chosen by the student, deceleration imposed by KLEF.

CHAPTER4

B.ARCH. PROGRAM CURRICULUM

For an academic program the curriculum is the basic framework that will stipulate the credits, category, course code, course title, course delivery (Lectures / Tutorials / Practice / Skill/ Project/ Self Study / Capstone Design etc.), in the Choice Based Credit System. However, all such are essentially designed, implemented and assessed in Outcome Based Education Framework.

4.1 PROGRAMSTRUCTURE

- a. B.ARCH. program is spread over a span of 10semesters.
- b. Each semester is of, approximately 17±1 week duration and each semester is classified as:
- c. Odd Semester (July –December)
- d. Even Semester (December – May).
- e. KLEF may offer summer term between May and June.
- f. All courses are offered under three categories vis-à-vis. even, odd and dual semester courses.
- g. Students have the flexibility to choose courses of their own choice prescribed by the KLEF.
- h. A student has to undergo practical training in 9th semester for 16 weeks.

i. Model distribution of credits in B.ARCH Program

TYPE	Credits
Humanities and Social Sciences courses	12
Building Science and Applied Engineering courses	30
Professional core courses	155
Professional Elective courses	35
Open Electives	12
Practice School	20
Thesis	18
TOTAL	282

4.2 COURSE STRUCTURE

- a. Every course has a Lecture-Studio-Practice-Skill (L-ST-P-S) component attached to it.
- b. Based upon the L-ST-P-S structure the credits are allotted to a course using the following criteria:
 - Every Lecture hour is equivalent to one credit.
 - Every Studio hour is equivalent to one credit.
 - Every Practice hour is equivalent to half credit.
 - Every skill-based practice hour is equivalent to quarter credit.
 - If the calculated value of credit is a fraction, it is rounded to the lower number.

4.3 COURSE CLASSIFICATION

Any course offered under B.ARCH. program is classified as:

a. Compulsory Courses

- Building Sciences
- Applied Engineering
- Humanities and Social sciences
- Professional core
- Skilling core

b. Elective Courses

- Professional Elective
- Open Elective
- Humanities and social science elective
- Science Elective

c. Audit Courses

- Indian Constitution

d. Skill Enhancement Courses

- Communication Skills
- Computer Studio
- Building Information Modeling
- Digital Graphics and Art

- Foreign Language

4.4 COURSE PRECEDENCE

The following are the guidelines for registering into courses with pre-requisites.

- a. Every course can have one or more of its preceding course(s) as pre-requisite(s).
- b. To register for a course, the student must successfully be promoted in the course(s) earmarked as pre-requisite(s) for that course.

4.5 SUMMER TERM COURSES

KLEF offers summer term courses during May and June. The following are the guidelines to register in to courses offered in Summer Semester.

- a. A student may register for course/s in each summer term by paying the stipulated fee. Students registering for more than one (1) summer course must ensure that there is no clash in the time table.
- b. A student can register into a detained course or a not-registered course (course offered in regular semester, but student failed to register due to the non-compliance of pre-requisite condition but has paid the fee.) A student can also register for other than the above two mentioned categories of courses only if they are permitted for acceleration.
- c. In any case, a student can register only for a maximum of 18 credits during summer term.
- d. Attendance & Promotion policy for summer term is same as compared to the regular semester except for condonation policy. Condonation is not applicable for summer term courses

4.6 AWARD OF DEGREE

A student having cleared all the courses and met all the requirements for the award of degree with

- a. $5.25 \leq \text{CGPA} < 5.75$ will be awarded Pass class
- b. $5.75 \leq \text{CGPA} < 6.75$ will be awarded Second class
- c. $6.75 \leq \text{CGPA} < 7.75$ will be awarded First class
- d. $\text{CGPA} \geq 7.75$ will be awarded First class with Distinction provided the student

has cleared all the courses in first attempt and must have fulfilled all the program requirements in five (5) years duration.

4.7 PRACTICESCHOOL

The Practice School (PS) program forms an important component of education at K L E F. It is an attempt to bridge the gap between an academic institution and the industry. The Program, which would be a simulation of real work environment, requires the students to undergo the rigor of professional environment, both in form and in substance. In the process, it provides an opportunity for the students to satisfy their inquisitiveness about the corporate world provides exposure to practicing professional skills and helps them acquire social skills by being in constant interaction with the professionals of an organization. During Practice School, some of the students may be offered stipend and/or job offer as per the discretion of the concerned industry.

4.7.1 PRACTICE SCHOOLDURATION

Practice School is offered usually for a period of one semester (16 Weeks).

4.7.2 ELIGIBILITY

The students should complete all the studio subjects from 1st – 4th year before registering into 9th semester

4.7.3GUIDELINES

The following guidelines are followed attending Practice-School.

- a. Practice School program carries 20 credits for a semester. Therefore, it involves substantial effort and requires seriousness, commitment and dedication from the students. One has to hard work for good experience and better placement opportunities.
- b. Students must abide by the rules and regulations of the company and the University.
- c. Practice School is mandatory for the students and experience enhances the opportunities for placement.
- d. The students, who were not selected by the companies in the campus, will be allotted a company by the Director, Practice School. Allotment of company is

done basing on the CGPA of the students and the availability of vacancies in the companies of their relevant branch of engineering.

- e. Students who have submitted the Registration-cum-Data Form will not guarantee the Practice School. The number of students sent to the practice school purely depends on the number of permissions obtained in various companies for different branches of engineering.
- f. At the time of allotment of companies, the students should be ready for opting companies in any location (Hyderabad, Bengaluru, Vizag, Chennai and Vijayawada) depending on the availability of the vacancies in their respective branches.
- g. Once the students are selected by a company or allotted to a company shall not be allowed either to change the company or to cancel from the practice school.

CHAPTER 5 – ATTENDANCE RULES

5.1 ATTENDANCE POLICY

Students must maintain a minimum attendance of 85% in every course. In case of medical exigencies, the student/parent should inform the Head of the Department within a week by submitting necessary proofs and in such cases the attendance can be condoned up to an extent of 10% by Principal concerned on the recommendation of the Head of the Department.

1. In case of attendance falling marginally below 75% due to severe medical reasons or any other valid reasons, the Principal/Program chair may bring such cases, along with a valid and adequate evidence, to the notice of the Dean Academics. The condonation board formed by Vice-Chancellor under the chairmanship of Dean-Academics will consider any further relaxation in attendance from the minimum 75% condition after going through case by case.
2. Attendance in a course shall be counted from the date of commencement of the class work.
3. Attendance for the students who are transferred from other institutes and for new admissions, attendance must be considered from the date of her/his admission.

5.2 ATTENDANCE MARKS

There are no specific marks attached to attendance as such, however, if the Course Coordinator of a course desires to award certain marks, for attendance in a course, s/he can do so based on following guidelines, which thereby must be clearly reflected in the respective course handouts which should duly be approved by Dean Academics. For any course, not more than 5% marks can be allotted for attendance.

The distribution of marks for attendance is [85,88] = 1 mark, [88, 91] = 2 marks, [91, 94] = 3 marks, [94,97]=4marks and [97,100]=5marks, below 85%, even in case of condonation, "0" marks.

The marks, if allotted for attendance will have to be considered for all L-ST-P-S

components of a course cumulatively but not specifically for theory component for any course.

5.3 ATTENDANCE WAIVER

Students maintaining a CGPA ≥ 9.00 and SGPA ≥ 9.00 in the latest completed semester get a waiver for attendance in the following semester. Students who thus utilize an attendance waiver will be awarded the marks allocated for attendance based on their performance in an advanced assignment specified by the course coordinator (emerging topics related to the course). S/he can appear in all assessments and evaluation components without being marked ineligible due to attendance-based regulations.

5.4 ATTENDANCE CONDONATION FOR PARTICIPATION IN KLEF/ NATIONAL/ INTERNATIONAL EVENTS

Only those students nominated/sponsored by the KLEF to represent in various forums like seminars/conferences/workshops/competitions or taking part in co-curricular/ extra-curricular events will be given compensatory attendance provided the student applies in writing for such a leave in advance and obtain sanction from the Principal basing on the recommendations of the Head of the Department (HoD) for academic related requests; or from the Dean Student Affairs for extra-curricular related requests. For participation in the KLEF's placement process the names of students will be forwarded by the placement cell in-charge to the respective Heads of the Departments.

Students participating in KLEF/National/International events like technical fests, workshops, conferences etc., will be condoned for 9 instructional days per semester, and in Entrepreneurship related activities a maximum of 18 instructional days per semester. This condonation is not applicable for summer term.

5.5 ELIGIBILITY FOR APPEARING IN SEM-END EXAMINATION

A Student registered for a course is eligible to write the Semester-End Examination for that course unless found ineligible due to one or more of the following reasons:

- a. Shortfall of attendance
- b. Acts of indiscipline
- c. Withdrawal from a course

5.6 ABSENCE IN ASSESSMENT & EXAMINATION

If a student fails to take any formative assessment component (due to ill-health or any valid reason), no second chance will be given and zero marks will be awarded for the same. In cases of excused absence, the instructor may provide an opportunity to the student to reappear in quizzes or assignments or any other internal assessment criteria based on the approval from the Principal on the basis of recommendations made by the concerned Head of the Department.

If a student fails to write Sem-In Exam-I or obtained less than 50% marks in Sem-In Exam-I, he has to attend remedial classes and score a minimum 85% of attendance in remedial classes to be eligible for Make-up test for Sem-In exam-I. Further, the number of remedial classes to be conducted shall be 50% of regular classes held till the Sem-In exam-I. However, there is no make-up test for Sem-In Exam-II or for all the STUDIO exam.

1. A student is in genuine absence for a Sem-In Exam only under the following circumstances:
 - a. Pre-approved participation in University/State/National/International co-curricular and extra-curricular activities
 - b. Ill health and medical emergencies for the student leading to hospitalization with certification by the doctor stating inability of student to attend Sem-In exams clearly within the necessary dates.
 - c. Death of immediate family member

5.7 Remedial Classes:

The following category of students are recommended to attend Remedial classes:

- Students who did not attend or obtain a minimum of 50% marks in the Sem-In exam 1
- Students those for whom CO1/CO2 is(are) not attained in Sem-In Exam 1
- Any other student may also be permitted to attend remedial classes as per the discretion of the Principal.

The following are the guidelines to conduct remedial classes:

- Remedial classes which are scheduled to be conducted usually one- or two-weeks post conclusion of Sem-In exam 1.
- The number of remedial classes to be conducted shall be 50% of regular classes held till the Sem-In exam-I.
- Remedial classes MUST NOT be scheduled during regular class work hours.
- The following ALMs are recommended for slow learners:
 - One minute paper
 - Think/Plan/Share
 - Role play
 - Focused listening and Listening for specifics
 - Just-in time teaching
 - Models
 - Sheets
 - Hands on activity

Course coordinators may also include alternate Active learning Methods based on the course being taught.

CHAPTER 6

ASSESSMENT & EVALUATION PROCESS

The assessment in each theory subject consists of two Sem-In Exams (Sem-in Exam-I and Sem-In Exam -II), in-class quizzes/tutorials/home-assignments/Active Learning Methods (continues assessment), and the Semester-End Examination (SEE). The distribution of weightage for each assessment step is listed below. The distribution of internal marks in the table below is only a guideline. Instructors at their discretion may apportion some marks for attendance beyond 75%. In such cases, the marks shown for quizzes and assignments will be accordingly be adjusted. Students are advised to consult the course handout to get more detailed information on assessment.

- a. The Sem-In tests and the Semester-End Examinations will be conducted as per the Academic Calendar.
- b. As per the necessity, the Supplementary examinations will be conducted at the discretion of Dean Academics with the approval of the Vice-Chancellor.
- c. Students may have to take more than one examination in a day either during Sem-In exams, Semester-End Examinations /Supplementary examinations.

6.1 SEMESTER-INEVALUATION

The following guidelines are followed for the Semester-In evaluation.

- a. The process of evaluation is continuous throughout the semester.
- b. The distribution of marks for Semester-In evaluation is 50% of aggregate marks of the course.
- c. The distribution of weightage for various evaluation components are decided and notified by the course coordinator through the course handout after approval by the Dean Academics, prior to the beginning of the semester.
- d. In order to maintain transparency in evaluation, answer scripts are shown to the students for verification, within one week of conduct of exam. If there is any discrepancy in evaluation, the student can request the course-coordinator to re-evaluate.
- e. The solution key and scheme of evaluation for all examinations are displayed by the Course-Coordinator in the appropriate web portal of the course, on the day of the conduct of examination.

- f. In case the student is unable to appear for any evaluation component owing to hospitalization, participation in extra/ co-curricular activities representing KLEF/ state/ country; the Dean Academics can permit to conduct of re-examination for such students.
- g. In case a student has missed any of the two semester in evaluations, S/he is eligible for and will be provided with an opportunity of appearing for re-examination. However such a facility is applicable for only one semester in evaluation tests.

6.2 SEMESTER ENDEXAMINATION

The following guidelines are followed for the Semester-In evaluation.

- a. The weightage for Semester End Examination is 50% of the aggregate marks and the student should secure minimum 50% in Semester End Examination.
- b. The pattern and duration of such examination are decided and notified by the Course Coordinator through the Course handout, after approval from the Dean Academic.
- c. To maintain transparency in evaluation, answer scripts are shown to the students for verification. If there is any discrepancy in evaluation, the student can request the Controller of Examinations to re-evaluate.
- d. If a student earns F grade in any of the courses of a semester, an instant supplementary exam (for only Semester End Exam component) will be provided within one fortnight of the declaration of the results.

6.3.1 EVALUATION FOR THEORY COURSES

The table below gives details about the evaluation components in courses which contain only the lecture components.

Type of Evaluation	Maximum Marks for which the Evaluation is Conducted	Duration	Weightage
Sem-In Exam-I	50 marks	Refer course handout(Anne xure A)	Refer course handout(Anne xure A)
Sem-In Exam -II	50 marks	Refer course handout(Anne xure A)	Refer course handout(Anne xure A)
Quizzes/ALM/Tutorial	Each quiz/ALM/ Tutorial will be conducted for a minimum of 10 marks	Refer course handout(Anne xure A)	Refer course handout(Anne xure A)

Assignment	In the form of a report, seminar, presentation, quiz, experiment, GD, etc. as defined in the course syllabus/ course plan	Refer course handout(Anne xure A)	Refer course handout(Anne xure A)
Sem-End Exam	100 marks	3 hours	Refer course handout(Anne xure A)

6.3.2 ASSESSMENT OF STUDIO BASED COURSES

The continuous assessments in STUDIO courses will be based on supervision of the students' work, their performance in viva-voce examinations and the quality of their work. The Sem-End Exam for the STUDIO courses are conducted by a panel of examiners including experts from outside KLEF as approved by Dean Academics.

Type of Evaluation	Evaluation component	Marks	Remarks	Weightage
Internal	Studio internal reviews	100		Refer Course handouts
	Studio Continuous evaluation	100		
External	Viva	25		Refer Course Handouts
	Portfolio	25		

NOTE: Check for specific courses or as specified by the Course Coordinator.

6.3.3 ASSESSMENT OF THEORY COURSES WITH EMBEDDEDSTUDIO

The following table briefs the evaluation components of a theory course with embedded lab.

Type of Evaluation	Evaluation Component	Marks	Remarks	Weightage out of 100
Internal	Sem-In Exam- 1	50	refer course handout(Annexure A)	Refer to course Handout(Annexure A)
	Sem-In Exam- 1	50	refer course handout(Annexure A)	
	Quizzes/ALM/ Tutorial	Each quiz/ALM/ Tutorial will be conducted for a minimum of 10marks	refer course handout(Annexure A)	
	Studio Continuous Assessment	10 per Sheet	Assessment includes marks for sheet and viva- voce	
External	Port folio	Refer course Handout (Annexure A)		Refer Course Handout (Annexure A)
	Viva-Voce	Refer course handout (Annexure A)		
	Semester End Exam	100		

6.3 GRADINGPROCESS

At the end of all evaluation components based on the performance of the student, each student is awarded based on absolute grading system.

6.4.1 ABSOLUTE GRADING

The list of absolute grades and its connotation are given below:

Letter Grade	Grade Point	Percentage ofmarks
O	10	90 - 100
A+	9	80 - 89
A	8	70 - 79
B+	7	60 - 69
B	6	56 - 59
P	5	50 - 55

F	0	0 – 49
Ab (Absent)	0	Absent

6.4.2 SGPA & CGPA

The SGPA is the ratio of sum of the product of the number of credits with the grade points scored by a student in all the courses and the sum of the number of credits of all the courses undergone by a student, in a semester.

$$SGPA(S_i) = \frac{\sum C_i * G_i}{\sum C_i}$$

where ' C_i ' is the number of credits of the i^{th} course and ' G_i ' is the grade point scored by the student in the i^{th} course.

The CGPA is also calculated in the same manner taking into account all the courses undergone by a student over all the semesters of a program,

$$CGPA(S_i) = \frac{\sum C_i * S_i}{\sum C_i}$$

where ' S_i ' is the SGPA of the i^{th} semester and ' C_i ' is the total number of credits in that semester.

- The SGPA and CGPA shall be rounded off to 2 decimal points and reported in the transcripts.
- CGPA can be converted to percentage of marks: $10 \times \text{CGPA} - 7.5$
- A student appearing for a course having Studio integrated with theory and in case obtains less than 50% in either of lab or theory component of semester end examination, and in such case the student has to reappear for the component only in which he has secured less than 50%. Till successful attainment of minimum 50% of both components, the student remains in the F grade for that course.
- Audit/Certificate courses are graded as satisfactory (S) or non-satisfactory(NS) only.
- At the end of each semester, the KLEF issues grade sheet indicating the SGPA and CGPA of the student. However, grade sheet will not be issued to the student if he/she has any outstanding dues.

6.4.3 ILLUSTRATION OF COMPUTATION OF SGPA AND CGPA

Computation of SGPA and CGPA Illustration for SGPA

COURSE	CREDITS	GRADE LETTER	GRADE POINT	CREDITPOINT (Credit xGrade)
Course 1	3	A	8	3 X 8 = 24
Course 2	4	B+	7	4 X 7 = 28
Course 3	3	B	6	3 X 6 = 18
Course 4	3	O	10	3 X 10 = 30
Course 5	3	C	5	3 X 5 = 15
Course 6	4	B	6	4 X 6 = 24
	20			139

Thus, SGPA = $139/20 = 6.95$

Illustration for CGPA

Item	Semester					
	I	II	III	IV	V	VI
Credits	20	22	25	26	26	25
SGPA	6.9	7.8	5.6	6.0	6.3	8.0

Thus,

$$CGPA = \frac{(20*6.9+22*7.8+25*5.6+26*6.0+26*6.3+25*8.0)}{(20+22+25+26+26+25)} = 6.73$$

6.4 BETTERMENT

A student may reappear for semester end examination for betterment only in the theory part of the course for improving the grade, subject to the condition that, the student has passed the course, his/her CGPA is ≤ 6.75 and the grade in the respective course to be equal to or lower than "C". In the case of reappearing, the better of the two grades is considered.

A Student can re-register in any course in any semester during the program for improvement of grade if the current grade in the course is lower than B⁺ and with due approval from Dean Academics in accord of academic regulations.

A student cannot reappear for semester end examination in courses like Industrial Training, courses with their L-ST-P-S Structure like 0-0-X-X, Project,

Practice School and Thesis.

6.5 COURSE BASED DETENTION POLICY

In any course, a student must maintain a minimum attendance as per the attendance policy referred in Chapter 5.1 and 5.4, to be eligible for appearing in the Sem-End examination, failing to fulfill this condition, will deem such student to be detained in that course. He/she is thereby ineligible to take semester end exam.

CHAPTER7 - PROMOTION

7.1 CREDITTRANSFER

7.1.1 CREDIT TRANSFER BETWEEN KLEF AND OTHERINSTITUTION

- a. Credit transfer from other institutions to KLEF or vice versa is permitted only for under graduate program.
- b. Credit transfer from KLEF to other institutions: Student studying in KLEF can take transfer to another institution under the following conditions:
 - KLEF has signed MOU with the institution.
 - However, a student, after seeking transfer from KLEF can return to KLEF after a semester or year. Based on courses done in the other institution, equivalent credits shall be awarded to such students.
- c. Credit transfer from another institution to KLEF: A student studying in another institution can take transfer to KLEF under the following conditions:
 - When a student seeks transfer, equivalent credits will be assigned to the student based on the courses studied by the student.
 - The student, when transferred from other institutions, has to stick to the rules and regulations of KLEF.
 - To graduate from KLEF, a student must study at least half of the minimum duration prescribed for a program at KLEF.

7.1.2 CREDIT TRANSFER THROUGH MOOCs:

Under graduate students can get credits for MOOCs courses recommended by KLEF up to a maximum of 20% of their minimum credits required for graduation. The discretion of allocation of MOOCs courses equivalent to the courses in the curriculum lies with the office of the Dean Academics.

A student may also be permitted to obtain 20 credits through MOOCs in addition to the minimum credits required for graduation. These 20 credits can also be utilized to acquire a Minor degree or a Honors degree if the courses are pronounced equivalent to those specified for the respective degrees by the office of the Dean Academics. These additional credits through MOOCs if to be considered for CGPA/Minor/Honors degree must be approved by Dean Academics prior to enrollment in the respective MOOCs.

Students acquiring additional credits for Honors/Minor degree must adhere to the rules governing the award of the respective degree, otherwise, a student applying for registering into additional credits through MOOCs must possess a minimum CGPA of 7.5 till that semester.

7.2 COURSECREDIT

A credit is a unit that gives weight to the value, level or time requirements of an academic course. The number of 'Contact Hours' in a week of a particular course determines its credit value. One credit is equivalent to one lecture hour per week or one tutorial hour per week or two hours per week of practical/ field work or four hours per week of skilling during a semester.

7.3 PROMOTION POLICY

A student shall be eligible for provisional promotion for registration of courses in the next semester subject to the following criterion:

A student is eligible for provisional promotion to a higher semester if S/he:

- A student shall not be permitted to enroll for the Architectural Design course in a semester unless S/he has completed the Architectural Design course of the previous semester.
- A student shall not be permitted to enroll for the tenth semester Architectural Design Thesis unless he / she has successfully completed Practical Training/ Practices School / Internship.

In case a student is unable to secure minimum P grade for a particular course even after three consecutive attempts, S/he has to repeat the course by re-registration.

7.4 RE-EVALUATION

Students desirous of seeing their Semester-End Examination answer scripts have to apply online to the COE for the same within the timeframe as declared by the COE by paying the prescribed fee. Student applications must be forwarded by the Head of the Department and the Principal of the School and then re-evaluation fees are to be paid. The application along with the attached fee receipt must be submitted to the office of the COE.

There is no provision for re-evaluation in case of Lab/Practical/skilling exams, student project, viva-voce exam or seminar/design/mini-project courses.

The final grades awarded to each course shall be announced by the COE and the same will be made available to students through the website/notice boards.

7.5 ACADEMIC COUNSELING BOARD(ACB)

Academic Counseling Board is constituted by the Dean Academics, for each program separately. This board shall comprise of the respective Chairmen, Board of Studies, two Professors and two Associate

Professors of the program.

A student will be put under Academic Counseling Board in the following circumstances:

- Secured a CGPA of less than 6.00.
- Secured 'F' grade in 3 or more courses.

The students under Academic Counseling Board may not be allowed to register for all regular courses in the semester, based on the recommendation of Academic Counseling Board and decision of Dean Academics.

7.6 BACKLOG COURSES

A course is considered to be a backlog if the student has obtained 'F' grade in the course.

7.7 RUSTICATION

A student may be rusticated from the KLEF on disciplinary grounds, based on the recommendations of any empowered committee, by the Vice Chancellor.

7.8 AWARD OF MEDALS

KLEF awards Gold and silver medals to the top two (2) students based on CGPA. However,

- a. The grade obtained by betterment, will not be considered for this award.
- b. S/he must have obtained first class with distinction for the award of Gold or Silver medal.

CHAPTER7 – CREDIT DISTRIBUTION

8.1 GRADUATE REQUIREMENTS

8.2 COURSE CATEGORY WISE CREDIT DISTRIBUTION

S No	Course Category	Short name	No of Courses	Total credits
1	Professional Core	PC	21	148
2	Professional Electives	PE	10	26
3	Open Electives	OE	4	8
4	Building Sciences and Applied Engineering	BS&AE	16	55
5	Professional Ability Enhancement Compulsory Courses	PAECC	3	26
6	Skill Enhancement Courses	SEC	6	12

8.3 PROFESSIONAL CORE

S No	Course Code	Course Title	L	T	P	S	CR	CH
1	21AR1101	Theory of Architecture	3	0	0	0	3	3
2	21AR1102	History of Architecture - I	3	0	0	0	3	3
3	21AR1152	Architectural Drawing - I	0	0	6	0	3	6
4	21AR1153	Architectural Design Studio -I (Basic Design)	0	8	0	0	12	8
5	21AR1205	History of Architecture - II	3	0	0	0	3	3
6	21AR1254	Model Making Workshop	0	0	4	0	2	4
7	21AR1256	Architectural Drawing - II	0	0	6	0	3	6
8	21AR1257	Architectural Design Studio -II	0	8	0	0	12	8
9	21AR2108	History of Architecture - III	3	0	0	0	3	3
10	21AR2138	Architectural Design Studio -III	0	8	0	0	12	8
11	21AR2212	Site Analysis and Planning	2	0	0	0	2	2
12	21AR2241	Architectural Design Studio -IV	0	8	0	0	12	8
13	21AR2213	Contemporary Indian Architecture	2	0	0	0	2	2
14	21AR3144	Architectural Design Studio -V	0	8	0	0	12	8
15	21AR3116	Contemporary Western Architecture	2	0	0	0	2	2
16	21AR3218	Specification, Estimation and Costing	3	0	0	0	3	3
17	21AR3220	Human Settlements and Planning	2	0	0	0	2	2
18	21AR3247	Architectural Design Studio -VI	0	8	0	0	12	8
19	21AR4150	Architectural Design Studio -VII	0	10	0	0	15	10
20	21AR4253	Urban Design Studio	0	8	0	0	12	8
21	21AR5255	Architectural Thesis	0	12	0	0	18	12

8.4 PROFESSIONAL ELECTIVES

S No	Course Code	Course Title	L	T	P	S	CR	CH
1	21AR3117A	Vernacular Architecture	2	0	0	0	2	2
2	21AR3117B	Sustainable Architecture - I						
3	21AR3118A	Interior Design Studio	0	0	4	0	2	4
4	21AR3118B	Furniture Design Studio						
5	21AR3221A	Appropriate Building Technologies	2	0	0	0	2	2
6	21AR3221B	Sustainable Architecture - II						
7	21AR3222A	Landscape Design Studio	0	0	4	0	2	4
8	21AR3222B	Modular Construction Studio						
9	21AR4124A	Architectural Conservation	3	0	0	0	3	3
10	21AR4124B	Set Design						
11	21AR4125A	Advanced Building Techniques	0	0	4	0	2	4
12	21AR4125B	Architecture Photography						
13	21AR4126A	Housing	2	0	0	0	2	2
14	21AR4126B	Intelligent Buildings						
15	21AR4227A	Behavioural Architecture	3	0	0	0	3	3
16	21AR4227B	Disaster Mitigation and Management						
17	21AR4228A	Dissertation	0	4	0	0	6	4
18	21AR4228B	Thesis Seminar						
19	21AR4229A	Urban Design	2	0	0	0	2	2
20	21AR4229B	Transportation planning						

8.5 OPEN ELECTIVES

S No	Course Code	Course Title	L	T	P	S	CR	CH
1	21UC1101	Integrated Professional English	0	0	4	0	2	4
2	21UC1202	English Proficiency	0	0	4	0	2	4
3	21UC2103	Design Thinking and Innovation	0	0	4	0	2	4
4		Human Resource Management	2	0	0	0	2	2
5		Innovation and Entrepreneurship						

8.6 BUILDING SCIENCES AND APPLIED ENGINEERING

S No	Course Code	Course Title	L	T	P	S	CR	CH
1	21AR1103	Building Materials - I	2	0	0	0	2	2
2	21UC0009	Ecology & Environment	2	0	0	0	0	2
3	21AR1204	Mechanics of Structures - I	3	0	0	0	3	3
4	21AR1206	Building Materials - II	2	0	0	0	2	2
5	21AR2107	Mechanics of Structures - II	3	0	0	0	3	3
6	21AR2137	Building Construction - I	0	4	0	0	6	4

7	21AR2109	Climate Responsive Architecture	3	0	0	0	3	3
8	21AR2210	Design of Structures - I	3	0	0	0	3	3
9	21AR2211	Building Services - I	3	0	0	0	3	3
10	21AR2240	Building Construction - II	0	4	0	0	6	4
11	21AR3114	Design of Structures - II	3	0	0	0	3	3
12	21AR3115	Building Services - II	3	0	0	0	3	3
13	21AR3143	Building Construction - III	0	4	0	0	6	4
14	21AR3219	Building Services - III	3	0	0	0	3	3
15	21AR3246	Building Construction - IV	0	4	0	0	6	4
16	21AR4123	Building Services - IV	3	0	0	0	3	3

8.7 PROFESSIONAL ABILITY ENHANCEMENT COMPULSORY COURSES

S No	Course Code	Course Title	L	T	P	S	CR	CH
1	21AR4226	Building Construction and Management	3	0	0	0	3	3
2	21AR5154	Practical Training / Internship	0	0	40	0	20	40
3	21AR5228	Architecture Professional Practice	3	0	0	0	3	3

8.8 SKILL ENHANCEMENT COURSES

S No	Course Code	Course Title	L	T	P	S	CR	CH
1	21AR1151	Art and Visual Graphic Studio	0	0	6	0	3	6
2	21AR1255	Surveying and Levelling	0	0	2	0	1	2
3	21AR2136	Computer Studio - I	0	0	4	0	2	4
4	21AR2239	Computer Studio - II	0	0	4	0	2	4
5	21AR4148	Working Drawing - I	0	0	4	0	2	4
6	21AR4251	Working Drawing - II	0	0	4	0	2	4



B.Arch
2021-22 Curriculum

B.Arch 21-22 curriculum

21AR1101 THEORY OF ARCHITECTURE

Course Code	21AR1101
L-ST-P-S	3-0-0-0
Credits	3
Contact Hours	3
Prerequisites	Nil

Mapping of Course Outcomes of 21AR1101

CO	Course Outcome	PO/PSO	BTL
CO 1	Introduction to Architecture and basic understanding on Architectural space and form development.	PO2, PO4	2
CO 2	To learn the components of building circulation and its relation to architecture.	PO2, PO1	2
CO 3	An understanding on architectural aesthetics in designing a building & also understand the key role of principles applied in architecture.	PO2, PO4	2
CO 4	Students should understand the functioning of design process and its application in architectural buildings through case studies.	PO4, PO10, PSO2	3

Syllabus:

Architectural Space and Mass

Definition of architecture- Architect role and responsibilities – primary elements of architecture 2D & 3D - Space defining elements, openings in space defining elements, spatial relationship, spatial organization, Primary forms, properties of form, transformation of forms - dimensional transformation, subtractive, additive forms, organization of additive forms - Articulation of forms –Degree of Enclosure, Light and View.

Circulation

Movement through space - Components of building circulation - The building approach, The building entrance, Configuration of path, Path space relationship, Form of circulation space -Circulation diagram

Aesthetic Components of Design

Proportion & scale in relation to human scale, Modular, Visual and Human Scale - Exploration of the basic principles of design such as balance, rhythm, repetition, transformation, symmetry, hierarchy, axis with building examples. Involves the study of the other principles that govern an architectural compositionsuch as Unity, Harmony, Dominance, Fluidity, Emphasis, Contrast etc.

Design Process and Analysis of Building

Design process –integration of aesthetics and function - Understanding of formative ideas, organization concepts, spatial characteristics, - Massing and circulation in design analysis of the following buildings: Falling water house, & Guggenheim Museum by F. L. Wright -Villa Savoye & Chapel of Notredame DuHaut by Le corbusier.

Required Readings:

1. Francis D. K. Ching, *Architecture - Form, Space and Order*, Van Nostrand Reinhold Company, 1979
2. Roger H. Clark, Michael Pause, *Precedents In Architecture*, Van Nostrand Reinhold Company , 1996

Reference books:

1. K.W.Smithies, *Principles of Design in Architecture*, Van Nostrand Reinhold Company , 1981
2. Sam F. Miller, *Design Process - A Primer For Architectural & Interior Design*, Van Nostrand Reinhold Company , 1995
3. Ernest Burden, *Elements of Architectural Design – A Visual Resource*, Van Nostrand Reinhold Company , 1994
4. V.S.Pramar, *Design Fundamentals in Architecture*, Somaiya Publications, New Delhi, 1973.

21AR1102 HISTORY OF ARCHITECTURE - I

Course Code	21AR1102
L-ST-P-S	3-0-0-0
Credits	3
Contact Hours	3
Prerequisites	Nil

Course Outcomes of 21AR1102

CO	Course Outcome	PO/PSO	BTL
CO1	To Understand Primitive Architecture and Ancient settlements in Pre-Historic times and get knowledge on the Ancient River valley civilizations in the world.	PO3,PO7, PSO2	2
CO2	Understand the Architecture and Planning of Ancient River Valley Civilizations	PO3,PO4, PSO2	2
CO3	Understand the Culture and its influence on Architecture in Ancient Greece and Ancient Rome and its impact on Western Architecture	PO3,PO7, PSO2	2
CO4	To study the Built forms in Ancient Greece and Ancient Roman Empire and its monumental Urban Architecture	PO3,PO5, PO10,PSO2	2

Architecture as evolving within specific cultural contexts including a aspects of politics, society, religion, climate; geography and geology, etc. through prehistory; Development of architectural form with reference to Technology, Style and Character- Examples from every historical style illustrating the same.

Syllabus:

Prehistoric / Primitive Architecture:

Introduction to Paleolithic & Neolithic Culture. It's Impact on Built forms. Primitive Settlements, Shelters, Megaliths, Memorials and Burial Systems.

Ancient Settlements: Jericho, CatalHuyuk, Hassuna, Skara Brae.

Ancient River Valley Civilizations:

Nile River, Tigris and Euphrates Rivers, Yellow River and Indus River

Topography, Climate, Religion, Culture and Political System. Character of Settlements and Typology of Shelters/Buildings.

Ancient River Valley Civilizations: Places of importance

Egyptian Architecture: Great Pyramid of Giza, Temple of Amon Ra, Karnak, Temples of Abu Simbel, Nubia

Mesopotamian Architecture: Ziggurat of Urnammu-Ur (Sumerian Architecture), Palace of Sargon-Khorsabad (Assyrian Architecture), City of Babylon and Ishtar Gate (Neo-Babylonian Architecture), Palace at Persepolis (Persian Architecture)

Chinese Architecture: Imperial Palaces, Traditional Chinese Gardens, Religious structures, Altars and Temples, Tombs and Mausoleums

Indus Valley Architecture: Harappa & Mohenjo-Daro settlement Architecture and Town planning

Classical Period: GREECE

Topography, Climate, Religion, Culture and Political System. Construction Materials, Techniques and Structural Systems. Greek Orders, Residences, Urban Spaces, Temples and other Public Buildings.

Classical Period: ROME

Roman History: Republic and Empire. Topography, Climate, Religion, Culture and Political System. Construction Materials, Techniques and Structural Systems. Roman Orders, Urban Spaces, Temples, Basilicas, Amphitheatres & Residences.

Classical Period Greece: Places of Importance

Athens, Agora, Acropolis, Parthenon, Stoa, Bouleuterion, Theatres.

Classical Period Rome: Places of Importance

Forum Romanum, Coliseum, Pantheon, Circus Maximus, Thermae of Caracalla

Required Reading :

1. Sir Banister Fletcher, "A History of Architecture", CBS Publications (Indian Edition), 1999.
2. Spiro Kostof, "A History of Architecture: Setting and Rituals", Oxford University Press, London, 1985.
3. Leland M Roth; "Understanding Architecture: Its Elements, History and Meaning"; Craftsman House; 1994.

References :

1. "History of World Architecture – Series", Harry N. Abrams, Inc. Pub., New York, 1972.
2. Lloyd S. & Muller H.W., "History of World Architecture – Series", London, 1986.
3. Gosta, E. Samdstrp, "Man the Builder", Mc.Graw Hill Book Company, New York, 1970.
4. Webb and Schaeffer; "Western Civilisation", Volume I; VNR: NY: 1962.
5. Vincent Scully, "Architecture – The Natural and the Manmade", Harper Collins Pub: 1991.

21AR1103 BUILDING MATERIAL -I

Course Code	21AR1103
L-ST-P-S	2-0-0-0
Credits	2
Contact Hours	2
Prerequisites	Nil

Mapping of Course Outcomes of 21AR1103

CO	Course Outcome	PO/PSO	BTL
CO1	Understanding of the building materials Soils and Bricks	PO3,PO6	2
CO2	Understanding of the building materials Rocks and Stones	PO6	2
CO3	Understanding of the building materials Timber & Bamboo	PO8	2
CO4	Understanding of the building materials Lime.	PO4, PO6,PO8	2

Properties and behavior of both natural and man-made building materials such as bricks, stones, clay, timber, bamboo, lime, cement; Application of these materials in construction; Effects of sun, rain, wind and other climatic and environmental conditions on various building materials and built environment etc.

Syllabus:**Bricks and Clay:**

Fundamentals and types of soil.

Bricks: Composition of good brick, properties and uses of bricks, classification of bricks, shape of bricks, firebricks, and substitutes for bricks.

Clay products: Tiles, terra cotta, stoneware, earthenware, porcelain, and clay block their properties and uses.

Rocks and Stone:

Geological Classification of rocks –test for stones, uses of stones, deterioration of stone, preservation of stones, stones available for construction in India their properties and uses. Stones for finishes –cutting & polishing. Artificial stone and their uses.

Timber & Bamboo:

Timber: Classification of trees, structure of trees, Defects in timber, Storage of timber, Uses of timber, characteristics, seasoning of timber, Defects and diseases, Decay of timber, Preservation, Fire resistance, Conservation of timber.

Bamboo: Anatomy of Bamboo, Properties, strength, processing, harvesting, working of Bamboo tools – Treatment and preservation of Bamboo and uses of Bamboo. Cane, Propagation Roofing materials – Thatch, grass, Bamboo, reeds.

Lime

Lime: Basic definitions, types of binding sources of lime, classification of lime, properties and uses of various types of limes, Lime mortar and surkhi.

Required Reading :

1. Don A. Watson, "Construction Materials and Processes", McGraw Hill, 1972.
2. W.B. McKay, "Building Construction", Vol, 1 and 2, Longmans, UK, 1981.
3. S.C Rangwala "Building Construction", Charotar Publishing House, India, 2000.
4. S.K.Sharma, "A Text book of Building Construction", Chand & Co Ltd., New Delhi, 1998.

Reference Books:

1. American Institute of Timber Construction (AITC), "Timber Construction Manual", Wiley Publishers, 2004.
2. Francis D.K Ching "Building Construction" illustrated, John Willey & Sons, 2008.
3. Barry, "Construction of Buildings", Volume 1&2, Blackwell Publishing Ltd., Oxford, 2005.
4. Wills H Wagner, Howard Bud, "Modern Carpentry", Good Heart – Wilcox publishers, Portland, 2003

21AR1151 ART AND VISUAL GRAPHIC STUDIO

Course Code	21AR1151
L-ST-P-S	0-0-6-0
Credits	3
Contact Hours	6
Prerequisites	Nil

Course Outcomes of 21AR1151

CO	Course Outcome	PO/PSO	BTL
CO1	Understand the Principles of Drawing.	PO1,PO10	2
CO2	Understand the Types, Properties and Application of Colors.	PO1,PO10	2
CO3	Understand the Painting Variations.	PO1,PO10	2
CO4	Understand the Techniques of Sculpturing.	PO1,PO10	2

Various mediums and techniques of art for artistic expression; free hand drawing; presentation in graphic form all elements of building design; study of shades and shadows, textures, tones, colors etc; rendering; hands on working with various mediums and materials.

Syllabus:
Drawing

Introduction to art – Types of drawing – Visual effects of drawing– Composition – Approach to sketching – Study of light, shade and shadow. Exercise involving Indoor and outdoor sketching – Spot sketching- Sketching Human figures & Objects– Sketching Vegetation - Drawing from imagination – Study of 3 D effects – Tools and materials – Illustration

Painting I

Introduction of painting– Properties of colour – Colour schemes – Types of colours - Application and visual effects of colour. Exercise involving Study of colour – Properties of paper, brush and other tools – Basic washes.

Painting II

Indoor and outdoor painting – Rendering techniques Exercise involving various mediums of colour– Pen and ink– Mixed mediums – Study of multi-colour and 3D effects from nature and built environment.

Sculpture

Introduction of sculpture –Sculpture using various materials such as clay, plaster of Paris, paper mâché, and wire.

Text Books:

1. Webb, Frank, "The Artist guide to Composition", David & Charles, U.K., 1994.
2. Ching Francis, "Drawing a Creative Process", Van Nostrand Reinhold, New York, 1990.
3. Alan Swann, "Graphic Design School", Harper Collins, 1991.
4. Barrington Barber, "Fundamentals of Drawing: A Complete Professional Course for Artists", Arcturus Publishing Ltd, 2 edition (5 September 2003).

Reference books:

1. Moivahuntly, "The artist drawing book", David & Charles, U.K., 1994.
2. Arundell (Jan) Exploring sculpture, Mills and Boon, London/Charles, T. Brand Ford Company, U.S.A.
3. The art of drawing trees, heads, colours, mixing, drawing, landscape and painting, water colour, oilcolour, etc. – The Grumbacher Library Books, New York, 1996.
4. Caldwell peter, "Pen and Ink Sketching", B.T. Bats ford Ltd., London, 1995.
5. Arthur L. Guptill, "Drawing and Sketching in Pencil",Dover Publications Inc.; Dover Ed edition (9 November 2007).

21AR1152 ARCHITECTURAL DRAWING - I

Course Code	21AR1152
L-ST-P-S	0-0-6-0
Credits	3
Contact Hours	6
Prerequisites	Nil

Course Outcomes of 21AR1152

CO	Course Outcome	PO/PSO	BTL
CO1	To Understand the Fundamentals of Drawing and Drafting	PO1, PO3, PS02	2
CO2	To Understand the Construction and Development of Surfaces for various Basic 3D Shapes.	PO1, PO5, PS02	2
CO3	To Understand the representation of various building components and related elements	PO3, PO4, PS02	2
CO4	To Understand the representation of a building in plan, elevation & sections. To Understand the Preparation of Simple Measure Drawing	PO3, PO5, PS02	2

Various mediums and techniques of art for artistic expression; free hand drawing; orthogonal projection of geometrical forms and representation; architectural and building representation through 2 dimensional and three dimensional drawings; presentation in graphic form all elements of building design; rendering using manual mode as well as digital; hands on working with various mediums and materials.

Syllabus:

Fundamentals of Drawing and its practice, Introduction to drawing equipment, familiarization, use and handling. Drawing sheet sizes, title panels, legends, layouts and composition, construction of lines, line value, line types, Architectural lettering; Basic geometry – Shapes & Forms; Study of illusions.

Pattern Drafting; Basic 2-D Shapes; Use of “SCALES” in drawings (Increasing & Decreasing); Orthogonal Projections, 3D projections – Isometric View, Oblique View, Axonometric, Bi-Metric, Tri-Metric, Exploded view.

Architectural Representation of components and materials/textures, Measured drawing of building components and furniture – Doors, Windows, Wardrobe, Drafting table etc., Measured drawing of a simple form/space.

Required Readings:

1. Morris IH., "Geometrical Drawing for Art Students", Orient Longman, Madras, 2004.
2. Francis D. K. Ching, "Architectural Graphics", John Wiley and Sons, 2009.
3. Fraser Reekie, Reekie's, "Architectural Drawing", Edward Arnold, 1995
4. Arthur Leighton Gupthill, "Rendering with Pen and Ink", Watson-Gupthill; New edition (1 August 1997)

Reference books:

1. Leslie Martin, "Architectural Graphics", The Macmillan Company, New York, 1978.
2. Cooper Flouglas, "Drawing & Perceiving", Van Nostrand Reinhold, New York 1995
3. Bhatt N.D. & Panchal V.M., Engineering Drawing; Charotar Publishing House, Anand, 2004

21AR1153 ARCHITECTURAL DESIGN STUDIO – 1 (BASIC DESIGN)

Course Code	21AR1153
L-ST-P-S	0-8-0-0
Credits	12
Contact Hours	8
Prerequisites	Nil

Course Outcomes of 21AR1153

CO	Course Outcome	PO/PSO	BTL
CO1	An understanding of the qualities of different elements as well as their composite fusions	PO1,PO3, PS02	2
CO2	An ability to engage and combine the elements of design in spontaneous as well as intentional ways in order to create desired qualities and effects	PO1,PO5, PS02	2
CO3	Development of required skills – observation / analysis / abstractions / interpretation / representations / expressions through models and drawings.	PO3,PO4, PS02	2
CO4	Understanding of 3D Composition by involving students in a number of exercises which will help generation of a form from a two dimensional / abstract idea.	PO3,PO5, PS02	2

The understanding the elements and principles of design as the building blocks of creative design will be facilitated through exercises that will develop originality, expression, skill and creative thinking. The grammar of design and visual composition will be explored through two dimensional compositions and three dimensional models using various media for representation. The objective is to enable the understanding of the relationship between the grammar of design and architecture

Syllabus:
Elements of Design CO1

Properties, qualities and characteristics of point, line, direction, shape, form, colour, texture and Light. Extraction of basic forms from natural and manmade environment. Enquiry into form both geometric and non-geometric entities. Exercises on Visual Composition and Pattern making.

Principles of Design CO2

Understanding Architectural Aesthetics. Principles such as Balance, Symmetry, Asymmetry, Proportion, Scale, Harmony, Rhythm and Contrast. Exercises on Visual Composition and Pattern making, Logo design, Collage, Abstraction. Composition using different types of Grids – Orthogonal, Radial, etc.

Evolution of Forms and Spaces CO3

Study of solids & voids to evolve sculptural forms & spaces; explore play of light & shade and application of colour.

Introduction to external & internal forms, analytical appraisal of forms, their quality; Concept of space, interrelationship between space, volume and order; Variations in forms with planer juxtapositions.

Anthropometric Study and Ergonomics CO 4

Anthropometric study and ergonomics human figure (including differently able persons), dimensions of furniture - relationship with human anthropometrics with freehand drawing of human figures, vehicles, trees, buildings etc. to have a better understanding of proportion.

Required Readings:

1. Francis D. K. Ching - Architecture - Form Space and Order Van Nostrand Reinhold Co., (Canada), 1979.
2. Charles Wallschlagger & Cynthia Busic-Snyder, Basic Visual Concepts and Principles for Artists, Architects and Designers, McGraw Hill, New York 1992.

Reference books:

1. Architect: A Candid Guide to the Profession, by Roger K. Lewis
2. Understanding Architecture: Its Elements, History, and Meaning by Leland M. Roth, West view Press Place publication.
3. Elda Fezei, Henry Moore, Hamlyn, London, New York, Sydney, Toronto, 1972.
4. Lawrence Bunchy - Acrylic for Sculpture and Design, 450, West 33rd Street, New York, N.Y. 10001, 1972.
5. Exner. V, Pressel. D, Basics Spatial Design, Birkhanser, 2009.
6. Owen Cappelman & Michael Jack Jordon, Foundations in Architecture: An Annotated Anthology of Beginning Design Project, Van Nostrand Reinhold New York, 1993.

21UC1101 INTEGRATED PROFESSIONAL ENGLISH

Course Code	21UC1101
L-ST-P-S	0-0-4-0
Credits	2
Contact Hours	4
Prerequisites	Nil

Course Objective:

To express themselves in English with greater fluency, accuracy and confidence. To communicate with others in practical, business-oriented situations. To handle variety of business contexts, from negotiating, to using telephone, making presentation.

COURSE OUTCOMES (COs):

CO NO	Course Outcome (CO)	PO/PSO	Blooms Taxonomy Level (BTL)
CO1	Understand the concepts of grammar to improve communication, reading, and writing skills	PO10	2
CO2	Demonstrate required knowledge over Dos and Don'ts of speaking in the corporate context. Demonstrate ability to face formal situations / interactions.	PO9	2
CO3	Understand the varieties of reading and comprehend the tone and style of the author. Skim and scan effectively and appreciate rhetorical devices	PO9	2
CO4	Apply the concepts of writing to draft corporate letters, emails, and memos	PO10	3

Syllabus:**COMPETENCY: 1**

Basic Grammar - Countable and uncountable nouns, present simple and continuous, past simple and continuous – classroom practice – Understand and interpret Texts and work place situations
 B)Structural Pattern - Present continuous for future arrangements State verbs, Regular and irregular verbs, Voice, Modal verbs – Reporting on going tasks in the corporate world
 C)Descriptive and Qualitative Patterns: Adjectives and Adverbs classroom practice) Time Expressions, Comparatives and superlatives , Pronouns, Conditionals, Phrases and clauses (Including Relative)

COMPETENCY: 2

- a) Formal contexts: Being a PA, describing changes in a company Taking orders over the phone.
- b) Listening & Speaking: Participate in conversation with proper contextual language markers, turntaking. Classroom practice- Presenting context, reason, problem – Case analysis (short).
- c) Body Language: Dos and Don'ts of one to one interaction, Telephone interaction Video/ webconferencing. Culture specific practices.
- d) Work Etiquette- situation, ambience, team skills, time management and leadership ability.

COMPETENCY: 3

- a) Understand and assimilate main ideas and specific details. (250-300 words text of moderatedifficulty)
- b) Read for general understanding, interpreting, factual or specific information, for grammaticalaccuracy and information transfer.
- c) Understand the general meaning of corporate context and office correspondence.
- d) Understand short reports of predictable nature.

COMPETENCY:4

- a) Internal Correspondence. Making notes on routine matters, such as, taking/ placing orders
- b) Emails: Types of emails, salutations, vocabulary used in formal and informal (Including beginnings and endings)
- c) Writing straight-forward, routine letters of factual nature.

REFERENCE BOOKS:

R1. Business Benchmark Book- Preliminary- 2nd edition Cambridge Press 2019.

R 2. Business Benchmark Book- Pre Intermediate to Intermediate- 2nd edition Cambridge Press 2019

Web Links : <https://www.cambridgeenglish.org/>

<https://learnenglish.britishcouncil.org>,<https://apps.apple.com/in/app/bec-from-cambridge/id1351207688><https://play.google.com/store/apps/details?id=com.liqvid.bec>

21UC0009 ECOLOGY AND ENVIRONMENT

Course Code	21UC0009
L-ST-P-S	2-0-0-0
Credits	0
Contact Hours	2
Prerequisites	Nil

Course Outcomes of 21UC0009

CO	Course Outcome	PO/PSO	BTL
CO 1	Understand the importance of Environmental education and conservation of natural resources.	6	1
CO 2	Understand the importance of ecosystems and biodiversity.	12	1
CO 3	Apply the environmental science knowledge on solid waste management, disaster management and EIA process.	6	2

Environmental studies, Mining, Resources, Disaster Management

Syllabus:

The Multidisciplinary nature of Environmental Studies - Natural Resources- Forest resources
 Mining its impact on environment - Water resources - Mineral resources-. Energy resources -
 Land resource s- Soil erosion
 Ecosystems - Biodiversity and its Conservation
 Environmental Pollution - Soil waste management - Electronic waste management, biomedical waste management
 Disaster management – Environmental Legislation Environmental Impact Assessment Process.

Text Book:

1. Anubha Kaushik, C.P.Kaushik, "Environmental Studies" , New Age International, (2007).
2. Benny Joseph, "Environmental Studies", Tata McGraw-Hill companies, New Delhi, (2009).

21AR1204 MECHANICS OF STRUCTURES – I

Course Code	21AR1204
L-ST-P-S	3 – 0– 0
Credits	3
Contact Hours	3
Prerequisites	Nil

Mapping of Course Outcomes of 21AR1204

CO	Course Outcome	PO/PSO	BTL
CO1	Understanding the concept of forces and structural systems	PO1, PO2	2
CO2	Understanding the sectional properties of structural members	PO3, PO4	2
CO3	Analysing the trusses and plane trusses	PO5, PO6	4
CO4	Analysing the columns using Euler's theory and Rankine formulae.	PO8, PO10	4

Syllabus:**Introduction to Forces and Structural Systems**

Types of force systems - Resultant of forces-Lami's theorem- principle of moments varignon's theorem - principle of equilibrium (no reaction problems) - simple problems

Properties of Section

Centroid- Moment of Inertia - Section modules – Radius of gyration - Theorem of perpendicular axis - Theorem of parallel axis –simple problems

Analysis of Trusses & Analysis of Plane Trusses

Analysis of trusses: Method of joints and Methods of sections, Introduction to Determinate and Indeterminate plane trusses - Analysis of simply supported and cantilevered trusses by method of joints.

Analysis of Columns.

Types of columns, columns and struts, buckling and crushing failure, Euler's theory, equivalent length and

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slenderness ratio, Rankine's formula. Equivalent length and critical loads of Columns.

Required Readings:

1. Bansal R.K.– A text book on Engineering Mechanics, Laxmi Publications, Delhi, 2005.
2. Bansal R.K. – A textbook on Strength of Materials, Lakshmi Publications, Delhi 2007.

References:

1. Punmia P.C., “Strength of Materials and Theory of Structures”; Vol. I, Lakmi Publications, Delhi 1994.
2. Ramamrutham S., “Strength of Materials”, Dhanpatrai& Sons, Delhi, 1990.
3. Nash W.A., “Strength of Materials” – Schaums Series, McGraw Hill Book Company, 1989.
4. Rajput R.K., “Strength of Materials”, S. Chand & Company Ltd., New Delhi, 1996.

21AR1205 HISTORY OF ARCHITECTURE - II

Course Code	21AR1205
L-ST-P-S	3-0-0-0
Credits	3
Contact Hours	3
Prerequisites	Nil

Course Outcomes of 21AR1205

CO	Course Outcome	PO/PSO	BTL
CO1	To understand vedic culture and study the origins of Early Hinduism, Jainism, Buddhism and its rudimentary forms of construction.	PO1,PO3, PSO2	2
CO2	To understand Hindu forms of worship, concept, symbolism and to get knowledge on the metaphysical plan of Temple Architecture	PO1,PO5, PSO2	2
CO3	To understand and to get knowledge on the temple architecture and temple towns during various periods and empires in South India and North India.	PO3,PO4, PSO2	2
CO4	To Study and to know the character and Architecture of temples of South India and North India in detail	PO3,PO5, PO10,PSO2	2

Architecture as evolving within specific cultural contexts including a aspects of politics, society, religion, climate; geography and geology, etc. through history in the Indian sub-continent; Development of architectural form with reference to Technology, Style and Character- Examples from every historical style illustrating the same.

Syllabus:**Early Hindu, Jain and Buddhist Architecture**

Origin of Early Hinduism. Vedic Culture, Vedic village& Rudimentary forms of Bamboo Structures.

Origins, Thought, Art and Culture of Jainism & Buddhism. Character of Jain Architecture.

Hinayana and Mahayana Styles of Buddhist Architecture. Evolution of Built form based on form&function.

Architectural Features like Stupas Chaityas, Viharas, Stambhas, Toranas, Railings etc.

Places of Importance:

Ashokan Pillar-Sarnath, Rock Cut Caves-Barabar; Sanchi Stupa-Sanchi Rock Cut Architecture; Great Stupa at Amaravati, Ajanta& Ellora; Karli Caves, Rani Gumpha-Udaigiri; Takht I Bahi- Gandhara

Evolution of Hindu Temple Architecture

Hindu forms of worship – evolution of temple form –Concept, meaning, symbolism, ritual and social importance of temple.

Classification of Indian temples - Elements of temple -Metaphysical plan of Temple Architecture

Early shrines of the Gupta and Chalukyan and Rashtrakuta periods

Places of Importance:

Tigawa temple - Ladh Khan and Durga temple, Aihole - Papanatha, Virupaksha temples, Pattadakal - Kailasanatha temple, Ellora.

Temple Architecture - Southern India

Brief history of South India and its Characteristics–Different phases of South Indian Temple Architecture, Relation between Bhakti period, , Dravidian Order-Evolution and form of gopurams, Temple architecture of temple towns

Temple Architecture - Northern India

Brief history of North India and its Characteristics –Different phases of North Indian Temple Architecture -Sub schools developed under the style.

Architectural production and salient features inOrissa, Gujarat, Madhya Pradesh and Rajasthan.

Southern India- Places of Importance

Rock cut productions under Pallavas: Rathas of Mahabalipuram, Shore temple-Mahabalipuram

Chola Architecture: Brihadeeswara Temple, Thanjavur,Pandyan and Nayaka Architecture: Meenakshi Temples, Temple Towns :Madurai.

Northern India- Places of Importance

Lingaraja Temple- Bhubaneswar, Sun temple-Konarak, Somnatha temple-Gujarat, Kandariya Mahadev temple-Khajuraho group, Madhyapradesh,Dilwara temple, Mt. Abu

Required readings:

1. Percy Brown, "Indian Architecture (Buddhist and Hindu Period)", Taraporevala and Sons, Bombay, 1983.
2. Satish Grover, "The Architecture of India (Buddhist and Hindu Period)", Vikas Publishing Housing Pvt. Ltd., New Delhi, 2003.
3. Christoper Tadgell, "The History of Architecture in India from the Dawn of civilization to the End of the Raj", Longmon Group U.K.Ltd., London, 1990.

References:

1. George Michell, "The Hindu Temple", BI Pub., Bombay, 1977.
2. Stella Kramrisch, "The Hindu Temple", Motilal Banarsidass, 1976.
3. Parameswaranpillai V.R., "Temple culture of south India", Inter India Publications,
4. George Michell Ed, "Temple Towns of Tamil Nadu", Marg Pubs, 1995.
5. Raphael D., "Temples of Tamil Nadu Works of Art", Fast Print Service Pvt Ltd., 1996.

21AR1206 BUILDING MATERIALS- II

Course Code	21AR1206
L-ST-P-S	2-0-0-0
Credits	2
Contact Hours	2
Prerequisites	Nil

Course Outcomes of 21AR1206

CO	Course Outcome	PO/PSO	BTL
CO1	Understanding of the building materials - Cement and RCC.	PO3, PO6	2
CO2	Understanding of the building material - Steel.	PO6	2
CO3	Understanding of the building material - Glass.	PO8	2
CO4	Understanding of the building material - Paints.	PO8, PO2	2

Properties and behavior of both natural and man-made building materials such as metals, glass, steel and finishing materials in contemporary buildings; Application of these materials in construction; Effects of sun, rain, wind and other climatic and environmental conditions on various building materials and built environment and the science of design for creating effective human comfort conditions within the built environment.

Syllabus:**CEMENT:**

Cement: Composition, Manufacturing, Properties of cement – Uses of Cement – Tests for cement, Cement mortar, Introduction to RCC.

METALS:

Ferrous metals - Properties and uses of cast iron, wrought iron, pig iron and steel. Market forms of steel: structural steel, stainless steel, steel alloys – properties and uses.

Non-Ferrous metals - Properties and uses of aluminum, zinc, lead, copper etc., Aluminum windows and doors, aluminum and its uses in interiors, aluminum frames, partitions, glazing & panels.

GLASS:

Composition of glass, brief study on manufacture, treatment, properties and uses of glass. Types of glass - float glass, cast glass, glass blocks, and foamed glass. Decorative glass, solar control, toughened glass, wired glass, laminated glass, fire-resistant glass, glass blocks, structural glass - properties and application in building industry, glazing and energy conservation measures.

PAINTING, VARNISHING & MISCELLANEOUS MATERIALS:

Painting: Characteristic of an ideal paint, types of paints, defects in painting, painting on different surfaces.

Varnishing: Varnish types, Process of varnishing.

Miscellaneous materials like Epoxy, Melamine, Putty, Foams, Bitumen etc.,

Required Books:

1. S.C.Rangwala, "Engineering Materials", Charotar Publishing House, India, 1997.
2. S.K Duggal, "Building Materials", Oxford and IBM Publishing Co, Pvt. Ltd., 1997.
3. P.C Varghese, "Building Materials", Prentice Hall of India Pvt. Ltd., New Delhi, 2005

Reference Book:

1. Arthur Lyons, "Materials for Architects and Builders", An introduction Arnold, London, 1997.
2. Don A.Watson, "Construction Materials and Processes", McGraw Hill Co., 1986.
3. S.N Sinha, "Reinforced Concrete Design", Tata-McGraw Hill, New Delhi, 2002
4. Howard Kent Preston, "Prestressed concrete for Architects and Engineers", McGraw Hill, New York, 1964

21AR1254 MODEL MAKING WORKSHOP

Course Code	21AR1254
L-ST-P-S	0-0-4-0
Credits	2
Contact Hours	4
Prerequisites	Nil

Course outcomes for 21AR1254

CO	Course Outcomes	PO/PSO	BTL
CO1	To understand cutting and sticking for making a model	PO7	2
	To understand representing hills, Plateau, water bodies, furniture's, Cars.	PO7,PO8	2
CO3	To understand components of a detailed model	PO7,PO8	2
CO4	To know different materials and apply the acquired knowledge and	PO7	2

Introduction to techniques for preparation of block models using various materials; detailed model of a small project using appropriate materials; exploration with plastic material such as clay, plaster of Paris, etc

Syllabus:

INTRODUCTION TO MODEL MAKING

Detail description of tools used in Model making - Basic surface development - introducing Techniques used for cutting and sticking - Different materials (Paper, Thermocol / Coir, Foam board) - Making models of Cube, Cylinder & Sphere - Making Block Models.

CONTOURS MODELLING, TREES, FURNITURES, VEHICLES and MINIATURE MODELS

Model making of Site with different levels using ethoflex or corrugated sheet - Different ways of representing trees, vehicles, street lights in architectural model, Blown up model along with furniture.

DETAILED MODEL ALONG WITH SURFACE DEVELOPMENT

Advanced Surface development (half cuts, reverse cut, elevation and slabs etc.), Detailed model with doors, windows, balconies and other architectural elements, making of detailed base showing roads, path ways, greens, plinth and water bodies.

EXPLORING MATERIALS

Exploring and experimenting with tensile materials -Bamboo, wood, metal frame works. Model making of any Architectural Structure.

Required Readings:

1. Nick Dunn, "Architectural Model making", Laurence King Publishing, 2nd edition, 2014.
2. Graham D. Pattinson, "A Guide to Professional Architectural and Industrial Scale Model Building", Prentice Hall, 1st Edition, 1982.

Reference books:

1. Martha Sutherland, "Model making - A Basic Guide (Norton Professional Books for Architects & Designers)", W. W. Norton & Company, First Edition, 1999.
2. Roark T. Congdon, "Architectural Model Building", Fairchild Books, First Edition, 2010.

21AR1255 SURVEYING AND LEVELLING

Course Code	21AR1255
L-ST-P-S	0-0-2-0
Credits	1
Contact Hours	2
Prerequisites	Nil

Course Outcomes of 21AR1255

CO	Course Outcome	PO/PSO	BTL
CO1	Understanding Surveying using Chain and Compass.	PO8	2
CO2	Understanding Surveying using Dumpy Level and Theodolite.	PO8	2
CO3	Understanding Surveying using Total Station and Alidade.	PO8	2
CO4	Applying survey practices in field	PO10	2

Principles of surveying and leveling, use of various survey and leveling instruments, carrying out surveys of land of medium complexity (field work); preparation of survey plans. Basic principles and theories which underlie the systematic study of topographic features, basic skills of landform analysis through map and field observation, need and role of Surveying and Levelling related to Architecture, preparation and interpretation of survey drawings, methods, tools and equipment necessary to carryout different survey procedures and recent advancements in the field of landforms survey and measurements.

Syllabus:**Introduction**

Reading of survey Maps, understanding of features and undulations of Ground. Scales used in Plotting. Study of landforms, topography and contours, slope analysis, grading process; graphic representations of landforms. Principles, definitions, units, scales, symbols and instruments used in Surveying, common errors in surveying and their corrections.

Linear Measurements

Measurements in horizontal plane, linear measurements with chain & tape, setting-out & survey stations, survey accessories, survey lines, open & closed traverse, chaining & offsetting, direct & indirect ranging, log-books, field boundaries, field area estimation. Compass survey, bearings & angles, local attractions, errors in compass survey.

Contours in Landforms

Characteristics, contour intervals, direct & indirect methods of contouring, block contour surveys, profile levelling, longitudinal & traverse cross sections, gradients, Contouring methods & equipment, plane-table, plotting contours & profiles, estimating areas & volumes.

Sloping Landforms and Levelling

Measurements along sloping landforms, principles, definitions, methods, instruments, & staff required for levelling, simple & differential levelling, dumpy level, adjustments, hand signals, reduced levels, rise & fall methods, errors in levelling, level tube & barometric levelling.

Precision methods in Landforms Survey & Measurement

Theodolite surveying, temporary adjustments, horizontal & vertical angles, closing errors and balancing traverse, automated & digital surveying, Total station, G.P.S, Aerial Photography, digital levels, auto-levels.

References:

1. Miller, V. C. and Westerback, M. E. (1989). Interpretation of Topographic Maps. Columbus: Merrill.
2. Lynch, K. and Hack. G. (1984). Site Planning. 3rd Ed. Cambridge: Maple-Vail Inc.
3. Easterbrook, D.J. (1999). Surface Processes and Landforms. 2nd Ed. New York: McMillan.
4. Carson, M. A. and Kirkby, M. J. (1972). Hill slope Form and Process. London and New York: Cambridge University Press.
5. Arora, K.R. (2004). Surveying Vol. 1-3. Delhi: Standard Book House.
6. Chandra, A. M. (2002). Plane Surveying. New Delhi: New Age International.
7. Duggal, S. K. (2004). Surveying Vol. 1-2. New Delhi: Tata McGraw Hill.
8. Punmia, B. C., Jain, A. K. and Jain, A. K. (2005). Surveying Vol. I-III. New Delhi: Laxmi Publications.
9. Shahani, P. B. (1980). Text of Surveying Vol. I. Oxford and IBH Publishing.
10. Subramanian, R. (2012). Surveying and levelling. New Delhi: Oxford University Press.

21AR1256 ARCHITECTURAL DRAWING - II

Course Code	21AR1256
L-ST-P-S	0-0-6-0
Credits	3
Contact Hours	6
Prerequisites	Nil

Course Outcomes of 21AR1256

CO	Course Outcome	PO/PSO	BTL
CO1	To Understand the concepts and Scientific Methods of Perspective Drawing and apply Rendering Techniques	PO7, PO8	2
CO2	To understand the principles of Shade & Shadow and Construct Sciography of Architectural Structures.	PO7, PO10	2
CO3	To Understand identification and measuring of specific Architectural Details of Historically significant Buildings.	PO7, PO10	2
CO4	To understand the presentation techniques of drawings	PO1, PO7	2

Various mediums and techniques of art for artistic expression; free hand drawing; perspective drawing; drawing and sketching; sciography; building documentation; study of shades and shadows, textures, tones, colors etc; rendering using manual mode as well as digital; hands on working with various mediums and materials.

Syllabus:

Rendering Techniques using various mediums – Dot rendering, Line rendering, Colour rendering etc., Introduction to perspective Drawing & Sketching – One-point perspective, two-point perspective, three point perspective – Simple 3D forms and building interiors; Exercises on any building interior/exterior view and rendering.

Introduction to Sciography – Shade, shadow casting on horizontal and vertical surfaces – Ground, different projections/depressions in walls, Chajjas; Sciography for 3D forms.

Introduction to Building Documentation – Building typologies – Vernacular, Historical prominent, Heritage, Public Buildings, Religious Structures. Report presentation on building documentation with appropriate sheet work.

Required Readings:

1. John M.Holmes, Applied Perspective, Sir Isaac, Plotman and Sons Ltd., London 1954.
2. Robert W.Gill, Basic Perspective, Thames and Hudson, London, 1974.
3. Leslie Martin C., Architectural Graphics, The Macmillan Company, New York, 1964.
4. Francis Ching, Architectural Graphics, Van Nostrand and Reinhold Company, NY 1975.

Reference books:

1. Claude Batley, Indian Architecture, D.B.Taraporevale Sons and Co., Ltd., Bombay
2. William Kirby Lockard, Drawing as a Means to Architecture, Van Nostrand, Reinhold Company, New York.
3. George A Dinsmore, Analytical Graphics – D.VanNostrand, Company Inc., Canada
4. Interiors: Perspective in Architectural Design Graphic - SMA Publishing Co. Ltd., Japan, 1967.
5. Ernest Norling, Perspective drawing, Walter Fostor Art Books, California, 1986.
6. Bernard Alkins - 147, Architectural Rendering, Walter Foster Art Books, 1986.
7. RoberW.Gill, Advanced Perspective, Thames and Hudson, London, 1974.

21AR1257 ARCHITECTURAL DESIGN STUDIO – II

Course Code	21AR1257
L-ST-P-S	0-8-0-0
Credits	12
Contact Hours	8
Prerequisites	21AR1153

Course Outcomes for 21AR1257

CO	Course Outcome	PO/PSO	BTL
CO1	To make student to remember anthropometric data, conduct desktop/case study and understand collected data towards framing parameters for Bedroom design.	PO2, PO4, PO10, PSO1	2
CO2	To make student to apply and analyze collected data, to derive concepts, evaluate schematic preliminary design options and final design presentation of a Bedroom for a cine actor.	PO2, PSO2	6
CO3	To make student to derive concepts, schematic preliminary design, and final design presentation of a Shop front for a given context.	PO2, PO10, PSO2	6
CO4	To make student to remember anthropometric data, conduct desktop/case study and understand collected data towards framing parameters for Coffee Shop design.	PO2, PO4, PO10, PSO1	2

Syllabus:**Scale and Complexity:**

Familiarize students with architectural design process through small scale projects involving small span, single space, single use spaces with simple movement, predominantly horizontal, as well as simple function public buildings of small scale.

Areas of focus/ concern:

Design activity will be limited to the level of visual composition, architectural form and space, aesthetic and psychological experience of form and space in terms of scale, color, light, texture, etc., function and need: user requirements, anthropometrics, space standards, circulation image and symbolism.

Typology/ project

Small living space, i.e. bedroom, bathroom, kitchen; shop, exhibition pavilion, children's environment, snack bar, petrol bunk, fire station, Residence.

Parallel subjects would give assignments connected with the current design exercise(s) as a part of their

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course work.

Required Readings:

1. Francis D. K. Ching - Architecture - Form Space and Order Van Nostrand Reinhold Co., (Canada), 1979.
2. Charles Wallschlagger & Cynthia Busic-Snyder, Basic Visual Concepts and Principles for Artists, Architects and Designers, McGraw Hill, New York 1992.

Reference books:

1. Architect: A Candid Guide to the Profession, by Roger K. Lewis
2. Understanding Architecture: Its Elements, History, and Meaning by Leland M. Roth, West view Press Place publication.
3. Exner. V, Pressel. D, Basics Spatial Design, Birkhanser, 2009.
4. Owen Cappelman & Michael Jack Jordon, Foundations in Architecture: An Annotated Anthology of Beginning Design Project, Van Nostrand Reinhold New York, 1993.

21UC1202 ENGLISH PROFECIENCY

Course Code	21UC1202
L-ST-P-S	0-0-4-0
Credits	2
Contact Hours	4
Prerequisites	Nil

Course outcomes for 21UC1202

CO	Course outcome	PO/PSO	BTL
CO 1	Apply the concepts of accurate English while writing and become equally at ease in using good vocabulary and language skills.	PO8, PO9, PO10	3
CO 2	Understand the importance of professional writing and apply the same in day-to-day usage.	PO8, PO9, PO10	3
CO 3	Apply the concepts of Ratios, Percentages, Averages and Analyzing the given information, a student is required to understand the given information and there after answer the given questions on the basis of comparative analysis of the data in the form of tabulation, bar graphs, pie charts, line graphs. Analyze the given data to find whether it is sufficient or not.	PO1, PO4	3
CO 4	Apply the basic functionality of Clocks and Calendars to find the solutions for the problems. Analyze the given symbols to understand the hidden meaning of the given expression and finding the solutions. Analyze the given conditions and finding out all the possible arrangements in linear & circular order.	PO1, PO5	4

Syllabus :

300 Word list (25 per week for 12 weeks), Voice & Error Identification, Reported Speech & Error Identification, Error Identification (Overall), Phrases & Clauses, Simple, Complex, & Compound Sentences & Error Identification, Active Listening Skills & Notetaking, Self-confidence, Self-Awareness, Self-Control, SWOC, Speed Reading Test, Word Perception-Quick horizontal eye movement (spelling), Vertical Reading & Word Perception-Semantic.

Language Laboratory Interactive: Debate, Blindfold, Role-Play, Situation Reaction Test—
Build an Island nation.

Reference Books:

1. Dictionary of Technical Terms
2. Dr. Meenakshi Raman and Dr. Sangeetha Sarma: Technical Communication. Oxford University Press: Delhi. 2016.
3. The Ultimate Verbal and Vocabulary Builder. Texas: Lighthouse Review. 2000.
4. Rajeev Vasisth: Interactive Vocabulary Drills. New Delhi: Arihant Publications Limited. 2011.
5. Language Laboratory Teacher Manual, KLEFU

21AR2107 MECHANICS OF STRUCTURES - II

Course Code	21AR2107
L-ST-P-S	3-0-0-0
Credits	3
Contact Hours	3
Prerequisites	Nil

Course Outcomes of 21AR2107

CO	Course Outcome	PO/PSO	BTL
CO1	Understanding the concept of simple stresses and strains and elastic properties of solids	PO7, PO9	2
CO2	Analysing determinate beams and plotting shear force and bending moment diagrams	PO6, PO9	4
CO3	Analysing indeterminate beams and plotting shear force and bending moment diagrams	PO6, PO9, PSO2	4
CO4	Understanding the theory of simple bending	PO9, PSO2	2

Syllabus:

Simple Stresses and Strains

Introduction to structural elements. Types of engineering materials, their mechanical properties and the tests for determination of the same. Stress and Strains; stress strain diagram for mild steel and high tensile steel and concrete Elastic constants and their mutual relationships; Simple redundant problems of stresses and strains.

Bending moment and Shear force - determinate beams

Diagrammatic conventions for supports and loading; Classification of beams; Concept of shear force and bending moment; relationship between load, shear force and bending moment, Shear force and bending moment diagrams for statically determinate beams.

Bending moment and Shear force - indeterminate beams

Analyse Continuous beams by Theorem of Three moments and draw SFD, BMD. Analyse Continuous beams by Moment Distribution Method and draw SFD, BMD.

Theory of simple bending

Theory of simple bending; bending and shear stresses in symmetrical sections; combined direct and bending stresses.

Required readings

1. Bansal R.K.– A text book on Engineering Mechanics, Laxmi Publications, Delhi, 2005.
2. Bansal R.K. – A textbook on Strength of Materials, Lakshmi Publications, Delhi 2007.

References:

1. Punmia P.C., “Strength of Materials and Theory of Structures”; Vol. I, Lakmi Publications, Delhi 1994.
2. Ramamrutham S., “Strength of Materials”, Dhanpatrai& Sons, Delhi, 1990.
3. Nash W.A., “Strength of Materials” – Schaums Series, McGraw Hill Book Company, 1989.
4. Rajput R.K., “Strength of Materials”, S. Chand & Company Ltd., New Delhi, 1996.

21AR2137 BUILDING CONSTRUCTION-I

Course Code	21AR2137
L-ST-P-S	0-4-0-0
Credits	6
Contact Hours	4
Prerequisite	Nil

Table 0-Course Outcomes of 21AR2137

CO	Course Outcome	PO/PSO	BTL
CO1	It is required that students should understand materials used in the building, method of construction and application	PO6,PO7, PO8	2
CO2	To understand the components of building and nuances of drawing plan, Elevation and section along with relevant sketches and details showing method of construction	PO6,PO7, PO9,	2
CO3	To understand, analyze the application and different arrangement styles of building materials	PO7,PO8, PSO1	4
CO4	Students should be able to analyze the different construction methods and details of contemporary and traditional work method demonstrate the techniques through study models	PO4,PO7 PO9,PSO2	4

Traditional and conventional knowledge systems that enable construction of a complete building; various structural systems and methods of construction and detailing of buildings of medium complexity using natural and manmade materials including foundation, walls, roofs, staircase, joinery and finishes. The course will combine lecture and studio exercises whose results will be in the form drawings and models, culminating in a studio which will translate an architectural design into working drawings which are good for construction either in manual/ digital mode.

Syllabus:**CO1 Stones:**

Geological Classification of rocks – test for stones, uses of stones, deterioration of stone, preservation of stones, stones available for construction in India their properties and uses. Stones for finishes – cutting & polishing – granite and marble. Artificial stone and their uses

CO2 Bricks & Clay Products:

Bricks: Composition of good brick, properties and uses of bricks, classification of bricks, shape of bricks, fire bricks, and substitutes for bricks Clay products: Tiles, terra cotta, stoneware, earthenware, porcelain, and clay block their properties and uses.

CO3 Basic Building Components, Foundation, Walls& roofs:

Basic building components: Cross section of a small building to understand foundation, plinth beam flooring, sill, lintel, roof beam and slabs, Parapet & weathering course; Foundation: typical types of foundation in stone, brick & RCC. Walls: Details of walls section across the opening (door & window) Roofs: simple configurations and details of various forms of roofs (flat, slope pyramidal & dome).

CO4 Brick Masonry:

Applications: Foundation, walling, types of brick walls, brick masonry (English, Flemish, rat trap bond) detailed brick layout at corners, junctions and brick piers, style of construction viz., exposed brick work, Reinforced brick walls, piers etc.

Brick Roofing:

Types of brick roofs, Madras terrace roof, jack arch roof, brick arches and domes, reinforced brick roofs, Types of arches, vaults and domes, and construction of arches, vaults and domes.

Reference Books:

1. Harold B.Olin – Construction principles, Materials and Methods – IFE, Chicago, 1980.
2. Dr. B.C Punmia – Building construction
3. R. Chudley, construction Technology.

21AR2108 HISTORY OF ARCHITECTURE - III

Course Code	21AR2108
L-ST-P-S	3-0-0-0
Credits	3
Contact Hours	3
Prerequisites	Nil

Course Outcomes of 21AR2108

CO	Course Outcome	PO/PSO	BTL
CO1	Understanding the evolution of early Christian and Medieval periods, its Architecture and socio – political changes.	PO1, PO3, PS02	2
CO2	Renaissance and Mannerist Architectures and their practices in Europe, growth of nations and styles of Baroque and Roccoco.	PO1, PO5, PS02	2
CO3	Understanding the Islamic principles, philosophy, & its relevance to various built forms, and the influence of Islamic architecture on Indian subcontinent. Architecture of various provinces under sultanate rule.	PO3, PO4, PS02	2
CO4	Study of Architectural developments during Mughal Dynasty, Study of cross culture influence and evolution of secular architecture in princely states	PO3, PO5, PS02	2

Syllabus:**Early Christian and Medieval Periods**

Birth and spread of Christianity – transformation of the Roman Empire – early Christian worship and burial. Church planning – basilican concept: S. Hagia Sophia, Constantinople; St. Marks, Venice. The Carolingian Renaissance – Feudalism and rural manorial life – Papacy – Monasticism – Craft and merchant guilds. Romanesque churches – Development of vaulting – Pisa Group – British Cathedrals. Political and social changes: Re-emergence of the city – Crusades - Scholasticism. Development of Gothic Architecture Church plan, structural developments in France and England – Notre Dame

Renaissance, Mannerism and Post Renaissance Movements

Idea of Renaissance and Humanism – Development of thought – Renaissance architecture: Brunelleschi and rationally ordered space – ideal form and the centrally planned church: Alberti and Donato Bramante – Merchant Prince palaces: Palazzo Ricardi– Villas of Palladop : Villa Capra Vicenza – Mannerist architecture : The Renaissance in transition – Michaelangelo : Library at S. Lorenzo, Florence, Capitoline Hill. Protestantism – French Revolution – Monarchy and growth of nations. Roman Baroque churches: The central plan modified – St. Peters, Rome; French Baroque: Versailles – English baroque – Sir

Christopher wren; St. Paul's London – Rococo Architecture.

Islamic Architecture in India and Delhi Sultanate

History of Islam: birth, spread and principles - evolution of building types in terms of forms and functions: mosque, tomb, minaret, madarasa, palace, caravanserai, market - character of Islamic architecture: principles, structure, materials and methods of construction, elements of decoration, colour, geometry, light. Islamic architecture in India: sources and influences.

Establishment of the Delhi Sultanate- evolution of architecture under the Slave, Khalji, Tughlaq, Sayyid and Lodhi Dynasties – tombs in Punjab- important examples for each period

Mughal Architecture

Mughals in India- political and cultural history- synthesis of Hindu-Muslim culture, Sufi movement - evolution of architecture and outline of Mughal cities and gardens under the Mughal rulers: Babur, Humayun, Akbar, Jahangir, Shahjahan, Aurangazeb- important examples- decline of the Mughal empire.

Cross cultural influences across India and secular architecture of the princely states: Oudh, Rajput, Sikh, Vijayanagara, Mysore, Madurai- important examples

Required Reading:

1. Sir Banister Fletcher, "A History of Architecture", CBS Publishers, 1996.
2. Spiro Kostof, "A History of Architecture - Setting and Rituals", Oxford University Press, London, 1995.
3. Brown Percy, "Indian Architecture (Islamic Period)", Taraporevala and Sons, Bombay, 1983.
4. Satish Grover, "Islamic Architecture in India", CBS Pub, New Delhi, 20025.

References:

1. George Mitchell, "Architecture of the Islamic World - Its History and Social meaning", Thames and Hudson, London 1978.
2. Robert Hillenbrand, "Islamic Architecture- Form, Function and Meaning", Edinburgh University Press 1994.
3. Christopher Tadgell, "The History of Architecture in India", Penguin Books (India) Ltd, New Delhi, 1990.
4. R.Nath, "History of Mughal Architecture", Vols I to III - Abhinav Publications, New Delhi, 1985.

21AR2109 CLIMATE RESPONSIVE ARCHITECTURE

Course Code	21AR2109
L-ST-P-S	3-0-0-0
Credits	3
Contact Hours	3
Prerequisites	Nil

Mapping of Course Outcomes of 21AR2109

CO	Course Outcome	PO/PSO	BTL
CO 1	An understanding of elements of climate, human comfort and human body heat balance.	PO4	2
CO 2	Understanding the concept of heat transfer in buildings, sun path diagrams and designing shading devices.	PO1	2
CO 3	Understanding air movement for designing buildings accordingly.	PO4, PO5	2
CO 4	Understanding climate responsive architecture through case studies.	PO1, PO5, PS02	2

Climatology as a science for the study of weather conditions averaged over a period of time; the elements of climate; study of human comfort; design of solar shading devices; Heat flow through building envelopes; Air movement due to natural and built form; Design strategies in different climate zones; vernacular and contemporary responses to climate through case studies; analysis using appropriate software; assessment of appropriateness of various Renewable Energy Systems based on climatic conditions.

Syllabus:

Climate and Human Comfort

Factors that determine climate of a place – Components of Climate – Climate characteristics - Climate classifications - NBC climatic classification for India – classification for building designers in tropics. Human body heat balance – Human body heat loss – Effects of climatic factors on human body heat loss – Effective temperature – Human thermal comfort – Use of C.Mahony's tables.

Heat Flow through Building Envelope Concepts

The transfer of heat through solids – Definitions – Conductivity, Resistivity, Specific heat, Conductance, Resistance and Thermal capacity – Surface resistance and air cavities – Air to air transmittance (U value) – Time lag and decrement – Types of envelopes with focus on glass.

Design of Solar Shading Devices

Movement of sun – Locating the position of sun – Sun path diagram – Overhead period–Solar shading– Shadow angles – Design of appropriate shading devices

Air Movement due to Natural and Built Forms

The wind – The effects of topography on wind patterns – Air currents around the building – Air movement through the buildings – The use of fans – Thermally induced air currents – Stack effect, Venturi effect – Use of courtyard.

Climate and Design of Buildings

Design strategies in warm humid climates, hot humid climates, hot and dry climates and cold climates – Climate responsive design exercises

Required Readings:

1. O.H. Koenigsberger and Others, 'Manual of Tropical Housing and Building- Climatic Design', Orient Longman, Madras, India, 2010
2. Bureau of Indian Standards IS 3792, 'Hand book on Functional Requirements of Buildings other than Industrial Buildings - Part I – IV', New Delhi,1987

Reference books:

1. Narashimhan -An Introduction to Building Physics, Professional Pub Service, 2001.
2. M.Evans - Housing Climate & Comfort – Architectural Press, London, 1980.
3. Givoni, Man, Climate and Architecture, Applied Science, Banking Essex, 1992.
4. Donald Watson and Kenneth Labs; Climatic Design – McGraw Hill Book Company – New York – 1983

21AR2138 - ARCHITECTURAL DESIGN STUDIO – III

Course Code	21AR2138
L-ST-P-S	0-8-0-0
Credits	12
Contact Hours	8
Prerequisites	21AR1234

Table 0-Course Outcomes for 21AR2138

CO	Course Outcome	PO/PSO	BTL
CO 1	To understand and analyze the use, the spaces and the concepts of residential activities.	PO2,PO4, PO10,PSO1	2
CO 2	To design a Small scale residential project	PO2,PSO1	3
CO 3	To understand and analyze the spaces, connectivity and the standards of Institution buildings. To design an institution oriented building	PO2,PO10, PSO2	3
CO 4	Time Problem design with minimal design agenda	PO2,PO10, PSO2	3

This studio based course synthesizes the knowledge gained from other courses and is central to the learning and practice of architecture. This course will engage in using conventional methods and linear processes of design to more exploratory nonlinear methods. The scale and complexity will increase progressively from lower semesters to senior semesters.

Syllabus:

Scale and Complexity:

Project involving organization of multiples of single unit space with predominantly horizontal movement as well as single use public buildings of small scale; passive energy

Areas of concern/ focus:

- form-space relationships
- spatial organization
- behavioral aspects especially those relating to children
- site planning aspects
- appropriate materials and construction

Suggestive Typologies/ projects:

Residential buildings, institutional buildings: nursery or primary schools, schools for children with specific disabilities, primary health center, banks, neighborhood market, neighborhood library, Gate complexes including security Kiosk and entry / exit gates, restaurant, museum/health club and small resort.

Required Readings:

1. Joseph De Chiara, Michael J Crosbie, “Time Saver Standards for Building Types”, McGraw Hill Professional, 2001.
2. Julius Panero, Martin Zelnik, “Human Dimension and Interior Space”, Whitney Library of Design, 1975
3. Joseph De Chiara, Julius Panero, Martin Zelnik, “Time Saver Standards for Interior Design and Space Planning”, McGraw Hill, 2001.
4. Ernst Neuferts, “Architects Data,” Blackwell, 2002.
5. Ramsey et al, “Architectural Graphic Standards”, Wiley, 2000.

Reference books:

1. Richard P.Dober, “Campus Planning” - Society for College and University Planning, 1996.
2. Achyut Kanvinde, “Campus design in India”, American year Book, 1969
4. Kevin Lynch, “Site planning”, MIT Press, Cambridge, 1967
5. Sam F. Miller, “Design Process: A Primer for Architectural and Interior Design”, Van Nostrand Reinhold, 1995.

21AR2136 COMPUTER STUDIO – I

Course Code	21AR2136
L-ST-P-S	0-0-4-0
Credits	2
Contact Hours	4
Prerequisites	Nil

Course Outcomes for 21AR2136

CO	Course Outcome	PO/PSO	BTL
CO 1	To understand the basics of computer system and their supporting technologies.	PO1, PO2	2
CO 2	To create documentation reports, analysis reports; and audio visual presentations.	PO1, PO2	2
CO 3	To reciprocate the tools of 2D visualization to create architectural drawings.	PO1, PO2	2
CO 4	To create layouts, plot/print to scale drawings, design and edit 2D graphic images.	PO1, PO2	2

Computer operation principles and image editing through a graphical Composition; Computer aided 2D drafting.

Syllabus:

Technology of small computer system, computer terminology operation principles of P.C, introduction to application software, and graphic system, and use of printers, scanner, plotter, File management, etc. Understanding Bitmap images and Vector Graphics, Image size and Resolution. Basic Tools for Editing and Creating Graphics.

Introduction to tools which help them create audio – visual presentations and architectural data analysis such as word processing package, spread sheets, multimedia presentations. Detail application of tools which enhance presentation and documentation skills – formatting text, inserting tables, pictures, creating charts, creating formulas, slide animations etc.

Understanding the drawing unit's settings, templates, coordinate system, limits, drawing tools, drawing objects, object editing, text, and dimensioning. Layers, transparent overlays, hatching utilities, line type, line weight and colour. Multiline, Polyline, etc. Styles, blocks and symbol library.

Introduction to basics of 3D settings and its interface. Layout settings, scales, view ports, plot/print settings. Introduction to software's and system requirements, preferences, terminology, and editing tools. Selections, choosing foreground and background colour, visual editing of architectural plans, editing of images for presentations etc.

Required Readings:

1. Deke McClelland, "Photoshop 7 Bible Professional Edition", Wiley John & Son INC, New York, 2000.
2. Aouad, "Computer Aided Design guide for Architecture, Engineering and construction", Spon process, 2012.
3. Adobe Creative Team – Adobe Photoshop CS (Class Workbook).

Reference books:

1. Ralph Grabowski, "The Illustrated AutoCAD 2002 Quick Reference", 1st edition, Cengage Learning, 2001.
2. Shamtikoo, "AutoCAD 2000: A Problem-Solving Approach", Delmar Cengage, 1999.
3. Fiorello. J. A., "CAD for Interiors beyond the basics", Wiley publications, 2011.

21UC1203 DESIGN THINKING AND INNOVATION

Course Code	21UC1203
L-ST-P-S	0-0-4-0
Credits	2
Contact Hours	4
Prerequisites	Nil

Course Outcomes for 21UC1203

CO#	Course Outcome	PO/PSO	BTL
CO1	Understand the importance of Design thinking process for contextualized problems	PO6, PO7	2
CO2	Analyze, define, and ideate for solutions	PO6, PO7	4
CO3	Develop and test the prototype made	PO6, PO7	3
CO4	Explore the fundamentals of entrepreneurship skills for transforming the challenge into an opportunity	PO6, PO7	2

Syllabus:

Design thinking an overview, Design Thinking for Contextualized Problem-Solving: Problem Selection/Definition Need for Cultural Relevance (Time, Space, and Environment).

Empathy: definition, Empathic research: framing interview questions, focus groups, procedure to conduct skilled interviews, Insights from Empathetic research, define: Developing user personas, nuggets from insights, laying customer journey maps, POV statements and POV questions to define user needs. Ideate: Techniques to generate, shortlist and evaluate Ideas: Rapid Estimation form and Solution concept form.

Prototyping and Testing: Products vs. Services, Rough Prototypes, Testing Techniques, User Experience High-Fidelity Prototypes

Entrepreneurial Innovation: Innovation Management, Business Model Basics, Financial Estimation, Pitch Decks, IPR Considerations.

Reference books:

1. Michael Lewrick, Patrick Link & Larry Leifer: The Design Thinking *Play Book*. Wiley Press:2018

21AR2210 – DESIGN OF STRUCTURES - I

Course Code	21AR2210
L-ST-P-S	3-0-0-0
Credits	3
Contact Hours	3
Prerequisites	Nil

Course Outcomes of 21AR2210

CO	Course Outcome	PO/PSO	BTL
CO1	Developing the design of structural components with timber.	PO1,PO3	3
CO2	Developing the design of steel connections using bolted and welded connections	PO1,PO3	3
CO3	Developing the design of steel tension members	PO1,PO3	3
CO4	Developing the design of steel compression members	PO1,PO3	3

Syllabus:

Timber Structures

Design of Beams and Columns Grading of Timber-Permissible Stresses-Design of timber beams-Madras terrace roof -Design of timber columns.

Steel Structures - Bolted and Welded Joints

Assumptions – failure of Bolted joints – Strength and Efficiency of Bolted Joints – Types – Design of Bolted Joints for Axially Loaded Members (Excluding eccentric connections) Types of welded joints – Advantages and disadvantages – Design of Fillet welds (Excluding eccentric connections). (Exercises)

Tension Members

Introduction – Net sectional area – permissible stresses. Design of Axially Loaded Tension member – Lug angle – code provision – tension splice.

Compression Members

Introduction – various sections – built up section – Design of columns (excluding Lacing, Battening and other connections.)

Required reading:

1. M.R. Shiyekar, "Limit State Design in Structural Steel", PHI Learning Private Limited, 2010.
2. N. Subramanian, "Design of Steel Structures", Oxford Higher Education, 2008.

References:

1. S.K. Duggal, "Limit State Design of Steel Structures", McGraw Hill Education, Private Limited, 2010.
2. Dr. V. L. Shah, Prof. Veena Gore, "Structures Publications", Pune, 2012.
3. S.S. Bhavikatti, "Design of Steel Structures" by Limit State Method as per IS800-2007, I.K. International Publishing House Pvt, Ltd, 2012.

21AR2211 BUILDING SERVICES - I

Course Code	21AR2211
L-ST-P-S	3-0-0-0
Credits	3
Contact Hours	3
Prerequisites	Nil

Course Outcomes of 21AR2211

CO	Course Outcome	PO/PSO	BTL
CO1	To know about the water treatment, distribution and waste water treatment methods & disposal.	PO7	1
CO2	Understanding the building sanitation method and different types of plumbing systems	PO8	2
CO3	To understand the layouts and sanitary layouts of a residence.	PO8	2
CO4	To understand the use and installation of various plumbing fixtures and to know the sewerage systems for sanitary conveyance.	PO8, PSO2	2

Study of and design and detailing for water supply, drainage, sewage disposal, garbage disposal, electrification, illumination, air conditioning, fire hazard protection, acoustical treatment, rainwater harvesting, etc.

Syllabus:**Water quality, Treatments and Distribution:**

Sources of water supply – Water Quality - Water requirements for all type of residential, commercial, Industrial buildings and for town – Water treatment methods – Screening, aeration, Sedimentation, Filtration, Disinfection, Softening, conveyance of water – Distribution of water – Choice of pipe materials - Types of fixtures and fittings – System of plumbing in all type of buildings.

Wastewater, Treatments and Disposal Wastewater:

Sewage disposal, primary treatment. Secondary treatment, biological treatment and Modern types of Sewage Treatment Plants - Sewer line fixtures and traps, Manholes, Septic tank. Basic principles of storm water drainage – drainpipes and type of pipe – storm water gutter – rainwater harvesting principles – storage sumps.

Building Sanitation:

Principles of sanitation, collection, and disposal of various kinds of refuse from buildings. Methods of carrying refuse, systems of refuse disposal, their principles. Plumbing definitions and related terms,

plumbing systems (one pipe, two pipe etc), House drainage system, Drainage of sub-soil water. Inspection chambers, Manholes, Sub-drains, culverts, ditches, and gutters, drop inlets and catch basins, roads and pavements, storm overflow/regulators.

Plumbing and Sanitary Appliances:

Basic principles of Plumbing, need, scope, terminology. Specifications and installation of sanitary fittings like wash basins, water closets, urinals, bidets, sinks, etc in buildings. Uses of gate valve, float valve, flap valve, ball valve, flush valve, etc, different types of taps, faucets, stop cocks, bib cocks, 'P', 'Q', 'S', floor/bottle traps used in buildings. Design considerations on drainage scheme. Planning of bathrooms, lavatory blocks and kitchen in domestic and multi- storied buildings. Preparation of plumbing drawings, symbols commonly used in these drawings.

Sewerage:

Indian standards and byelaws for sanitary conveyance. Disposal of sewage from isolated building, Gradients used in laying of drains and sewers for various sizes. Septic tank details & capacity calculation. Sewage treatment. Use of pumps in sanitation, biogas, soil disposal without water carriage, rural sanitation. Layout design and details of water supply distribution system in a Campus or Small residential Neighborhood - Layout design and details of sewage and drainage system for different types of buildings - water supply pipelines, storm water drainage pipelines and Rainwater Harvesting for small residential Neighborhood.

Required Reading :

1. S.C.Rangwala, "Water supply and sanitary engineering", Chartar publishing house, Anand, 1989. (N.A.)
2. Punmia B.C., "Waste Water Engineering", Laxmi Publications, 2009.
3. Arceivala S.J., "Waste Water Treatment for Pollution Control", Tata McGraw Hill, 2008. Birdie, B. S. (1996). Water supply and Sanitary Engineering. DhanpatRai and Sons.

Reference Books:

1. Punmia, B. C., Jain, A. K. and Jain, A. K. (1995). Water Supply Engineering. New Delhi: Laxmi Publications.
2. P.N. Modi, Sewage Treatment Disposal and Waste Water Engineering, Standard Book House.
3. National Building Code - 2005.
4. A. Kamala & DL KanthRao, Environmental Engineering, Tata McGraw – Hill publishing company Limited.

21AR2240 BUILDING CONSTRUCTION-II

Course Code	21AR2240
L-ST-P-S	0-4-0-0
Credits	6
Contact Hours	4
Prerequisites	Nil

Course Outcomes for 21AR2240

CO	Course Outcome	PO/PSO	BTL
CO1	To understand the construction of doors and windows in accordance with the type of usage	PO1, PO3 PSO2	2
CO2	To understand the uses of wooden trusses and staircases in construction industry/practice	PO1, PO3 PSO2	2
CO3	To understand the installation of paneling, soundproof and light weight partitions	PO3, PO4 PS02	2
CO4	To understand the techniques of bamboo constructions and the construction techniques of wall and kitchen cabinets	PO3, PO5 PO9, PSO2	2

Traditional and conventional knowledge systems that enable construction of a complete building; various structural systems and methods of construction and detailing of buildings of medium complexity using natural and manmade materials including foundation, walls, roofs, staircase, joinery and finishes; Technology that informs the construction of contemporary buildings using various structural systems and materials. The course will combine lecture and studio exercises whose results will be in the form drawings and models, culminating in a studio which will translate an architectural design into working drawings which are good for construction either in manual/ digital mode.

Syllabus:**Timber-Joinery:CO1**

Methods of construction using natural timber in joinery works including methods of fixing and options for finishing - Windows (paneled, louvered, glazed and sliding windows) - Doors (paneled, glazed, sliding, sliding/folding, louvered and pivoted) – Ventilators (top hung, bottom hung, pivoted, louvered, and glazed.

Floors Trusses and Staircases: CO2

Methods of construction using natural timber in various structural components of the building such as floors, walls, and roof trusses - Exercises involving the above through case studies - Types of timber staircases. Methods of construction of timber staircases- basic principles and design details including detailing of handrail and baluster- Exercises involving the above through drawings.

Partitions and Paneling: CO3

Methods of construction using man-made timber products such as ply woods, block boards, MDF, etc., in fixed partitions, sliding/folding partitions, wall paneling. - Exercises of the above through drawings and case studies.

Bamboo and Other Materials: CO4

Design and Construction Techniques using bamboo for building components for small scale buildings like snack bar, tree house including detailing of doors and windows, arches, barrel walls, weave structures and understanding of the same through case studies Cane, gate, coir, coconut - Growth, Form, Shape, Roofing materials – Thatch, grass, Bamboo, reeds – Basics – Case studies and applications.

Furniture and Fitments

Showcase and Shelf: TV Shelf, showcase and room dividers, dressing wardrobe. Cupboard & cabinet: kitchen cupboards and wall cabinets

Reference Books:

1. American Institute of Timber Construction (AITC), "Timber Construction Manual", Wiley Publishers, 2004
2. Francis D.K Ching "Building Construction" illustrated, John Willey & Sons, 2008.
3. Barry, "Construction of Buildings", Volume 1&2, Blackwell Publishing Ltd., Oxford, 2005.
4. Wills H Wagner, Howard Bud, "Modern Carpentry", Good Heart – Wilcox publishers, Portland, 2003.

21AR2212 SITE ANALYSIS AND PLANNING

Course code	21AR2212
L-ST-P-S	2-0-0-0
Credits	2
Contact Hours	2
Prerequisites	Nil

Table 0- Course Outcomes for 21AR2212

CO	Course Outcome	PO/PSO	BTL
CO1	To make students understand about the basics of site, it's measuring and drawing methodologies.	PO9	2
CO2	To explain the importance of analysis of a site required in architectural design and building construction.	PO3	2
CO3	To make students understand the context of the site with respect to the surrounding land use typology.	PO3	2
CO4	To discuss about the site planning techniques and layout principles to be followed prior to site designing.	PO4	2

Site and its content in architectural creations; Influencing factors which governs the siting of a building or group of buildings in a given site; Topography analysis; Scientific techniques of site analysis- case studies; Methodology of preparing a site analysis diagram and mapping; Codes and building regulations; Site utilities and Infrastructure planning. Integration of Renewable Energy systems as per ECBC.

Syllabus:**Introduction**

Definition of plot, site, land and region, units of measurements. Introduction to survey, methods of surveying, where they are used, Surveying Instruments and their application. Need for surveying. Measuring and drawing out a site plan from the measurements. Computation of area by geometrical figures and other methods. Drawing marking out plan, layout plan and centerline plan. Exercises on the above.

Site Analysis

Importance of site analysis; Onsite and off-site factors; Analysis of natural, cultural and aesthetic factors – topography, hydrology, soils, vegetation, climate, surface drainage, accessibility, size and shape, infrastructures available - sources of water supply and means of disposal system, visual aspects; Preparation of site analysis diagram. Study of microclimate: - vegetation, landforms and water as modifiers of microclimate. Study of land form; - contours, slope analysis, grading process, grading criteria, functional and aesthetic considerations – Case studies and exercises on the above.

Site Context

Context of the site. Introduction to existing master plans land use for cities, development control Rules. Preparation of maps of matrix analysis & composite analysis. Site selection criteria for housing development, commercial and institutional projects - Case studies.

Site Planning Principles

Site Design Elements, Analyzing the site and context factors categorically, Organization of elements in consideration with pedestrian and vehicular circulation, Zoning of the site, Connecting Spaces. Open vs Built, Grey vs Grey spaces, Massing and arrangement of activities, types of roads, hierarchy of roads, networks, road widths and parking, regulations. Turning radii & street intersections, Land scape and other site services. Examples of few well-planned projects.

Required reading:

1. Kevin Lynch, "Site planning", MIT Press, Cambridge, MA, 1984.
2. Edward. T. Q., "Site Analysis", Architectural Media, 1983.

References:

1. B.C. Punmia, Ashok K. Jain, Ashok Kr. Jain, Arun Kr. Jain, "Surveying", Vol.I, Firewall Media, 2005.
2. P.B.Shahani, "Text of surveying", Vol. I, Oxford and IBH Publishing Co, 1980.
3. Joseph De.Chiarra and Lee Coppleman, "Urban Planning Design Criteria", Van Nostrand Reinhold Co., 1982
4. Storm Steven, "Site engineering for landscape Architects", John wiley & Sons Inc, 2004.
5. Second Master Plan – Development Regulations – CMDA, 2008.

21AR2241 ARCHITECTURAL DESIGN STUDIO – IV

Course Code	21AR2241
L-ST-P-S	0-8-0-0
Credits	12
Contact Hours	8
Prerequisites	21AR2138

Course Outcomes for 21AR2241

CO	Course Outcome	PO/PSO	BTL
CO1	To memorize anthropometry, circulation patterns, standards various facilities to be provided.	PO2, PO4, PO10, PSO1	2
CO2	To create and design spatial planning, circulation, and functionally good community oriented open spaces – Project 1	PO2, PO4, PO9	6
CO3	To Create and design functional and activity-oriented community spaces- Project 2	PO2, PO4, PO9, PO10	6
CO4	To analyze the architecture, rural planning, infrastructure and settlement planning of a village (rural settlement) . To document the observations and compile the analysis for presentation – Project 3	PO2, PO4, PO9, PO10, PSO2	5

This studio based course synthesizes the knowledge gained from other courses and is central to the learning and practice of architecture. This course will engage in using conventional methods and linear processes of design to more exploratory nonlinear methods. The scale and complexity will increase progressively from lower semesters to senior semesters.

Syllabus:**Objectives:**

Creating a holistic understanding of the socio-cultural, geographic and economic aspects that shape the rural environment as well as to expose the students towards the design of simple community oriented buildings. A comprehensive study of a rural settlement through field visits and introductory lectures that is an exemplar of collective design evolved organically over a period of time. The students are exposed to conducting various surveys covering, physical, visual characteristics and demographic aspects which helps in understanding vernacular / traditional architecture involving local materials and construction techniques.

To emphasis on the importance of designing built form and open spaces that meet the aspirations of the community. To enable the presentation of concepts through 2D and 3D presentation including sketches and model.

Scale and Complexity:

Projects involving public and community-oriented buildings - multi room, single use, small span, multiple storied, horizontal and vertical movement; active cum passive energy; comprehensive analysis of rural settlement in a hierarchical manner.

Area of concern/ focus:

- Rural settlements and architecture
- Community oriented design
- Simple public buildings (not more than Ground+ 2 floors)

Suggestive Typologies/ projects:

Rural projects that involve studies and design at settlement and building level- noon meal centre, market, primary health Centre, department store, higher secondary school, campus students centre

Required Readings:

1. Joseph De Chiara, Michael J Crosbie, "Time Saver Standards for Building Types", McGraw Hill Professional, 2001.
2. Julius Panero, Martin Zelnik, "Human Dimension and Interior Space", Whitney Library of Design, 1975
3. Joseph De Chiara, Julius Panero, Martin Zelnik, "Time Saver Standards for Interior Design and Space Planning", McGraw Hill, 2001.
4. Ernst Neuferts, "Architects Data," Blackwell, 2002.
5. Ramsey et al, "Architectural Graphic Standards", Wiley, 2000.

Reference books:

1. Richard P. Dober, "Campus Planning" - Society for College and University Planning, 1996.
2. Achyut Kanvinde, "Campus design in India", American year Book, 1969
3. Kevin Lynch, "Site planning", MIT Press, Cambridge, 1967
4. Sam F. Miller, "Design Process: A Primer for Architectural and Interior Design", Van Nostrand Reinhold, 1995.

21AR2213 CONTEMPORARY INDIAN ARCHITECTURE

Course Code	21AR2213
L-ST-P-S	2-0-0-0
Credits	2
Contact Hours	2
Prerequisites	Nil

Course Outcomes of 21AR2213

CO	Course Outcome	PO/PSO	BTL
CO1	Understand the Evolution of Dwellings as base of Traditional and Vernacular styles of India	PO1, PO3	2
CO2	Understand the Architecture and Planning of various Cities during Medieval Age	PO1, PO5	2
CO3	Understand the Culture and Built Forms in Pre – Independence (Colonial Rule) and Post-Independence of India	PO3, PO4	2
CO4	Understand the Theories of current Architect practices and their applicability in meeting present day Needs	PO3, PO5	2

Pre-Independence Architecture, Post-independence architecture, Contemporary Indian Architectural Practices.

Syllabus:**Identified Indian Architecture**

Ancient Scriptures about Indian construction techniques. Influence of Culture, Tradition on Indian Architecture. Vernacular architecture of Various Zones of identified India, Climatic factors influence on construction style of Vernacular buildings. Traditional Buildings design in different regions of India. Indus Valley civilization and Vedic villages & their Architectural styles. Building Material usage change since medieval to known history of India. Indian Public & Residential Buildings designing.

Influenced Indian Architecture

Transformation of Indian traditional architecture due to influence of various Indian occupied rulers like Islamic, Mughal, Deccan kings, Vijayanagar empire, etc.,
 Lessons from the public architecture (place designing like Market places, palaces, tombs, forts, Public gathering places). Influence of Colonial architecture in transforming the building design and its elements.

Post Independent & Modern Architecture in India

Indo-Saracenic architecture. Modern architecture influence on Indian Architecture near to post-Independence times. New Delhi, Kolkata, Chennai, Princely states Architecture of India (colonial architecture). International trends like Brutalist architecture, Cubism, etc., influence on Indian architecture.

Contributions of BV Doshi, Raj Rewal, Sirish Beri, Nari Gandhi, Achyut Kanvinde, Anantha Raje, Charles Correa, Laurie Baker, etc., to Indian Architecture

Contemporary Indian Architecture

Contemporary theories in Indian Architects like Minimalism, Expressive, Exposed Brick, Earthen Architecture, Sustainable Architecture, etc. The concepts of contemporary architects like Chitra Viswanath, Brinda Somayya, Sanjay Mohe, Jaisim, Bimal Patel, Sirish Beri, etc.,

Redefining Traditional and Indian Vernacular styles. Change of Role of Courtyard, opening in the buildings, Natural lighting, Neighbourhood & High-rise Buildings designing. Contemporary public buildings study.

Required reading:

1. Diane Ghirardo , "Architecture after Modernism", Thames & Hudson, London, 1990.
2. Miki Desai et. al., "Architecture and independence", Oxford University Press, 2000.
3. Christopher Alexander, "Pattern Language", Oxford University Press, Oxford, 1977.
4. Robert Venturi , "Complexity and Contradiction in Architecture", 1977.

References:

1. Jane Jacobs, "Deaths and Life of Great American Cities", Vintage, 2003.
2. James Steele, "Hassan Fathy", Academy Editions, 1985.
3. Kenneth Frampton ed, "Charles Correa", The Perennial Press, 1998.
4. William Jr. Curtis, "Balkrishna Doshi, An Architecture for India", Rizzoli, 1

21AR2239 - COMPUTER STUDIO - II

Course code	21AR2239
L-ST-P-S	0-0-4-0
Credits	2
Contact Hours	4
Prerequisites	Nil

Course Outcomes for 21AR2239

CO	Course Outcome	PO/PSO	BTL
CO 1	To understand interface, workspace, and utilization of tools of 3D modeling software apply the required tools and components in building a 3D model.	PO1, PO2	2
CO 2	To create documentation reports, analysis reports; and audio visual presentations.	PO1, PO2	2
CO 3	To understand, visualize the space and apply the tools of BIM software, identify the need of tools of BIM software.	PO1, PO2	2
CO 4	To create a detailed 3D model by working in collaboration by application of advanced tools	PO1, PO2	2

Computer operation principles and image editing through a graphical Composition; Computer aided 2D drafting and 3D Modelling through simple exercises; Rendering of a building to create a photo realistic image.

Syllabus:

Explain the uses of BIM (building information Modeling), touching upon the Concepts used in 2D Drawing and extending to 3D Modeling, Basic awareness on Interface, Setting up workspace.

3D modeling using Walls – Windows – Doors– floors – Slabs – Staircase – Railing – Furniture. Basic editing of components. Using Cross Sections Tool. Exporting 3D Model to Architectural 2D- Drawings (Plans – Elevations – Sections – Details.).

Introduction – Applying materials – Creating and Editing materials – Setting up Camera – Rendering settings – Enhancing final output using Image editing software. Curtain Walls – Columns – beams – Massing – working in collaboration

Adding Architectural Elements – Creating components – Rendering in Cloud.

Required Readings:

1. Ryan Duell, Tobias Hathorn , Tessa ReistHathorn, “Autodesk Revit Architecture 2016 Essentials: Autodesk Official Press”, Sybex, First Edition, 2016.
2. Eric Wing, “Autodesk Revit 2017 for Architecture No Experience Required”, Sybex, First Edition, 2016.

Reference books:

1. Marcus Kim, Lance Kirby, Eddy Krygiel, “Mastering Autodesk Revit 2017 for Architecture”, Wiley India, 2016.
2. Prof Sham Tickoo Purdue Univ, “Exploring Autodesk Revit 2017 for Architecture”, CADCIM Technologies, 13th Edition, 2016.

21AR3114 DESIGN OF STRUCTURES - II

Course Code	21AR3114
L-ST-P-S	3-0-0-0
Credits	3
Contact Hours	3
Prerequisites	Nil

Course Outcomes of 21AR3114

CO	Course Outcome	PO/PSO	BTL
CO1	Understanding the concept of limit state design of R.C structures	PO7, PO9	2
CO2	Developing the design of reinforced concrete beams	PO6, PO9	3
CO3	Developing the design of reinforced concrete columns	PO8, PO9	3
CO4	Developing the design of reinforced concrete slabs	PO9	3

Syllabus:

Introduction to limit state design

Concepts of limit state design, Characteristic loads, Characteristic strength, Partial loads and Material Safety factors, Representative stress, Strain curves, Assumptions in limit state design, Stress block parameters, Limiting moment of resistance. Concept of bond, anchorage and development length, I.S Code provisions. Design examples in simply supported beams.

Design of R.C Beams

Singly and doubly reinforced beams: Limit state analysis and design of singly reinforced, doubly reinforced beams. Flanged sections: Limit state design of T and L beam sections.

Design of R.C compression members

Introduction to columns: Design of Short and long columns; Uniaxial loads, Uniaxial bending and bi-axial bending - I.S code provisions.

Design of R.C slabs

Introduction to slabs, types of slabs Design of one-way slabs, two way slabs, Continuous slabs using IS coefficients.

Required reading:

1. B.C. Punmia, "Reinforced Concrete Structures", Vol.1&2, Laxmi Publications, Delhi, 2004.
2. IS 456, "Indian Standard, Plain and Reinforced Concrete", Code of Practice, Bureau of Indian Standards, 2000.
3. SP-16, Design Aids for Reinforced Concrete to IS 456 NBC of India, 1983
4. IS 1905, Code of Practice for Structural Safety of Buildings, 1987.
5. Ashok K. Jain, "Reinforced Concrete: Limit State Design", Nemchand, Bros Roorkee 1983.
6. S.N. Sinha, "Reinforced Concrete Design", Tata McGraw Hill Publishing, New Delhi, 1998.
7. Shah, "Reinforced Concrete", Vol. 1 and 2, Charotar Publishing House, Anand, 1998.

References:

1. Dass, M. M. *Structural Analysis*. New Delhi : PHI Learning.
2. Jindal, R. L. *Elementary Theory of Structures*.
2. Junnarkar, S. B. (1997). *Mechanics of Structures*. Vol. II. 22nd Ed. Charotar Publishers.
3. Punmia, B. C., Jain, A. K. and Jain, A. K. (1992). *Theory of Structures*. 9th Ed. New Delhi.
4. Ramamrutham, S. *Theory of Structures*. New Delhi : Tata McGraw Hill Education.
- Reddy, C. S. (1999). *Basic Structural Analysis*. New Delhi : Tata McGraw-Hill Education

21AR3115 BUILDING SERVICES- II

Course code	21AR3115
L-ST-P-S	3-0-0-0
Credits	3
Contact Hours	3
Prerequisites	Nil

Course Outcomes for 21AR3115

CO	Course Outcome	PO/PSO	BTL
CO1	Study of electricity, installations, wiring and principles of distribution and safety	PO1, PO4	2
CO2	Know the application artificial illumination, and lighting design for various spaces	PO6, PO10	2
CO3	Knowledge of air conditioning and ventilation principles evaluate electrical layouts	PO3, PO9	2
CO4	Understanding properties of sound and Architectural acoustics, and analyzing acoustic concepts and design, learning how to create acoustic and lighting designs to different building types – Studio work	PO3, PO9	2

Study of and design and detailing for electrification, illumination, air conditioning, fire hazard protection, acoustical treatment, rainwater harvesting, etc. in buildings and building premises, disaster management systems, intelligent energy conservation systems, electronic security and surveillance systems for buildings, etc. .; compliance requirements w.r.t. National Building Code and Energy Conservation Building Code.

Syllabus:**Electrical Services :**

Electrical systems – Basic of electricity– single/Three phase supply – protective devices in electrical installation – Earthing for safety – Types of earthing – ISI Specifications. Electrical installations in buildings – Types of wires, Wiring systems and their choice – planning electrical wiring for building – Main and distribution boards –Principles of illumination.

Illumination and Lighting Design :

Visual tasks – Factors affecting visual tasks – Modern theory of light and colour – synthesis of light – Additive and subtractive synthesis of colour – Luminous flux – Candle – solid angle illumination – utilization factor – Depreciation factor –MSCP – MHCP –Laws of illumination. Classification of lighting –Artificial light sources – Spectral energy distribution – Luminous efficiency – Colour temperature – Colour rendering. Design of modern lighting – Lighting for stores, offices, schools, hospitals and house lighting. Elementary idea of special features required and minimum level of illumination required for physically handicapped and elderly in building types.

Electrical Layout of Simple Buildings:

Electrical layout of a simple residential, school and commercial building.

Heat Ventilation and Air Conditioning (HVAC):

Behaviour of heat propagation, thermal insulating materials and their co-efficient of thermal conductivity. General methods of thermal insulation: Thermal insulation of roofs, exposed walls. Ventilation: Definition and necessity, system of ventilation. Principles of air conditioning Air cooling, Different systems of ducting and distribution, Essentials of air-conditioning system.

Fundamentals of architectural acoustics Fundamentals:

Sound waves, frequency, amplitude, decibels, logarithms, measurement versus perception, addition and subtraction of decibels. NC curves. Material property: Absorption, reflection, scattering, diffusion, transmission, absorption co-efficient, NRC, sound transmission class (STC), impact insulation class (IIC).

Acoustics of Architectural Spaces :

Reverberation time, sound in enclosed space, basic room acoustics concepts and design, design of auditorium, conference hall, recording studio and classrooms. Environmental noise and its control.

Required Readings:

1. Barron. M. (2009). Auditorium acoustics and architectural design. 2nd Ed. Taylor & Francis.
2. Concept nine, R. (2008). The Architecture of Light: Architectural Lighting Design Concepts and Techniques. Sage Publications.
3. Cox, T. J. and D'Antonio, P. (2009). Acoustic Absorbers and Diffusers. 2nd Ed. Taylor & Francis
4. Cuttle, C. Lighting by Design. 2nd Ed. Architectural Press.
5. Eagan, D. M. (2002). Architectural Lighting, 2nd Ed. McGraw-Hill.
6. Eagan, D. M. (2002). Concepts in Architectural Acoustics.
7. Guzowski, M. (1999). Day lighting for Sustainable Design. McGraw Hill.
8. Harold, B. M. and Good friend, L. Acoustics for Architects. Reinhold.

References:

1. Heschong, L. (1976). Thermal Delight in Architecture. Cambridge: MIT Press.
2. Hopkins. C. (2008). Sound Insulation: Theory into Practice. 1st Ed. Butterworth Heinemann.
3. Randall, W. (2008). Residential Lighting: A Practical Guide to Beautiful and Sustainable Design. 2nd Ed. Wiley.
4. Rea, M. (2000). The Lighting Handbook. 9th Ed. Illuminating Engineering Society of North America.
5. Reinhart, C. (2014). Day lighting Handbook.
6. Smith, B. J., Peters, R. J. and Owen, S. (1982). Acoustics and Noise Control. New York: Longman.
7. Steffy, G. (2000). Time-Saver Standards for Architectural Lighting. McGraw-Hill.
8. Szokolay, S. V. (2008). Introduction to architectural science. Taylor & Francis.
9. Vigran, T. E. (2008). Building Acoustics. 1st Ed. Taylor & Francis.

21AR3143 BUILDING CONSTRUCTION- III

Course code	21AR3143
L-ST-P-S	0-4-0-0
Credits	6
Contact Hours	4
Prerequisites	Nil

Course Outcomes for 21AR3143

CO	Course Outcome	PO/PSO	BTL
CO1	To understand the construction of doors and windows in accordance with the type of usage	PO1, PO3, PSO2	2
CO2	To understand the use R.C.C in Structural and nonstructural building components in construction industry/practice.	PO1, PO5, PS02	2
CO3	Clear understanding of paneling, soundproof and light weight partitions	PO3, PO4, PS02	2
CO4	Students should also understand the techniques of water proofing and damp proofing.	PO3, PO5, PS02	2

This is an Industry based course to provide the students with the latest & recent trends in the use of glass in architecture. The right selection and usage of glass for appropriate purposes is vital in the design of buildings. Therefore modern concepts on Glass Architecture, Role of Glass in Green design and concepts on considerations for improving the building performance using glass are included.

To understand the design potential of steel as a material in construction and the inherent structural benefits of the material. To inform the various components of steel as structural and aesthetic design element thru various case studies. To familiarize the best practices of steel as a construction material.

Syllabus:**Glass in Buildings:CO1**

Glass: Classification of glass, types of glass, physical properties and uses of glass, special varieties of glass and Architectural glass. Construction methods using glass for single story glass structures like pavilions, green houses, staircases. Construction methods using glass for single/multi-story buildings including curtain walling details – Exercises of the above through case studies and drawings.

Doors Windows and Ventilators: CO2

Types of doors based on the make (battened, ledged, braced, flush, paneled, framed and etc.) usage (pivoted, single leaf, double leaf, revolving, swing, rolling shutter, safety doors, collapsible, etc.),

hardware fixtures, joinery, door-fixing details, and types of materials used in doors (wood, metal, glass, aluminum, CPVC & PVC). Types of windows based on the make (sliding, pivot, casement, louvered, fixed, bay window, etc.) and material (wood, steel, glass and aluminum) hardware fixtures, joinery, window fixing details.

Steel Structures: CO3

Introduction to Steel structures: Steel structural shapes, Introduction to IS 800; Rivets, Design of steel structural members, tension, compression and bending Members. Concepts of connections, design of riveted and welded connections like beam end connections. Design of Steel Beams and Columns, Concepts of plate girders. Design of laterally supported and unsupported beams. Beams subjected to bi- axial bending, built-up beams - design concepts with flanged plates. Theory of columns, slenderness ratio, design of axially loaded steel columns, design of built- up lacing and battened columns.

Partitions and False Ceiling:CO4

Introduction, requirement of partition, types of partitions (viz. Brick, clay, concrete, glass, timber, gypsum etc.) Various types of panelling (glazed, wooden etc.), details for panelling, sound proof and lightweight partitions.

Water Proofing and Damp Proofing Causes and defects of dampness, methods adopted for waterproofing and damp proofing at different levels of a building, admixtures and different materials (rigid, flexible) used in the process. Damp proofing: Hot applied and cold applied – Emulsified asphalt, Bentonite clay. Butyl rubber, silicones, Vinyl's, Epoxy resins and metallic water proofing materials, their properties and uses. Waterproofing: water proofing membranes such as rag, asbestos, glass felt, plastic and synthetic rubber-vinyl, butyl rubber, neoprene, polyvinyl chlnide – prefabricated membranes sheet lead, asphalt their properties and uses. Application: application of the above in basement floor, swimming pool, and terraces.

Reference Books:

1. American Institute of Timber Construction (AITC), "Timber Construction Manual", Wiley Publishers, 2004.
2. Francis D.K Ching "Building Construction" illustrated, John Willey & Sons, 2008.
3. Wills H Wagner, Howard Bud, "Modern Carpentry", Good Heart – Wilcox Publishers, Portland, 2003.
4. Barry, "Construction of Buildings", Volume 1&2, Blackwell Publishing Ltd., Oxford 2005.

21AR3144 ARCHITECTURAL DESIGN STUDIO – V

Course Code	21AR3144
L-ST-P-S	0-8-0-0
Credits	12
Contact Hours	8
Prerequisites	21AR2241

Course Outcomes for 21AR3144

CO	Course Outcome	PO/PSO	BTL
CO 1	To understand and analyze the use, the spaces and the concepts of different homes for the disabled	PO2, PO4, PO10, PSO1	2
CO 2	To design a Social oriented building –A Home for physically and mentally challenged- Project 1	PO2, PSO1	3
CO 3	To understand and analyze the spaces, connectivity, and the standards of Institution buildings.	PO2, PO10, PSO2	2
CO 4	To design an institution-oriented building – School of Architecture - Project 2 Time Problem - To design an Art center / Museum	PO2, PO10, PSO2	3

This studio based course synthesizes the knowledge gained from other courses and is central to the learning and practice of architecture. This course will engage in using conventional methods and linear processes of design to more exploratory nonlinear methods. The scale and complexity will increase progressively from lower semesters to senior semesters.

Syllabus:
Objectives

To explore the design of buildings addressing the socio – cultural & economic needs of contemporary urban society. Understanding the importance of spatial planning within the constraints of development regulations in force for urban areas. Designing for large groups of people in a socially and culturally sensitive manner, taking into account aspects such as

- user perception,
- crowd behaviour,
- large scale movement of people
- Identity of buildings.

Emphasizing on the importance of understanding the relationship between open space and built form, built form to build form and site planning principles involving landscaping circulation network and parking. To explore computer aided presentation techniques involving 2D and 3D drawings and models as required.

Scale and Complexity:

Buildings and small complexes that address the social and cultural needs of contemporary urban life (residential. Commercial, institutional) with a thrust on experiential qualities; multi bayed, multiple storied and circulation intensive; passive and active energy

Areas of concern/ focus

Behavioral aspects and user satisfaction socio-cultural aspects designing for the differently abled Building byelaws and rules. Appropriate materials and construction techniques Climatic Conditions and its impact on Design

Design Typology/ project:

Housing Projects- detached, semi-detached, row housing, cluster housing, apartment; housing and facilities for other user groups- Old age Home, orphanage, working women’s hostel, home for physically and mentally challenged; Museum/ Art centre, Educational campus, R & D centre, shopping complex.

Required Readings:

1. Edward. S. and Maisel. J (2004). Universal Design, New York : Taylor & Francis
2. Preiser, W. (2001). Towards universal design evaluation. New York : McGraw-Hill.
3. Seidle, J. (1996). Barrier free design. 1st Ed. New York : Routledge
4. Jain, k and Jain, M (1992). Mud Architecture of the Indian Desert. Ahmedabad: Aadi Centre

Reference books:

1. Richard P. Dober, “Campus Planning” - Society for College and University Planning, 1996.
2. Achyut Kanvinde, “Campus design in India”, American year Book, 1969
3. Kevin Lynch, “Site planning”, MIT Press, Cambridge, 1967
4. Sam F. Miller, “Design Process: A Primer for Architectural and Interior Design”, Van Nostrand Reinhold, 1995.

21AR3116 CONTEMPORARY WESTERN ARCHITECTURE

Course Code	21AR3116
L-ST-P-S	2-0-0-0
Credits	2
Contact Hours	2
Prerequisites	Nil

Course Outcomes of 21AR3116

CO	Course Outcome	PO/PSO	BTL
CO1	Understand Cubism & Constructivism along with various Building styles of Early Modern Architects.	PO1,PO3	2
CO2	Understand Post Modernism and International Style along with Ideas and Works of Various Architects of that time.	PO1, PO5	2
CO3	Understand Critical Regionalism and other alternative practices along with Ideas and Works of Various Architects of that time.	PO3, PO4	2
CO4	Understand Deconstructivism along with Forms, Ideas and Concepts followed by Various Architects in their works.	PO3,PO4	2

Early modern architecture, later modern architecture, alternative practices and ideas, 21st century architecture

Syllabus:
Early Modern Architecture:

Study of various movements. Boroque-Rococo, Cubism, Constructivism, Brutalist Architecture, Neo-Classism etc., Study of works of Architects: Philip Johnson, Robert Venturi, Frank Lloyd Wright, Mies Vand Rohe, Oscar Niemeyer, Alver Alto, Le Corbusier, Louis Khan, Richard neutral, Richard Neutra, Richard Meier.

Later Modern Architecture

Post modernism, Various Design & Art schools and their Philosophies like Bauhaus, Change of ideologies and conceptualization, and international style. Study of the ideas and works of Architects like Paul Rudolph, Robert Venturi, I.M.Pei, KenzoTange, Minoru Yamasaki, KishoKurokawa, Richard Meier, Toyo Ito.

2021-22 B. Arch Curriculum

Alternative Practices and Ideas

African Architecture, Critical regionalism, works and ideas of Hassan Fathy, Geoffrey Bawa, Tado Ando, Laurie baker and Paulo soleri.

21st Century Architecture

Expressionism, Deconstructivism – Works of ZahaHadid, Daniel Libeskind, Frank o gehry, Peter Eisenman, Santiago Calatrolva and his structural concepts- News forms and ideas of Norman Foster, Greg Lynn, Rem Koolhaas.

Contemporary concepts of Earthships, Energy Efficiency, Sustainability, Floating Architecture, Berm Architecture.

Required reading:

1. Kenneth Frampton, "Modern Architecture: A Critical History", Thames & Hudson, London, 1994.
2. Diane Ghirardo , "Architecture after Modernism", Thames & Hudson, London, 1990.
3. Miki Desai et. al., "Architecture and independence", Oxford University Press, 2000.
4. Christopher Alexander, "Pattern Language", Oxford University Press, Oxford, 1977.
5. Robert Venturi, "Complexity and Contradiction in Architecture", 1977.

References:

1. Michael Hays ed., "Architecture Theory" since 1968, CBA, 1999.
2. Jane Jacobs, "Deaths and Life of Great American Cities", Vintage, 2003.
3. James Steele, "Hassan Fathy", Academy Editions, 1985.
4. Kenneth Frampton ed, "Charles Correa", The Perennial Press, 1998.
William Jr. Curtis, "Balkrishna Doshi, An Architecture for India", Rizzoli, 1988

21AR3117A VERNACULAR ARCHITECTURE

Course code	21AR3117A
L-ST-P-S	2-0-0-0
Credits	2
Contact Hours	2
Prerequisite	Nil

Course Outcomes for 21AR3117A

CO	Course Outcome	PO/PSO	BTL
CO1	To understand the Vernacular Architecture, its Approaches & Concepts.	PO1, PO4	2
CO2	To Understand the Vernacular styles of Buildings in Western, Northern & North-Eastern India.	PO6, PO10	2
CO3	To Understand the Vernacular Architectural Styles of Southern India.	PO3, PO9	2
CO4	To study and Understand the Influence of Western world on Vernacular Architecture.	PO3, PO9	2

Vernacular architecture as a process and not a product; Determinants of vernacular form; Overview of the various approaches and concepts to the study of vernacular architecture; Various vernacular architectural forms in the various regions of India; Impact of Colonial rule on the vernacular architecture and settlements in India.

Syllabus:

Definition and classification of Vernacular architecture – Vernacular architecture as a process – Survey and study of vernacular architecture: methodology – Sense of Identity, Continuity, Socio-Cultural and Contextual responsiveness of vernacular architecture: an overview.

Approaches and Concepts, Different approaches, and concepts to the study of vernacular architecture: an overview of historical outline, religious context, and social customs aesthetic, architectural, temporal, political and anthropological studies in detail. Vernacular tradition in building serves in creating a balance between nature and society, optimal utilization of natural resources and of local skills and craftsmanship.

Vernacular Architecture Of The Western, Northern & North-East Regions Of India, Forms spatial planning, cultural aspects, symbolism, colour, and art, materials of construction and construction technique of the vernacular architecture of the following: Deserts of Kutch and Rajasthan; Havelis of Rajasthan, Rural and urban Gujarat; wooden mansions (havelis); Havelis of the Bohra Muslims, Geographical regions of Kashmir; house boats, Houses of Sikkim, Arunachal Pradesh, Mizoram, Etc., housing Styles.

Vernacular Architecture Of South India, Forms, spatial planning, cultural aspects, symbolism, art, colour, materials of construction and construction technique, proportioning systems, religious beliefs and practices in the vernacular architecture of the following:

- Kerala: Houses of the Nair & Namboothri community; Koothambalam, Padmanabhapuram palace etc.
- Tamil Nadu: Houses and palaces of the Chettinad region; Agraharams etc.
- Karnataka: Houses of Melkote, Madikere etc.
- Andhra Pradesh – Iktas houses in Nalgonda etc.

Western Influences On Vernacular Architecture Of India, Colonial influences on the Tradition Goan house - Evolution of the Bungalow from the traditional bangla, Victoria Villas – Planning principles and materials and methods of construction. Settlement pattern and housing typologies in Pondicherry and Cochin.

Text books:

1. Oliver, Paul Encyclopedia of Vernacular Architecture of the World, vol. 1-11. Cambridge University Press, Cambridge.1997.
2. Madavi Desai, Traditional Architecture: House Form of Islamic Community in Bohras in Gujarat.
3. Amos Rapoport, House, Form & Culture, Prentice Hall Inc. 1969.
4. Amos Rapoport, The meaning of the Built Environment, Sage Publications, New Delhi, 1982.
5. R W Brunskill: Illustrated Handbook on Vernacular Architecture, 1987.

References:

1. V.S. Pramar, Haveli – Wooden Houses and Mansions of Gujarat, Mapin Publishing Pvt. Ltd., Ahmedabad, 1989.
2. Kulbushanshan Jain and Minakshi Jain – Mud Architecture of the Indian Desert, AadiCentre, Ahmedabad 1992.
3. Acharya Prasanna K, Indian Architecture according to Manasara Silpasastra, Indian, India, Patna: 1979 (Reprint of 1928 ed.).
4. G.H.R. Tillotsum – The tradition of Indian Architecture Continuity, Controversy – Changes since 1850, Oxford University Press, Delhi, 1989.
5. Carmen Kagal, VISTARA – The Architecture of India, Pub: The Festival of India, 1986.
6. S. Muthiah and others: The Chettiar Heritage; Chettiar Heritage 2000.

21AR3117B SUSTAINABLE ARCHITECTURE - I

Course code	21AR3117B
L-ST-P-S	2-0-0-0
Credits	2
Contact Hours	2
Prerequisite	Nil

Course Outcomes of 21AR3117 B

CO	Course Outcome	PO/PSO	BTL
CO1	To understand the concept of green building need for it in today's context	PO7	1
CO2	To understand the traditional buildings under different climatic zones and the elements in vernacular buildings	PO8	2
CO3	Understanding the climatic influences on built environment	PO8	3
CO4	To understand the importance of site planning and energy efficient landscaping as an important tool in sustainable architecture	PO8, PSO2	3

Introduction to Green concepts; Depleting resources and climate change; Sustainable site selection and development sustainable building materials and technologies; Low impact construction – Bio mimicry, Dimensions of sustainable, sustainable community; case studies of eco- cities/ communities.

Syllabus:

Concept of green building- Introduction to green building concept, need for green buildings today, statistics denoting the impact of built environment on our planet and its resources,

Traditional methods and materials, techniques that were incorporated in preindustrial era, analysis of traditional knowledge and their relevance in today's context. Indian vernacular architecture concepts and analysis of spatial elements like courtyard houses, terraces, pavilions. Use of local materials and climate responsive techniques like jharokas, jaalis, chajjas etc.,

Climatic influence on buildings design consideration for built environment under different climatic conditions- thermal and visual comfort, thermal conductivity and heat transfer, strategic design to suit the local climatic conditions, physical and technological aspects of the building

Site Planning and Landscape Design- relation between site features and design requirements, site planning techniques and checklist and evaluating surface drainage, criteria for plant selection in different conditions

Required Reading :

1. Thomas, Randall & Fordham Max Sustainable urban design: an environmental approach” 2003.
2. Edwards, Brian and Hyett, Paul Rough guide to sustainability 2001.
3. Langston, Craig A. and Ding, Grace Sustainable practices in the built environment 2001.
4. Givoni Baruch, “Passive and Low Energy Cooling of Buildings”, VNR, New York, 1994.
5. Mackenzie Dorothy, “Green design: design for the Environment”, Laurence King, London, 1997.
6. Farmer John & Richardson Kenneth, “Green Shift: Changing attitudes in architecture to the NaturalWorld”, Architectural Press, Boston, 1999.
7. The European Commission, “A Green Vitruvius: Principles and Practices of Sustainable Architectural Design”, James & James, London, 1999
8. Gray, O., Robinetle, “Landscape Planning for Energy Conservation”, Van Nostrand Reinhold, New York, 1984.

21AR3118A INTERIOR DESIGN STUDIO

Course code	21AR3118A
L-ST-P-S	0-0-4-0
Credits	2
Contact Hours	4
Prerequisite	Nil

Course Outcomes for 21AR3118A

CO	Course Outcome	PO/PSO	BTL
CO1	To understand the basic design acumen and anthropometry, ergonomics	PO1, PO3, PSO2	2
CO2	To enhance their skills by applying design concept and theme for small spaces	PO1, PO5, PSO2	2
CO3	Apply the skills in Planning of residential spaces with material usage understanding	PO3, PO4, PSO2	4
CO4	Study and apply anthropometry in hospitality related environment.	PO3, PO5, PSO2	4

Syllabus:

Area of focus/Concern:

Scope/Focus of the project:

Introduction to parameters of design, anthropometrics and ergonomics, human activity and use interior spaces and furniture. Analysis of design to perceive elements which define the character of the environment. Analyze the design process and concept formation.

Scale and complexity:

The student is expected to learn and apply the concepts to design residential interior spaces less than 25sqm carpet area through detailed measured drawings and sketches

Typology:

- Bedroom/Kitchen
- Living/Dining

Explore their design knowledge in developing interior spaces for small retail spaces by understanding the usage of basic materials and construction

Typology:

- Retail Outlet
- Garment Store
- Boutique

Reference Books:

1. Karen Mark, Space Planning Basics, Van Nostrand Reinhold, New York 1992
2. Francis.D. Ching & orky Bingelli, Interior Design Illustrated, Wiley Publishers,

21AR3118B FURNITURE DESIGN STUDIO

Course code	21AR3118B
L-ST-P-S	0-0-4-0
Credits	2
Contact Hours	4
Prerequisite	Nil

Course Outcomes for 21AR3118B

CO	Course Outcome	PO/PSO	BTL
CO1	To understand the basic design acumen and anthropometry, ergonomics	PO1, PO3, PSO2	2
CO2	To enhance their skills by applying design concept and theme to human scale	PO1, PO5, PSO2	2
CO3	Apply the skills in Planning of furniture with material usage understanding	PO3, PO4, PSO2	4
CO4	Study and apply anthropometry in daily use products.	PO3, PO5, PSO2	4

Understanding the methods and techniques involved in furniture design.

Syllabus:**Introduction**

A brief introduction to Product Designing – Various elements – History of Product Design – Definition of Product Design, understanding of Product Design - Purpose of Product Design – Role of Product Designers.

Human Factors

Definition of human factors, Application of human factors data. Human activities, their nature and effects. Man-machine system and physical environment. Human performance and system reliability. Information input and processing. Human control systems. Applied anthropometry – Human response to climate.

Aspects of Product Design

Visual, Auditory, Tactual, Olfactory human mechanisms, Physical space and arrangement. Visual display, process of seeing, visual discrimination, quantitative and qualitative visual display, Alphanumeric and related displays, Visual codes and symbols.

Design Exercises

Design of Household elements, tools and devices – Spoon/Cutlery.

Design of furniture – Chairs/Computer table, Kitchen racks, Cabinets etc.

Element design for the physically and mentally different people.

Reference Books

1. *Time Saver Standards for Interior Design*
2. Andrew Alpern, *Handbook of Speciality Elements in Architecture*, McGrawhill Co., USA, 1982.
3. Francis D.K.Ching, *Interior Design Illustrated*, VNR Publications, New York, 1987.
4. *An invitation to Design*, Helen Marie Evans.

21AR3219 BUILDING SERVICES - III

Course code	21AR3219
L-ST-P-S	3-0-0-0
Credits	3
Contact Hours	3
Prerequisites	Nil

Course Outcomes for 21AR3219

CO	Course Outcome	PO/PSO	BTL
CO 1	Familiarity with different air conditioning systems, their context of use and basics of planning involved.	PO1, PO2	2
CO 2	An understanding of fire safety, fire fighting, fire prevention and installations in buildings.	PO1, PO2	2
CO 3	An understanding of mechanical transportation systems in a building and their design requirements.	PO1, PO2	2
CO 4	Ability to integrate services in buildings.	PO3, PO4, PSO2	3

Air conditioning-principles, systems and design criteria, fire and safety, mechanical transportation systems in the building, Integration of services in design

Syllabus:
Air Conditioning –Principles, Systems and Design Criteria

Thermodynamics. Transfer of heat. Refrigeration cycle components. Vapor compression cycle. Refrigerant, Compressor, condenser, evaporator, refrigerant control devices, electric motors, air handling units, cooling towers. Air conditioning systems for buildings of different scales and their requirements- window type, split system, package unit, direct expansion system, chilled water system, fan coil unit, district cooling systems. Energy efficient systems, environmental aspects and latest innovations. Design criteria for selection of air conditioning. Configuring/ sizing of mechanical equipment, equipment and spaces for them. Horizontal and vertical distribution of services for large buildings. Exercise on the above through choice, calculations, layout, drawings

Fire and Safety

Causes of fire in buildings. Stages of fire and how it spreads. Fire drill. Heat/ fire/ smoke detection. Alarm and extinguisher systems. Fire safety standards. General guidelines for egress design for multi-storey buildings. Understanding all the above through product literature/ field visits. Exercise on design of fire safety systems for different building types through choice, calculations, layout, and drawings

Mechanical Transportation Systems in Buildings

Lifts and escalators - types and applications. Round trip time for lifts. Design of lift lobby and vertical transportation core. Conveyors, travelators, dumb waiters. Standards for all. Latest technologies in vertical transport systems. Integration of lifts and escalators with building automation systems. Understanding all the above through product literature/ field visits. Design exercise on the above through choice, calculations, layout and drawings

Integration of Services into Architectural Design

Principles of grouping and integrating of horizontal and vertical distribution of all services in a multi-storeyed building/ large building. Services to include vertical transportation, electrical, communication, air conditioning and fire safety. Integrating service requirements into architectural design in an appropriate typology involving a simple scale project through sketches/ drawings

Required Readings:

1. William H. Severns and Julian R Fellows, 'Air conditioning and Refrigeration', John Wiley and Sons, London, 1988.
2. National Building Code -Bureau of Indian Standards.
3. 'ISHRAE Handbook for Refrigeration', 2015.
4. George R. Strakosch (Editor), Robert S. Caporale, 'The Vertical Transportation Handbook' 4th Edition, Wiley and Sons, 2010.
5. David Lee Smith, 'Environmental Issues for Architecture', Wiley, 2011. David Lee Smith, 'Environmental Issues for Architecture', Wiley, 2011.
6. National Building Code -Bureau of Indian Standards.

Reference books:

1. A.F.C. Sherratt, 'Air Conditioning and Energy Conservation', the Architectural Press, London, 1980.
2. Andrew H Buchanan; 'Structural Design for Fire Safety', Wiley, 2001.
3. Swenson S. Don, 'Heating, Ventilating and Air Conditioning', American Technical Publishers, 1995.
4. ISHRAE, 'All about AHUs- Air Handling Units'.
5. CIBSE Guide D, 'Transportation Systems in Buildings', 2010.
6. A.K.Mittal, 'Electrical and Mechanical Services in High Rise Building: Design and Estimation Manual', CBS, 2009.

21AR3246 BUILDING CONSTRUCTION- IV

Course code	21AR3246
L-ST-P-S	0-4-0-0
Credits	6
Contact Hours	4
Prerequisite	Nil

Course Outcomes for 21AR3246

CO	Course Outcome	PO/PSO	BTL
CO1	Understanding of Cement and Concrete properties.	PO6,PO7,PO8	2
CO2	Understanding of Special concrete and Concreting methods.	PO6,PO7,PO9	2
CO3	Understanding of the Reinforced Cement Concrete Construction	PO7,PO8	2
CO4	Understanding of Advanced Application Reinforced Cement Concrete Construction.	PO4,PO7,PO8, PO9	2

Traditional and conventional knowledge systems that enable construction of a complete building; various structural systems and methods of construction and detailing of buildings of medium complexity using natural and manmade materials including foundation, walls, roofs, staircase, joinery and finishes; Technology that informs the construction of contemporary buildings using various structural systems and materials. The course will combine lecture and studio exercises whose results will be in the form drawings and models, culminating in a studio which will translate an architectural design into working drawings which are good for construction either in manual/ digital mode.

Syllabus:

CO1: RCC: To expose the students to the preparation of concrete mix and placing and curing. Concrete construction methods and special concrete and concreting methods. To expose to students to appropriate material Construction method–

Cement & concrete

Cement: Composition of cement, properties of cement, various kinds of cement and their uses. Concrete: proportioning concrete, grading of aggregates, water cement ratio, workability of concrete Estimating yield concreting. Concreting: form work for concreting, mixing, transporting, and placing, consolidating and curing of concrete. various types of cement concrete, the properties and uses.

CO2: Special Concrete and Concreting Method: High density, fiber Reinforced, polymer concrete – properties & uses. Ready mixed concrete – grunting –cold weather & underwater concreting – Lightweight concrete construction – Composition of lightweight concrete & its advantages – its application in building walls, roof, foundations & ornamental work.

CO3: Concrete Construction: Introduction to RCC framed structures concrete in foundation: types of footing – Isolated, combined, continuous, strip raft & piles. Concrete slabs: one-way two way continuous & cantilever. Concrete beams: singly reinforced, doubly reinforced, cantilever & continuous beams. Concrete columns, floors, walls, partitions, lintels, arches, sunshades.

CO4: RCC in building components (foundation, columns, beams, slabs & walls) Typical details for RCC footing, pile foundation - precast pile, cast in situ piles, types of piles, method of driving piles, walls, column, beams, lintels, sunshades, floor and roof slabs (1- & 2-way slabs) cantilever. Concepts & Design of different types of staircases

Introduction to prefabricated Concrete elements, and pre & post stressed concrete and their applications.

Reference Books:

1. Francis D.K. Ching, "Building Construction illustrated", John Wiley & Sons, 2000
2. W.B. McKay, "Building Construction", Vol 1 and 2, Longmans, UK, 1981.
3. Barry, "Construction of Buildings", Volume 1&2, Blackwell Publishing Ltd., Oxford, 2005.
4. Pamphlet and Manuals supplied or published by SERC, BMPTC, HUDCO and Other research organization.

21AR3218 ESTIMATION, COSTING AND SPECIFICATIONS

Course code	21AR3218
L-ST-P-S	3-0-0-0
Credits	3
Contact Hours	3
Prerequisites	Nil

Course Outcomes for 21AR3218

CO	Course Outcome	PO/PSO	BTL
CO 1	An understanding of data required and methods of estimation	PO1	1
CO 2	Ability to estimate various quantities using different methods	PO3	1
CO 3	An understanding of the types of estimates and costing	PO1, PO3	1
CO 4	Knowledge of various specifications and terminology used	PO7, PO9, PSO2	1

Specifications of various building works as per NBC and ECBC; Writing specifications for materials and various items of work; Systems of taking out quantities and estimating for all trades involved in construction of medium complexity; preparation of Bill of Quantities (BOQ); Cost estimating for building works (material and labor); valuation report preparation; Budgeting for specific projects.

Syllabus:

Introduction

Introduction to Quantity estimation - costing and specifications related to building projects - Definition and purpose of Estimating and Costing - Procedure of estimating or method of estimating - data required to prepare an estimate (Drawings/ specification/ rates) - complete estimate structure

Measurement of Materials and Works

Introduction to measurement of various construction work items - importance and significance in construction projects - Units of measurement, rules for measurement - Methods of taking out quantities: Long wall and short wall method, centre line method, partly centre line, cross wall method - Standard modes of measurement as per Indian Standards for various work items.

Types of Estimates and Costing

Preliminary/Approximate Quantity Estimates: Importance & purpose of Preliminary / Approximate estimates, Plinth area method, Cubical contents method and centre line method and their preparation. Types of approximate estimates, basic differences, and advantages.

Detailed Quantity Estimation: Types of detailed estimates and their application, Methods of deriving

detailed quantities for various construction work items. Preparation of Detailed estimate, Work items as per construction stages: Foundations, Superstructure, Finishing works in a simple building. Description & significance of Items in Bill-of-Quantities (BOQ)

Costing: Introduction, meaning, purpose, methods of estimating cost of construction for various work items, cost indices, rates of labour and material, analysis of rates, preparation of abstract of estimated cost, use of CPWD schedule of rates. Deriving construction cost as per BOQ

Specifications

Introduction, Definition, importance and purpose of specifications, impact on costing. Principles and practices. Types of specifications. Knowledge of manufacturers' specifications for construction materials/ products. Specification of common building materials including carriage & stacking of materials. Specifications for a simple building. Standard specifications of BIS. General abbreviations used in specifications. Specification of new building materials

Reference books:

1. Birdie, G.S. (2005). Text Book of Estimating and Costing. Dhanpat Rai Publishing.
2. Chakraborty, M. Estimating, Costing, Specification & Valuation
3. C.P.W.D. Standard Schedule of Rates.
4. Dutta, B. N. (1998). Estimating and Costing in Civil Engineering. 24th Ed. UBS Publishers, Distributors Ltd.

21AR3220 HUMAN SETTLEMENTS AND PLANNING

Course code	21AR3220
L-ST-P-S	2-0-0-0
Credits	2
Contact Hours	2
Prerequisite	Nil

Course Outcomes of 21AR3220

CO	Course Outcome	PO/PSO	BTL
CO1	Understand the various elements of Human Settlements and the classification of Human Settlements.	PO2	1
CO2	Understand familiarize the students with Planning concepts and process in Urban and Regional Planning.	PO4	1
CO3	Understand the changing dynamics of Urban Form and its planning according to urban transformation	PO4, PO9	1
CO4	Understand the interrelationship between Human Settlements structure and Social Dynamics	PO4, PO9	1

Elements and characteristics of human settlements; origins; determinants and their evolution through the course of history; Settlements as expression of political aspirations; Various planning concepts in urban, rural and regional level development plans in the context of India; Changing scenario in the context of Globalization.

Syllabus:

Origin of Human Settlements – Factors influencing the growth and decay of human settlements, Elements of Human Settlements; Type and classification of settlements – Urban and Rural.

Introductory study of the development of various settlement forms – Before and after Industrial Revolution. Theory of ‘EKISTICS’; Planning concepts and their relevance to Indian Planning practice – Ebenezer Howard (Garden City Concept), Patrick Geddes (Geddisian Triad), C.A Perry (Neighborhood Planning), Radburn Theory, Satellite Towns, City Beautiful; Concept and Case studies.

Town planning & Regional theories like Garde City, city Beautiful movement, Linear city, Concentric circle theory, sectoral theory, Christeller weber central place theory, etc.,

Brief Introduction to the town planning organization in India – Various levels of planning, National, Regional, Urban, Rural, Local etc. differences and relationships between them; Ecological, Social and Economic aspects of town planning in India; Definitions and terms in Indian context – Zonal plan, Master Plan, Land Use Plan, Development regulations, Regional plans, etc.

Urbanization – Fact, elementary theories and problems related to urbanization with social reference to India; Emergence of new forms of developments, Transportation and communication – Potentials and limitations of road-ways, Railways, Airways and Water-ways in development of settlements; Problems and potentials.

Concepts of SMART cities, Utopian Cities, IOT facilities in Urban Planning, Modal Split, NMT, Pedestrianization of cities etc.,

Required Readings:

1. C.L.Doxiadis, Ekistics, “An Introduction to the Science of Human Settlements”, Hutchinson, London, 1968.
2. Andrew D.Thomas, “Housing and Urban Renewal”, George Allen and Unwin, Sydney, 1986.
3. “Ministry of Urban Affairs and Employment”, Government of India, New Delhi,1999 ‘
4. “Urban Development Plans: Formulation & Implementation” , Guidelines, 1996.
5. Madras Metropolitan Development Authority, ‘Master Plan for Madras Metropolitan Area, Second Master Plan, 2007.

Reference books:

1. Government of India, “Report of the National Commission on Urbanisation”, 1988.
2. Hansen N., “Regional Policy and Regional Integration”, Edward Elgar, UK, 1996.
3. Sandhu. R. S., “Sustainable Human Settlements”, Asian Experience, Rawat publications, 2001.
4. Gastek.P., “Living Plans: New concepts for advanced housing”, Brikhauser publications, 2005.

21AR3221A APPROPRIATE CONSTRUCTION TECHNOLOGIES

Course code	21AR3221A
L-ST-P-S	2-0-0-0
Credits	2
Contact Hours	2
Prerequisite	Nil

Course Objectives:

This course will enable students to:

- Understand cost effective and alternative building materials and technology and the research and development happening in national and international level.
- Understand the various methods of Construction Techniques which arise from contextual requirements, e.g., Hilly region, flood and cyclone prone areas, Earthquake prone areas.
- Understand various sustainable and energy efficient construction techniques.
- Understand the importance of BIM, virtual reality, and artificial intelligence in building construction
- Appropriate technologies and cost-effective technologies; technologies as evolved from contexts through the practice of international architects and Indian architects; Systems and techniques developed in research labs, etc.

COURSE OUTCOMES:

CO	Course Outcome	PO/ PSO	BTL
CO1	Familiarity with the alternative building materials, applying cost effective materials and techniques to resolve environmental issues	PO2, PO3	2
CO2	Familiarity with the indigenous construction materials and techniques for building resilience and disaster mitigation	PO2, PO3	2
CO3	Familiarity with the material and techniques for energy efficient building construction	PO2, PO3	2
CO4	Introduction to Building Information Modelling and application of the same in modern construction industry	PO6	3

Syllabus:**CO-1**

Apply cost effective building materials and techniques in construction, Study of the availability of Materials, Comprehend the importance of Recycling used Materials, study about different Government departments researching on alternative building materials and techniques, Learning about current

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architectural practices on alternative building materials and techniques. Identify Environmental Issues,

CO-2

Vernacular construction practices as the suitable techniques to make resilient buildings. Various types of construction details of foundations, soil stabilization, retaining wall, plinth fill, flooring, wall, opening, roof, parapets, boundary wall, staircase, etc. Local practices for disaster resistance and traditional regional responses.

CO-3

Building resources: Passive energy system design, building envelope, Building orientation and components of building fabric, Curtain wall, sourcing, and recycling of building materials. Use of alternative building materials and technologies for making building energy efficient and less resource dependent. Dry construction technology for lesser use of water and other resources.

CO-4

Introduction to Building Information Modelling and its application to the building construction industry. Building automation systems - approaches, application – lighting, security, fire detection, office automation, vertical transportation, surveillance. Smart construction, Autonomous equipment, Future Potential for AI in Construction

REFERENCES:

1. Alternative Building Materials and Technologies – By K S Jagadeesh, B V Venkatta Rama Reddy & K S Nanjunda Rao – New Age International Publishers
2. Non-conventional Energy Resources – By D S Chauhan and S K Sreevasthava – New Age International Publishers
3. Buildings How to Reduce Cost – Laurie Backer - Cost Ford
4. Handbook of Low-Cost Housing, A. K. LAL
5. “Automation Systems in Smart and Green Buildings (Modern Building Technology)” by V K Jain

21AR3221B SUSTAINABLE ARCHITECTURE- II

Course code	21AR3221B
L-ST-P-S	2-0-0-0
Credits	2
Contact Hours	2
Prerequisite	Nil

Course Outcomes for 21AR3221 B

CO	Course Outcome	PO/PSO	BTL
CO1	To understand the importance of energy efficiency in buildings and strategies involved.	PO1, PO4	2
CO2	To understand the importance of relevance of water in built environment	PO6, PO10	2
CO3	Introduction to green rating systems and building codes	PO3, PO9	2
CO4	Introduction to simulation and analysis software	PO3, PO9	2

Passive design considerations; active systems; design for energy efficient building- day lighting and natural ventilation; technologies for alternative sources of energy; Net Zero buildings; software tools for the design of a building and the performance evaluation of a building with respect to energy; Rating systems: IGBC, LEED, GRIHA.

Syllabus:

Energy Efficiency in buildings: General understanding of energy efficiency in thermal appliances, electrical appliances, HVAC systems, Energy performance assessment in terms of building operations, and embodied energy; BEE ratings for electrical appliances

Water in built environment- water crisis and increased misuse, water pollution and social implications. Groundwater and surface water management, site planning for efficient water management. Traditional water harvesting techniques in different climatic zones.

Green rating systems- Introduction to green rating systems like LEED, IGBC, GRIHA Criteria for rating and general understanding and comparison between various rating systems NBC and other national codes for green buildings

Simulation Software- General introduction and application of Building Simulation software for various applications like thermal comfort, day lighting, artificial lighting and HVAC systems

Reference Books:

1. Energy conservation building code 2007
2. National building code – India
3. International building code
4. Design for Water | Rainwater Harvesting, Storm water Catchment, and Alternate Water Reuse, Author: Heather Kinkade-Levario, Date of publication: June 2007, Publisher: New Society Publishers; 1 edition, ISBN 978-0865715806
5. Waterscapes | Planning, Building and Designing with Water, Author Editors: Herbert Dreiseitl, Dieter Grau, Karl H.C. Ludwig, Publisher: Birkhäuser Basel, Date of publication: April, 2001, ISBN 978-3764364106

21AR3222A LANDSCAPE DESIGN STUDIO

Course Code	21AR3222A
L-ST-P-S	0-0-4-0
Credits	2
Contact Hours	4
Prerequisite	Nil

Course Outcomes for 21AR3222A

CO	Course Outcome	PO/PSO	BTL
CO1	To develop an understanding about space design at local level	PO6,PO7,PO8	2
CO2	To develop a skill to integrate various knowledge systems to arrive at a design proposal of an urban scale, the process used for the same	PO6,PO7,PO9	2
CO3	To make the students understand the area, scale, design and implementation factors with the involvement of stakeholders	PO7,PO8	2
CO4	To make the students work on relatively large project for incorporating multidisciplinary domains in the projects for consideration of the same.	PO4,PO7,PO8, PO9	2

Syllabus:**Area of focus/Concern:**

Studio Project in Landscape Analysis, Landscape Design and Site Planning. Students are expected to incorporate the other subjects of the present semester to add value to the Studio outcome. Various materials which can be used at site for different components of the built form, may be explored through site visits and observatory studies. Design may be a cumulative result of an informed decisions of varied nature with due care to prevent Soil erosion, promote ground water recharge processes.

Scale and complexity:

- Small recreation or civic spaces at community level for medium sized area upto 2 Hectares.

Typology/Project:

- ✓ Community gardens
- ✓ Residential Garden
- Exercise related to the application of ecological principals in a range of situations directed towards understanding and proposing design possibilities

Typology/Project:

- ✓ Urban open space systems
- ✓ Rural Landscape
- ✓ Heritage and Cultural Landscape

Reference Books:

1. C,H.T (n d) Land Form Designs, P D A Publications
2. Micheal.L (n d) Landscape Detailing Vol I Enclosure
3. Stevens, D (n d) Ultimate Water Gardens Book.
4. Simons, J.O (n d) Landscape Architecture – A manual of site planning and Design

21AR3222B MODULAR CONSTRUCTION STUDIO

Course Code	21AR3222B
L-ST-P-S	0-0-4-0
Credits	2
Contact Hours	4
Prerequisite	Nil

Course Outcomes for 21AR3222B

CO	Course Outcome	PO/PSO	BTL
CO1	To develop an understanding about space design at local level	PO6, PO7, PO8	2
CO2	To develop integrate various knowledge systems to arrive at a design proposal of a practical scale, the process used for the same	PO6, PO7, PO9	2
CO3	To make the students understand the area, scale, design, and implementation factors with the involvement of Modular construction	PO7, PO8	2
CO4	To make the students work on a project for incorporating Modular construction	PO4, PO7, PO8, PO9	2

Syllabus:

Principles of Modular construction, Objectives, Types of Modular construction, Delivery methods, Modular building process, Pros & Cons of Modular construction. Identify the participants including customers, Manufacturers, Installers, etc.

Design Phase – Site evaluation, design considerations, Scope of work, building codes & specifications.

Pre-construction and construction phases – Objectives, Construction documents, Estimation and budgeting, Scheduling, supply chain management of modular construction, Quality control and Assurance.

Safety programs and standards, Tools plus machinery and heavy equipment needed.

Reference Books:

1. Introduction to Commercial Modular Construction, Modular Building Institute, 2019
2. Design for Modular Construction: An Introduction for Architects, MBI, 2019
3. Multifamily Modular Construction Toolkit, Fannie Mae, NIBS, and the Modular Building Institute, 2020

21AR3247 ARCHITECTURE DESIGN STUDIO - VI

Course Code	21AR3247
L-ST-P-S	0-8-0-0
Credits	12
Contact Hours	8
Prerequisite	21AR3144

Course Outcomes for 21AR3247

CO	Course Outcome	PO/PSO	BTL
CO1	To expose the students to the challenges of designing functionally complicated buildings, having a complex array of activities and services	PO2, PO4, PO10, PSO1	2
CO2	To Design a functionally complex Building (Medium Rise Structure) - PROJECT 1	PO2, PSO1	3
CO3	To familiarise the students to the task of coordinating integration of structural design and specialised building services in the framework of architectural design	PO2, PO10, PSO2	2
CO4	To make students understand advanced construction technology and newer building materials. To Design a functionally complex Building (High Rise Structure)) - PROJECT 2	PO2, PO 4, PO 9, PO 10, PSO2	3

This studio-based course synthesizes the knowledge gained from other courses and is central to the learning and practice of architecture. This course will engage in using conventional methods and linear processes of design to more exploratory nonlinear methods. The scale and complexity will increase progressively from lower semesters to senior semesters.

Syllabus:**Objectives:**

The focus of the studio is on functionality and integration of advanced technology and services. The studio enables understanding the complex mechanisms of designing services intensive buildings in tight urban context, having multiple levels (above and/or underground).

The special emphases are on utilitarian parameters, space optimisation, conformance with regulatory requirements, integration of structural systems and building services (HVAC, fire, electrical, communication, plumbing etc.) in architectural layout and construction technology. The studio encourages the students to explore modern automation and intelligent systems for building management and energy conservation. They will learn about site planning, Vehicle & Pedestrian traffic then the site, and landscaping in tight spatial context.

STUDIO EXERCISE

Emphasis on the design of services intensive, multi-storeyed, buildings in tight urban spatial context, such as buildings for Health care, Hospitality, Institutional or multifunctional commercial usage, Museum/ Art centre, R & D centre. Design focuses on closed environment, with emphases on interior spaces, integration of various services, and conformance with regulatory norms. The external environment to take into consideration circulation of emergency vehicles and parking optimisation.

Reference books:

1. Baiche, B. and Walliman, N. (2012). *Neufert Architects Data*, 4th Ed. Oxford: Wiley-Blackwell.
2. Chiara, J. D. and Michael, J. C. 2001. *Time Savers Standards for Building Types*. Singapore: McGraw Hill Professional.
3. Gauzin-Muller, D. (2002). *Sustainable Architecture and Urbanism: Concepts, Technologies, Examples*. 1st Ed. Basel: BirkhauserVerlag AG.
4. Richard P. Dober, "Campus Planning" - Society for College and University Planning, 1996.
5. Kanvinde, "Campus design in India", American year Book, 1969
6. Parker, D. And Wood, A. (2013). *The Tall Buildings Reference Book*. New York :Routledge.
7. Wood, A. and Ruba, S. (2012). *Guide to Natural Ventilation in High Rise Office Buildings*. New York: Routledge.

21MB52C3 HUMAN RESOURCE MANAGEMENT

Course code 21MB52C3
L-ST-P-S 3-0-0-0
Credits 3
Contact Hours 3
Prerequisite Nil

Course Outcomes of 21MB52C3

CO	Course Outcomes	PO/PSO	BTL
CO 1		5,10	1,2
CO 2		5,10	2
CO 3		5,10	2
CO4		5,10	2

Syllabus:

References:

21BB32C3 INNOVATION AND ENTERPRENURESHIP

Course code	21BB32C3
L-ST-P-S	3-0-0-0
Credits	3
Contact Hours	3
Prerequisite	Nil

Course Outcomes of 20BB32C3

CO	Course Outcomes	PO/PSO	BTL
CO 1	Explain and apply the key terms, definitions, and concepts used in the study of Innovation and Entrepreneurship Development	5,10	1,2
CO 2	Demonstrate how as an entrepreneur he can use the concepts of Innovation, to create new product, services and business processes	5,10	2
CO 3	Construct a well-structured business plan by including all the necessary elements of the business plan	5,10	2
CO4	Demonstrate how as an entrepreneur he can use the concepts of Entrepreneurship, to develop a new entrepreneurial organization	5,10	2

Syllabus:

Introduction to Innovation: Concept of innovation, Sources of innovation, Innovation Life cycles – leveraging market, technology and S –curves, Disruptive innovations, Technology adaptation and diffusion, Intellectual Property – Patents, Trademarks and copy rights. Innovations Management: Invention vs. Innovation; Innovation Strategies, Models; Concurrent Engineering; Process Innovation; Economics of Innovation; Innovation Management process. The Entrepreneurial Development Perspective: Concepts of Entrepreneurship Development; Evolution of the concept of Entrepreneur; Drivers of Entrepreneurship: Attributes and Characteristics of a successful Entrepreneur; Role of Entrepreneur in Indian economy and developing economies with reference to Self-Employment Development; Entrepreneurial Culture; Women Entrepreneurship. Creating Entrepreneurial Venture: Defining Business Idea; Techniques of generating business ideas, Opportunity assessment; Business Planning Process; Environmental Analysis - Search and Scanning; Identifying problems and opportunities; Basic Government Procedures to be complied with. Entrepreneurship Development: Role of Central Government and State Government in promoting Entrepreneurship - Introduction to various incentives, subsidies and grants - Export Oriented Units - Fiscal and Tax concessions available ; Role of different agencies in the Entrepreneurship Development; Innovation and Entrepreneurship in different sectors in India.

References:

1. Corporate Entrepreneurship: Building The Entrepreneurial Organisation, Paul Burns PalgraveMacmilan.
2. Innovation and Entrepreneurship, Drucker F Peter, 1985.Heinemann, London.

21AR4123 BUILDING SERVICES - IV

Course code	21AR4123
L-ST-P-S	3-0-0-0
Credits	3
Contact Hours	3
Prerequisite	Nil

Course Outcomes for 21AR4123

CO	Course Outcome	PO/PSO	BTL
CO 1	To gain knowledge about different Building Automation Systems and Controls	PO1, PO2	2
CO 2	To gain knowledge about different Communication and Security Systems	PO1, PO2	2
CO 3	To gain knowledge on the various intelligent systems in Vertical Transportation	PO1, PO2	2
CO 4	Ability to integrate the advanced services in Buildings	PO3, PO4, PSO2	3

Building automation systems and controls, communication and security systems, modern intelligent vertical transportation systems, integration of services into architectural design

Syllabus:
Building Automation Systems & Controls

Philosophy. Introduction to System configuration, system modules, distributed systems, communication protocol and on-line measurements. Fire protection, security and energy management. Control objectives. Sensors, controllers and actuators. Understanding the concept of Microprocessor based controllers & digital controls. Examples of sub-systems such as - Digital Addressable Lighting Interface (DALI) and how it's useful to Architects

Communication and Security Systems

Voice communication systems, local area network, wireless LAN, Digital TV, CCTV, digital CCTV, teleconferencing, cellular phone system, and CABD. SMATV. Data networking. Short- and long-haul networks. Wideband network. Office automations. Public address/sound reinforcement systems. Digital public address system. Modern security systems.

Modern Intelligent Vertical Transportation Systems

Sky lobby, double-deck lifts, twin lifts, advanced call registration systems, large scale monitoring systems, applications of artificial intelligence in supervisory control, energy saving measures related to lift systems/escalator systems, other modern vertical transportation systems, such as: gondola systems, materials handling systems, etc.

Integration Of Services into Architectural Design

Introduction to Smart Building concept. Integrating the technologies and systems, impact of information technology on buildings and people. Shared tenant services. Interaction and integration between building structure, systems, services, management, control and information technology. Different Application & Design software available.

Reference books:

1. Clements-Croome, Derek, Intelligent Buildings: An introduction, Routledge, 2014
2. Shengwei Wang, Intelligent Buildings and Building Automation, Spon Press, 2010
3. James Sinopoli, Smart Building Systems for Architects, Owners & Builders, Elsevier, 2010
4. P. Manolescue, Integrating Security into Intelligent Buildings, Cheltenham, 2003
5. A. Dobbelsteen, Smart Building in a Changing Climate, Techne Press, 2009
6. D. Clements-Croome, Intelligent Buildings: An Introduction, Routledge, 2014
7. A. Oliviero, Cabling [electronic resource]: The Complete Guide to Copper and Fiberoptic Networking, John Wiley & Sons, 2014
8. W.T. Grondzik, & A.G. Kwok, Mechanical & Electrical Equipment for Buildings, Wiley, 2015

21AR4124A ARCHITECTURAL CONSERVATION

Course code	21AR4124A
L-ST-P-S	3-0-0-0
Credits	3
Contact Hours	3
Prerequisite	Nil

Course Outcomes for 21AR4124A

CO	Course Outcome	PO/PSO	BTL
CO1	To make students understand about the basics of Conservation in India.	PO9	2
CO2	To Study the Conservation Practices.	PO3	2
CO3	To explain the importance & analysis of Urban Conservation	PO3	2
CO4	To Discuss about Conservation planning & Adaptive Conservation.	PO4	2

Various issues and practices of Conservation; values and ethics; status of conservation in India and the various agencies involved in the field of conservation worldwide and their policies; various guidelines for the preservation, conservation and restoration of buildings; management of historic sites; study of various charters; character and issues in our heritage towns through case studies; Role of INTACH, UNESCO, ICOMOS and other such organization.

Syllabus:

Introduction to conservation: Understanding Heritage. Types of Heritage. Heritage conservation- Need, Debate and purpose. Defining Conservation, Preservation and Adaptive reuse. Distinction between Architectural and Urban Conservation. International agencies like ICCROM, UNESCO and their role in Conservation

Conservation in India: Monument conservation and the role of Archeological Survey of India –role of INTACH – Central and state government policies and legislations- select case studies of sites such as Hampi, Golconda, Mahabalipuram etc.

Conservation practice: Brief study on Listing –Grading-Documentation - Assessing architectural character of historic structures. Guidelines for preservation, rehabilitation and adaptive re-use of historic structures

Urban conservation: Understanding the character and issues of historic cities in South India. Upgradation programmes in old areas and development strategies for regeneration of inner-city areas– select case studies of towns like Srirangapatna, Mysore and Bijapur. Historic districts and heritage precincts.

Conservation planning: Conservation as a planning tool. - Financial incentives and planning tools such as Transferable Development Right (TDR)-urban conservation and heritage tourism infrastructure facilities. Conservation management- community participation and financing conservation.

Adaptive Conservation: Heritage tourism, Heritage Walk creation, Athens charter, Adaptive reuse of Heritage buildings.

Reference books

1. Donald Apple yard, "The Conservation of European Cities", M.I.T. Press, Massachusetts, 1979.
2. James M. Fitch, "Historic Preservation: Curatorial Management of the Built World" University Press of Virginia; Reprint edition, 1990
3. Robert E. Stipe, a Richer Heritage: Historic Preservation in the Twenty-First Century".
4. Univ. of North Caroling press, 2003.
5. Conservation Manual, Bernard Fielden; INTACH Publication, 1989..

References

1. B.K. Singh, "State and Culture", Oxford, New Delhi
 2. A.G. K. Men ed. "Conservation of Immovable Sites", INTACH Publication, N.Delhi., 1988
 3. Seminar Issue on Urban Conservation
 4. Fielden, Bernard M. and Jokilehto, Jukka. (1998). Management Guidelines for World Cultural Heritage Sites. Rome: ICCROM.
 5. Tandon, Rajeshwari, editor. (2002). A Case for National Policy for Heritage Conservation & Management. New Delhi: INTACH, August 2002.
 6. Feilden, Bernard. (1989). Guidelines for Conservation: A Technical Manual. New Delhi: Indian National Trust for Art and Cultural Heritage (INTACH).
 7. Indian National Trust for Art and Cultural Heritage (INTACH). (1999). Architectural Heritage Division, New Delhi. Conserving the Heritage of Our Historic Cities: Pre Seminar Working Document. New Delhi: INTACH.
- Bisht, A.S., et al. (2000). Conservation of Cultural Property in India. Agam Kala Prakashan, Delhi

21AR4124B SET DESIGN

Course code	21AR4124B
L-ST-P-S	3-0-0-0
Credits	3
Contact Hours	3
Prerequisite	Nil

Course Outcomes for 21AR4124B

CO	Course Outcome	PO/PSO	BTL
CO1	To Understand the Background writing and Concept creation for PLAY.	PO9	2
CO2	To Study the Technology and concepts involved in Film set design.	PO3	2
CO3	To study and making of Background set to resemble the feature, Variation nasality in Lay outing Set	PO3	2
CO4	To Produce a Mock model on Concept allotted and study Lighting and prop Installations.	PO4	2

Dance, drama, lecture, theatre, film set design, set lay outing, table top set, event set

Syllabus:

DANCE/ DRAMA/ LECTURE/ THEATRE: Background study of the Event Scenario. Historical Evolution of the stage, degree of encirclement in various types of stage designs such as open air, arena, thrust in and proscenium stages, Script and story board, Terminology and Theory of Stage Design, Technical aspects like Sound, Lighting and Colour scheme, Visualization of and creation of sets e.g. with backdrops and scenery, Set design with appropriate props, Costume design and make up, Expenses.

FILM SET DESIGN: Film set designs with response to camera positioning and movement, Indoor and outdoor shooting, Film sets as a creation of virtual environment appropriate for the scenery and shots, Support structure for film set erection for indoor and outdoor shooting, Architects role in cinematography: visualization, story board frames, Proportions, Computer generated stage set up: Mixing and editing, Exploring various materials of stage props, Budget

SET LAYOUTING: Principles of layout for creating effective visual signage and explore the unique problems, technique, theory, and approaches of signage in film, theatre, and other forms of mediated exhibition. Introduction to design application for building signage.

TABLETOP SET UP: Stop motion Animation and computerized animation, Concepts or story, Tabletop miniature box model, Lighting and special effects, Voice over, music and mixing, Overall editing and final presentation, Costing.

EVENT STAGE: Concept and design, Ambience lighting and special effect, Stage props: Video wall presentation, sound and acoustics, Cost and estimation.

References:

1. Stage Design: A Practical Guide by Gary Thorne.
2. Theatre Design: Behind the Scenes with the Top Set, Lighting, and Costume Designers by Babak A. Ebrahimian.

21AR4125A ADVANCED BUILDING TECHNIQUES

Course Code	21AR4125A
L-ST-P-S	2-0-0-0
Credits	2
Contact Hours	2
Prerequisites	Nil

COURSE OBJECTIVES:

The objective of the course is to introduce the students to the latest development in construction and building industry.

To Enhance technical skills in the field of construction technology through an understanding of specialized applications and processes

COURSE OUTCOMES:

CO	Course Outcome	PO/ PSO	BTL
CO1	Familiarity with the advanced construction techniques in RCC and their adoptability to architecture.	PO2	2
CO2	Understand and apply various pre-engineered Concrete structures, adaptation in large span structures, pre-engineered Steel structures, adaptation in steel frames/space frames and their components.	PO2	2
CO3	Understand and apply different aspects and technologies involved in the construction of High-rise buildings	PO2, PO3	2
CO4	Introduction to advanced building materials and their application in the contemporary architectural practice	PO2	2

Syllabus:**CO-1**

Advanced construction method in RCC, prestressed concrete beams, slabs, frames, lift slab construction. Post tensioning, multi storied building frames, circular slabs, and beams. Uses of rapid hardening cement, Ready mix concrete, light weight concrete.

CO-2

Folded plates like prismatic, V type, trough type, pyramidal, prismatic. Shell structure, cyclonic shell, hyperbolic paraboloid.

CO-3

Construction techniques for erection of space frames, suspended roofs, membrane structure, cable structures. Studies on large span structures, multistoried buildings, marine structures, special application steel structures,

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CO-4

Advanced building materials, plastic, PVC, metals, synthetic boards, fireproof/ resistant boards/ tiles, acoustic materials, composite panels and their application, non-load bearing gypsum blocks, etc.

Reference Books:

1. Construction Technology by R. Chudley, Pearson, 2005
2. Building, Planning and scheduling by Gurcharan Singh, Standard Publication, 2009
3. Andrea Deplazes (Ed), Constructing Architecture: Materials processes structures- A Handbook Second Extended edition.
4. James Ambrose, Building Construction Enclosure System.

21AR4125B ARCHITECTURE PHOTOGRAPHY

Course Code	21AR4125A
L-ST-P-S	0-0-4-0
Credits	2
Contact Hours	4
Prerequisites	Nil

Introduction to Photojournalism and the contributions of photography to the professional practice of architecture and develop proficiency in this art using modern photography techniques.

Syllabus:

Introduction to architectural photography and role of the photographic image in the global world – basic instruction in Photojournalism

Equipment: cameras and lenses – techniques: film speed, exposure measurement, gray scale– photo-finishing and editing digital images.

Perspectives: Single Point, Two- Point, Three- Point and methods of correcting distortions – Lighting: External and Interior.

Required Reading:

1. M. Harris, "Professional Architectural Photography", Focal Press, 2001.
2. M. Harris, "Professional Interior Photography", Focal Press, 2002

References:

1. M. Heinrich, "Basics Architectural photography", Birkhauser Verlag AG, 2008.
2. Gerry Kopelow, "Architectural Photography: the professional way", 2007.

21AR4126A HOUSING

Course code	21AR4126A
L-ST-P-S	2-0-0-0
Credits	2
Contact Hours	2
Prerequisite	Nil

Course Outcomes of 21AR4126A

CO	Course Outcome	PO/PSO	BTL
CO1	Understand housing and Housing issues	PO1, PO3	2
CO2	Understand Housing, 5 year plans specific to housing	PO1, PO5	2
CO3	Understand Critical Sources of Finance	PO3, PO4	2
CO4	Understand Planning – Physical, Administration, Socio-Cultural, Sustainable, Financial, Future forecasts and Trends	PO3, PO4	2

Issues concerning housing in the Indian Context; Various agencies involved in the production of housing; Factors that influence housing affordability; Various schemes and policies of the government in the housing sector; Standards and guidelines for housing; Housing design typologies and the processes involved in housing project development; Case studies and post occupancy evaluation.

Syllabus:

Concept of shelter, timeline, Dynamics of housing (users, need, demand & supply, terminologies); Migration, urbanization, scale, scope, types and ownership. Housing issues – Significance in National development; statistics of housing, problems, Future Demands – slums, shortage etc.

Planning principles & Policies in Housing, 5 year plans specific to housing, Current scenario, Issues & Challenges. National & State policies; Development control regulations; Government & Private agencies, Schemes – Public Private Partnership, Slum rehabilitation Authority, Redevelopment etc. Study of International and Various countries policies in comparison to India.

Economics of Housing – Concepts, issues, valuation, rent, development cost; Low-cost housing, mass housing, Affordable Housing, Sources of Finance – Banks, Finance agencies. Case studies and exploration and analysis of housing schemes for Rural & Urban areas.

Study of user profiles, Planning – Physical, Administration, Socio-Cultural, Sustainable, Financial, Future forecasts and Trends. Contemporary solutions for housing like Bunker houses, 3D printing, Tube houses, Container housing.

Required Readings:

1. Babur Mumtaz and Patweikly, *Urban Housing Strategies*, Pitman Publishing, London, 1976.
2. GeoffreyK.Payne, *Low Income Housing in the Development World*, John Wiley and Sons, Chichester,1984.
3. John F.C.Turner, *Housing by people*, Marison Boyars, London, 1976.
4. Martin Evans, *Housing, Climate and Ocmfort*, Architectural Press, London, 1980.
5. *Forbes Davidson and Geoff Payne*, Urban Projects Manual, Liverpool University Press, Liverpool, 1983.

21AR4126B INTELLIGENT BUILDINGS

Course code	21AR4126B
L-ST-P-S	2-0-0-0
Credits	2
Contact Hours	2
Prerequisite	Nil

OBJECTIVES:

- To provide practicing engineers and managers with enhanced knowledge of advanced intelligent building technologies, system operation and control.
- Evaluate the characteristics and limitation of various automation system in buildings.
- Apply the underlying principles and theory to the operation and maintenance of each system.

Syllabus:

Intelligent Buildings

Concept, Definition, intelligent Architecture and structure, evolution of intelligent buildings, IB assessment criteria – intelligent homes.

Energy Management In Design

Natural building design consideration – Energy efficient strategies – Contextual factors – Longevity and process Assessment – Renewable energy sources and design- Advanced building Technologies- Smart buildings.

Energy Management In Services

Energy in building design – Energy efficient and environment friendly building – Thermal phenomena – thermal comfort – indoor air quality – passive heating and cooling systems – Energy Analysis – Active HVAC systems- Preliminary Investigation – energy audit – types of energy audit – Energy flow diagram – Energy consumption/unit production – identification of wastage – priority of conservative measures – Maintenance of management program.

Building Energy Conservation Technologies

Standards of energy efficiency in building. Trends in energy consumption. Energy audit: evaluation of energy performance of existing buildings, use of computer models, impact of people behavior. Energy efficiency in buildings: approaches, materials and equipment, operating strategies, evaluation methods of energy savings. Optimum Selection of energy sources. Air-to-air energy recovery.

Control Systems in Buildings

Introduction to automatic control systems, control issues related to energy conservation, interior air quality and thermal comfort in buildings – ventilation. Classification of HVAC control system: selection and sizes of sensors, actuators and controllers. Practical HVAC control system Designing and tuning controllers – Building automation systems, design for security.

REFERENCES:

1. Moore F., "Environmental control system" McGraw Hill, Inc., 1994.
2. Brown, G Z, Sun, "Wind and Light: Architectural design strategies", John Wiley, 1985.
3. Cook, J, Award - "Winning passive Solar Design", McGraw Hill, 1984.
4. James M Sinopoli, "Smart Building Systems for Architect", Owners and Builders Publisher, Butterworth- Heinemann, 2009.

21AR4150 ARCHITECTURE DESIGN STUDIO - VII

Course code	21AR4150
L-ST-P-S	0-10-0-0
Credits	15
Contact Hours	10
Prerequisite	21AR3247

Course Outcomes for 21AR4150

CO	Course Outcome	PO/PSO	BTL
CO1	To memorize anthropometry, circulation patterns, importance of services and building techniques	PO2, PO4, PO10, PSO1	2
CO2	To understand and apply the integration of services into intelligent sustainable building case study	PO2, PO4, PO9	3
CO3	To Create and design spatial planning and functionality in Low Rise – High Density Project. (Project 1)	PO2, PO4, PO9, PO10	4
CO4	To analyze the spaces, connectivity and the standards of sustainable and service intensive building. Case study . To create design of a sustainable service integrated intelligent green building in High Rise – High Density Project. (Project 2)	PO2, PO4, PO9, PO10, PSO2	6

This studio-based course synthesizes the knowledge gained from other courses and is central to the learning and practice of architecture. This course will engage in using conventional methods and linear processes of design to more exploratory nonlinear methods. The scale and complexity will increase progressively from lower semesters to senior semesters.

Syllabus:

Issues related to housing shortages, basics of housing finance, incremental housing, sites and services schemes, slums and squatter settlements are to be discussed in the class. The students are expected to design in a climate responsive and environment friendly way while planning medium sized housing complexes. The students are especially expected to showcase knowledge on the appropriate technology for low-cost housing, Landscape Design, Disaster Resilient Buildings and Quantity Estimation & Specifications.

The students are expected to carry out detailed site analysis, documenting physical features, vegetation, landforms soil characteristics, slope analysis and natural drainage patterns. Site planning exercise should depict understanding of vehicular and pedestrian movement patterns, land grading and conservation of ecologically sensitive features; They are also expected to be conscious about the need for energy conservation through passive design. They will apply advanced simulation and modelling techniques to orient their buildings and decide energy performance parameters. Sample quantity estimates and specifications are to be prepared.

STUDIO EXERCISE

There could be two design exercises: low-rise high-density housing and high-rise high density housing. Also housing and facilities for other user groups - Old age Home, orphanage, working women's hostel, home for physically and mentally challenged While designing socio-economic determinants, regulatory and technological alternatives shall be studied in detail. Exercises in simulation and conceptual modelling shall be conducted. Application of concepts of project phasing, financing and construction planning are to be applied.

Reference books:

1. Clapham, D., Clark, W. A. V. and Gibbs, K. (2012). The Sage Handbook of Housing Studies. London: Sage Publications.
2. Ferre, A. and Tihamer, S. H. (2010). Total Housing: Alternatives to Urban Sprawl. New York: ACTAR Publishers.
3. Greater London Council. (1978). An Introduction to Housing Layout: A GLC Study. London.
4. Levitt, D. and Levitt, B. (2010). The Housing Design Handbook. New York :Routledge.
5. Untermann, R. and Small, R. (1977). Site Planning for Cluster Housing. Van Nostrand Reinhold.
6. Huxtable, A-L. (1984). Tall Buildings Artistically Reconsidered.
7. Kloft, E. and Johann, E. (2003). High-rise Manual: Typology and Design, Construction and Technology, 1st Ed. Basel :BirkhauserVerlag AG.
8. Markus, K., Rollbacher, R., Herrmann, E., Wietzorrek, U. and Ebner, P. (2009). Typology+:Innovative Residential Architecture. Basel :BirkhauserVerlag AG.

21AR4148 WORKING DRAWING-1

Course code	21AR4148
L-ST-P-S	0-0-4-0
Credits	2
Contact Hours	4
Prerequisites	Nil

Course Outcomes for 21AR4148

CO	Course Outcome	PO/PSO	BTL
CO1	To introduce Working drawings and their significance in the construction of buildings.	PO1, PO7	2
CO2	To teach students the essential components of working drawings, notations, drawing standards,	PO4, PO7	2
CO3	To strengthen the students' knowledge about preparing working drawings for various building elements.	PO6, PO8	3
CO4	To Improve the construction details knowledge	PO9, PO10	5

Working drawings, vendor drawings, Preparation of drawings, working drawing details

Syllabus:

Introduction to working drawings: shop drawings / vendor drawings.

An exercise in fundamental elements in a “Working Drawing-Plan” an assignment on a typical standard “Working Plan”.

Various formats for working drawing preparation, various types of vendor drawings, such as aluminum composite panels, steel doors, fire rated doors, curtain wall systems, aluminum windows, etc.

Working drawing details: a. Developing Key plans, General Arrangement Plans, Part plans, Roof Plan / Terrace Plan and the like. b. Excavation drawings, Foundation drawings, Center-line drawings, Floor Plans, Sections, Elevations. c. Basic internal electrical and plumbing.

Reference Books:

1. Building and Construction Authority. (2005). CONQUAS-21. Singapore : The BCA Construction Quality Assessment System.
2. Jefferis, A. and Madsen, D.A. (2005). Architectural Drafting and Design. 5th Ed. New York : Thomson Delmar Learning.
3. Jeong, K-Y. (2010) Architecture Annual. Seoul :Archiworld Co.
4. Joe, B. (Ed). (2002). Details in Architecture: Vol. I-V. Victoria : The Images Publishing group. Osamu, A. W., Linde, R. M. and Bakhoum, N. R. (2011). The professional practice of architectural working drawings. 4th Ed. Hoboken : John Wiley & Sons.
5. Weston, R. (2004). Plans Sections Elevations – Key buildings of the twentieth century. London : Laurence King Publishing.

21AR4226 BUILDING CONSTRUCTION AND MANAGEMENT

Course Code	21AR4226
L-ST-P-S	3-0-0-0
Credits	3
Contact Hours	3
Prerequisite	Nil

Course Outcomes for 21AR4226

CO	Course Outcome	PO/PSO	BTL
CO1	To understand the Objectives and Methods of project Management System	PO3, PO7 PO8	2
CO2	To understand various Tools and Techniques to facilitate efficient Management of Projects	PO3, PO9	2
CO3	To Analyze Project cost model and steps involved in cost optimization	PO6, PO8	3
CO4	To Applying Scientific Evaluation Techniques to Manage Project Durations and resources with Examples	PO8	4

Project management concepts–objectives& scope, planning /monitoring & control, scheduling / Quality & cost; Traditional management system; Development of bar chart; CPM networks Merits and Demerits; PERT network, theory of probability and statistics; Cost model and cost optimization; resource allocation–resource smoothing, resource leveling; Project Feasibility study, Real estate & regulatory strategies, Facility Programming & Planning, Design management, EPC, Testing & commissioning.

Syllabus:

Introduction to Project Management:

Project management concepts-objectives, planning, scheduling Controlling and role of decision in project management. Traditional management system, Gantt’s approach, Load chart. Progress Chart, Development of bar chat, Merits and Demerits.

Project Programming and Critical Path Method:

Project Network-Events Activity, Dummy, Network Rules, Graphical Guidelines for Network, Umbering the events, Cycles, Development of Network-planning for Network Construction, Models of Network construction, steps in development of Network. Work Break Down Structure, hierarchies. Concepts: critical path method-process, activity time estimate, Earliest Event time, Latest allowable Occurrence time, start and finish time of activity, float, critical activity and critical path-problems.

Analysis: Cost model-Project cost, direct cost, indirect cost, slope curve, Total project cost, optimum duration contracting the network for cost optimization. Steps in cost optimization, updating, resource allocation-resource smoothing, resource leveling.

Programming Evaluation Review Technique:

Pert network, introduction to the theory of probability and statistics. Probabilistic time estimation for the activities for the activities of PERT Network. Computerized Project Management: Introduction: Creating a New project, building task. Creating resources and assessing costs, Refining your project. Project Tracking-Understanding tracking, recording actual. Reporting on progress. Analyzing financial progress

Reference Books:

1. S.P. Mukhopadhyay, "Project Management for architects and Civil Engineers", IIT, Kharagpur 1974.
2. Jerome D. Wiest and Ferdinand K. Levy, "A Management ide to PERT/CPM", prentice hall of Indian pub. Ltd. New Delhi 1982.
3. SR.A. Burgess and G. White, "Building production and project management", the construction press,London 1979

21AR4227A BEHAVIOURAL ARCHITECTURE

Course code	21AR4227A
L-ST-P-S	3-0-0-0
Credits	3
Contact Hours	3
Prerequisite	Nil

Course Outcomes for 21AR4227A

CO	Course Outcome	PO/PSO	BTL
CO1	To study the activity related to Age groups in public place planning.	PO1, PO4	2
CO2	To Understand the Behavioural Interface & Building systems in relation to this.	PO6, PO10	2
CO3	To Understand the Behavioural Design process and execution to create evaluation methods.	PO3, PO9	2
CO4	To study and Understand the Influence Behavioural Architecture on Urban Environment.	PO3, PO9	2

Principles and percepts of issues as related to architectural design in theory and practice; Appreciation of architecture with respect to man and his behavior; Nature and Design; 12 Principles of organization on Nature; Ideas and Intent in design - Intuitive, contextual, Iconic, Experiential, Environmental, Energy based, Symbolic, Modular; Ideologies/ philosophies from the practice of architecture through contemporary history.

Syllabus:

Introduction to Behavioural Architecture: Designing for pattern and activities, Archetypal activities/Archetypal spaces: planning of public spaces with reference to age groups and activities.

Building Systems: Room use, geometry & meaning, hidden behavioural assumptions, adjacencies, vertical bypass & horizontal bypass, various stages in the design of building subsystems.

Building – Behavioural Interface: Geometry of spaces, their meaning & connotations, Social organization of buildings, Behavioural assumptions in the planning of new towns and neighbourhoods, borrowed space.

Behavioural Design: Process organization chart, affinity matrices, pictograms: behavioral design process model, design context, activity/adjacency relationship, evaluation chart, Area use frequency program, simultaneous use, community utilization map, occupancy load profile, defensible space, EDRA etc.,

Urban Environment: Patterns of activity in time and space, the ecology of a neighborhood park and playground, cross-cultural issues, social & psychological issues in the planning of new towns, environmental perceptions and migration, awareness and sensitivity to open spaces, environmental cognition.

References:

1. Burnette, C. (1971). Architecture for human behaviour Philadelphia Chapter: AIA.
2. Canter, D. and Lee, T. (1974). Psychology and the built environment. New York: Halstead Press.
3. Christopher, A. et al. (1977). A pattern language. New York: Oxford University Press.
4. Clovis, H. (1977). Behavioural architecture. McGraw Hill.
5. Lynch, K. (1973). The image of a city. Cambridge:MIT.
6. Sanoff, H. (1991). Visual research methods in design. New York: John Wiley & Sons.
7. Zeisel, J. (1984). Enquiry by design: Tools for environment – behaviour research. Cambridge: Cambridge University Press.

21AR4227B DISASTER MITIGATION AND MANAGEMENT

Course code	21AR4227B
L-ST-P-S	3-0-0-0
Credits	3
Contact Hours	3
Prerequisite	Nil

Course Outcomes for 21AR4227B

CO	Course Outcome	PO/PSO	BTL
CO1	To Understand the necessity for disaster management and measures that are to be followed.	PO9	2
CO2	To Study the Disaster preparedness and Involving Design Considerations for buildings	PO3	2
CO3	To study the Design considerations for Disaster management and precautions.	PO3	2
CO4	To Understand the Relief & Rehabilitation for Disasters	PO4	2

Disasters, their significance and types; Relationship between vulnerability, disasters, disaster prevention and risk reduction is understood. Inter- relationship between disasters and development; Disaster Risk Reduction (DRR); Disaster Risk Management in India; Disaster Management Act and Policy; Role of GIS and Information Technology Components in Preparedness, Risk Assessment, Response and Recovery Phases of Disaster; Disaster Damage Assessment; applications and case studies.

Syllabus:

Introduction: Disaster Management & its necessity; Types, characteristics, causes & impacts; Natural disasters, Manmade disasters, Epidemics; Institutional & Legal arrangement; NDMA; Financial arrangement; Role of Architect at all stages of Disaster Management.

Disaster Prevention & Mitigation: Risk Assessment & Vulnerability Mapping; Long-term measures; Review & revision of building bye-laws & codes; Hospital Preparedness; Retrofitting; Mitigation strategies, Trigger Mechanism; Capacity building; Awareness programs. Architectural Design considerations.

Disaster Preparedness: Forecasting & Early Warning Systems: Plans of action for probable disasters; emergency, medical, casualty management systems; Resources needed; Training, Simulation & Mock Drills; Partnerships for Mitigation & Preparedness; Audit of buildings & infrastructure; Architectural

Design considerations. Response: Role of various agencies; Standard Operating Procedures (SOPs); Level of Disasters; Incident Command System (ICS); First & Other Key Responders; Medical Response; Information & Media Partnership; Search & rescue; Architectural Design considerations.

Relief & Rehabilitation: Temporary Relief Camps; Management of Relief Supplies; Provision of Intermediate Shelters; Relocation & reconstruction, repair & retrofitting of buildings & infrastructure; Socio-cultural-economic considerations; Capacity building for self-help construction; training & awareness programs. Architectural Design considerations.

References:

1. Mary C Comerio; Disaster Hits Home, New policy for Urban Housing Recovery, Oxford University Press, London; 2001
2. Proceedings – Learning from practice- Joint US and Italy Workshop- October 18- 23; 1992; National Science Foundation; US
3. Earthquake Resistant Design and Construction of buildings- Code of Practice- Bureau of Indian Standards; 1993
4. Encyclopedia of Disaster Management Policy and Administration, Vol. I, S. L. Goel, Deep of Deep Publication Pvt. Ltd., New Delhi, India.
5. Encyclopedia of Disaster Management Policy and Administration, Vol. II, S. L. Goel, Deep of Deep Publication Pvt. Ltd., New Delhi, India.

21AR4228A DISSERTATION

Course code	21AR4228A
L-ST-P-S	0-4-0-0
Credits	6
Contact Hours	4
Prerequisite	Nil

Course Outcomes for 21AR4228A

CO	Course Outcome	PO/PSO	BTL
CO1	To understand the importance of reasoning	PO7, PO8	2
CO2	To select the topic which may eventually culminate in the Architectural Design Thesis in the subsequent semester.	PO3, PO9	2
CO3	To select and apply the concept of reasoning to the chosen topic	PO6, PO8, PO7	3
CO4	To analyze the spaces, connectivity, and the standards of sustainable and service intensive building. Case study	PO10	5
CO5	To write a report on the research done in the topic with appropriate studies.	PO6, PO8, PO7	5

This is research writing in a thrust area in architecture. Methods of analysis should have a scientific basis and thorough investigative research is required from primary and secondary sources- through library research and literature review; documentation; etc. This can be a prelude to the 'Architectural Design Thesis'.

Syllabus:

Students may choose a topic related to Architecture and allied subjects. The topics must be vetted by the faculty. Emphasis must be on critical understanding, logical reasoning, and structured writing. Students may be encouraged to select the topic which may eventually culminate in the Architectural Design Thesis of the subsequent semester. Students can thus utilize this as an opportunity for pre-Thesis study, amounting to literature review and relevant case studies which are otherwise required for Thesis. By the end of the semester, students are expected to submit a written paper of approximately 3500 words. Standard referencing conventions and technical writing norms must be adhered to. Students are expected to present the progress of the study at various stages of the semester. Final assessment of the students' work may be based on written Paper as well as oral communication. However, greater weightage may be given for writing skills and research content of the study

Reference books:

1. Anderson, J. and Poole, M. (1998). Thesis and assignment writing. Brisbane : John Wiley.
2. Borden, I. and Ray, K. R. (2006). The dissertation: an architecture student's handbook. 2 nd Ed. Oxford : Architectural Press.
3. Fink, A. (1998). Conducting research literature reviews: from paper to the Internet. Thousand Oaks :Sage.
4. Murray, R. (2005). Writing for academic journals. Berkshire: Maidenhead, Open University Press.

21AR4228B THESIS SEMINAR

Course code	21AR4228B
L-ST-P-S	0-4-0-0
Credits	6
Contact Hours	4
Prerequisite	Nil

Syllabus:

This course is meant to give students practice speaking in front of an audience. and to explore topics in detail. Students will explore and research topics of their interest; then organize presentations for faculty and other students. The topics must be approved by the Course Coordinator (CC) in advance.

To help students improve as speakers, each student will receive feedback from their CC, Guides, other faculty members and fellow students. All enrolled students must be present at each seminar. It is expected that students will actively participate by asking questions of the speaker.

The seminar process includes topic selection, synopsis submission, research on the topic and finally a presentation. Students should strive for professionalism in all aspects of this class. Speakers should dress professionally. Students can take aid of various mediums of visual presentation ranging from Power points to films to working models to best explain their topic. It is the student's responsibility to arrange for any equipment they may require.

Each student will give two 20-minute presentations. The student's seminar should cover a minimum of four related papers in the topic chosen. First one will be a practice seminar in front of the class to get immediate feedback and constructive criticism. The entire department we will invited for the second one. Students to submit a detailed report describing their presentation.

Your final grade will be determined by several factors: the quality and content of your seminars, your improvement from the first to the second, your participation in the class, your report, and your ability to meet deadlines.

21AR4229A URBAN DESIGN

Course code	21AR4229A
L-ST-P-S	2-0-0-0
Credits	2
Contact Hours	2
Prerequisite	Nil

Course Outcomes of 21AR4229A

CO	Course Outcome	PO/PSO	BTL
CO1	To memorize Urban Design terminologies	PO2, PO4, PO10, PSO1	2
CO2	To understand Users and Activities in a city	PO2, PO4, PO9	2
CO3	To understand Public spaces, streets & Transport	PO2, PO4, PO9, PO10	2
CO4	To understand Application of Urban Design	PO2, PO4, PO9	2

Urban design as a discipline; Components of a city and their interdependent roles; Determinants of urban form; Evolution of historic urban form.; Theories and illustrations of Urban design and the interpretation of the urban form in different ways and layers; Identity and ‘place’ making; architectural codes and imageability; contemporary urban issues ; sustainable urban design; case studies.

Syllabus:

Introduction to Urban Design; Terminologies; Urban Design as a Multi-Disciplinary field; Stakeholders and their role in the process of Urban Design. Users and Activities in a city and their Analysis; User needs and behavioral studies; Socio-cultural and Socio-economic aspects of people; Memory and mentalmapping

Urban Design – Scope, Scale, Strategies, levels & legislation; “FIVE ELEMENTS” in a city; People-Centric Design and Public Participation. Urban morphology & Urban Character; Elements and aspects of Urban Design; Built & unbuilt spaces; Buildings; Public spaces, streets & Transport; Pedestrianization& streetscape; Movement pattern; Services; Defensible Spaces; Environment and Urban Design.

Survey techniques; Evolution Analysis; Townscape analysis; Perpetual structure; Permeability study (Privacy & Accessibility) & Visual Analysis; Constraints and possibilities; designing in a context and site planning; articulation of spaces; Flexibility, adaptability; Formulation of issues for intervention.

Application of Urban Design, Examples of Good Urban Design; New Urbanism, case studies and contemporary urban interventions.

Required Readings:

1. Babur Mumtaz and Patweikly, Urban Housing Strategies, Pitman Publishing, London, 1976.
2. Geoffrey K. Payne, Low Income Housing in the Development World, John Wiley and Sons, Chichester, 1984.
3. John F. C. Turner, Housing by people, Marison Boyars, London, 1976.
4. Martin Evans, Housing, Climate and Comfort, Architectural Press, London, 1980.
5. Forbes Davidson and Geoff Payne, Urban Projects Manual, Liverpool University Press, Liverpool, 1983.

Reference books:

1. Bridging the Urban housing shortage in India, NAREDCO
2. Report on trend and progress of Housing in India
3. Revisiting Low Income Housing, A review of Policies and perspectives by Pritika Hingorani
4. Housing Finance: A Study of Experiences of Commercial Banks by Dr. N. K. Thingalaya, Indian Institute of Banking and Finance, Mumbai
5. Housing and housing finance – A review of the links to Economic Development and poverty reduction by John Doling, Paul Vandenberg and Jade Tolentino, Asian Development Bank.
6. Urban Housing and Slums by A. K. Jain
7. Incremental Housing-A Proactive urban strategy by Reinhard Goethert, SIGUS, School of Architecture and Planning, MIT
8. Urban and regional development plans formulation and implementation guidelines, Volume – I, January 2015 by Government of India, Ministry of Urban Development
9. Sustainable housing for sustainable cities – A policy framework for developing countries by UN-Habitat

21AR4229B TRANSPORTATION PLANNING

Course code	21AR4229B
L-ST-P-S	2-0-0-0
Credits	2
Contact Hours	2
Prerequisite	Nil

21AR4253 URBAN DESIGN STUDIO

Course code	21AR4253
L-ST-P-S	0-8-0-0
Credits	12
Contact Hours	8
Prerequisite	21AR4150

Course Outcomes for 21AR4253

CO	Course Outcome	PO/PSO	BTL
CO1	Understand the role of Services at higher scale in Urban level	PO7, PO8	2
CO2	Understand and apply the integration of services into intelligent sustainable building case study	PO3, PO9	2
CO3	Create High Density Urban facility as a solution to the Urban area problems, Current issues. (Project-1)	PO6, PO8 PO7	3
CO4	Analyze the spaces, Transformation according lifestyle changes in Urban population, connectivity, and the standards of sustainable and service intensive building. Case study. Create design of a sustainable service integrated intelligent green building High Density Project. (Project 2)	PO6, PO8 PO7, PO10	5

This studio based course synthesizes the knowledge gained from other courses and is central to the learning and practice of architecture. This course will engage in using conventional methods and linear processes of design to more exploratory nonlinear methods.

Syllabus:**CREATION OF NEW PARADIGMS IN ARCHITECTURAL DESIGN**

Students are to be exposed to the complexities of large-scale architectural projects, often involving a group of buildings in a public realm and having multiple stakeholders. Students are encouraged to look beyond the concerns of individual building project to address the interface between public and private realm; and also contextualize their design interventions to the surrounding urban environs. The studio enables the students to apply the lessons learnt in the Urban Design class.

The students are expected to carry out site analysis and site planning at a real-life location, considering its location context, physical features, views, orientation, volumetric analysis and figure ground study of the built-form characteristics, visual imageries, streetscape and skyline analysis; pedestrian, vehicular circulation pattern, and utility networks. They also try to understand the correlation between physical, socio-cultural, environmental and socioeconomic dimensions of the built environments, so as to identify

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opportunities and constrains associated with large-scale urban interventions. Students are then expected

to apply this understanding to a realistic site to create physical environments through basic tools of master planning, such as: movement networks, open spaces, suggestive built form, infrastructure network and planning norms.

STUDIO EXERCISE

Design exercise could be any medium to large scale project in the public domain, situated within an existing (and preferably compact) urban fabric, such as: redevelopment of commercial areas, waterfront development, transit-hubs, market squares, densification along transit corridors, mixed use complexes. If intervention is in heritage areas, conservation strategies for along with revitalization techniques can also be attempted. The projects thus undertaken as group work will have to ultimately contribute ideas for the improvement of the quality of the urban environment. The projects are strictly follow the contemporary based life style.

Reference books:

1. Carmona, M., Heath, T. and Tiesdell, S. (2010). *Public Places Urban Spaces*. Oxford : Architectural Press.
2. Lang, J. T. (2005). *Urban Design: A Typology of Procedures and Products*. Oxford : Elsevier/Architectural Press.
3. Larice, M. and Macdonald, E. Ed. (2013). *The Urban Design Reader, 2nd Ed.* The Routledge Urban Reader Series. Abingdon, Oxon : Routledge
4. Krier, R. (1979). *Urban form and space*. London : Academy Editions.
5. Lynch, K. (1984). *Good city form*. Boston : MIT Press.
6. Marshall, S. (2009). *Cities design and evolution*. New York : Routledge.
7. Moughtin, C., Cuesta, R., Sarris, C. And Signoretta, P. (2003). *Urban Design - Methods and Techniques*. Oxford : Architectural Press.
8. Watson, D., Plattus, A. and Shibley, R. (2003). *Time-Saver standards for urban design*. New York : McGraw Hill.
9. Whyte, W. H. (1980). *The social life of small urban spaces*. Washington D.C : Conservation Foundation.

21AR4251 WORKING DRAWING-II

Course code	21AR4251
L-ST-P-S	0-0-4-0
Credits	2
Contact Hours	4
Prerequisite	Nil

Course Outcomes for 21AR4251

CO	Course Outcome	PO/PSO	BTL
CO1	To train the students to prepare detailed Working drawings for effective execution at construction site,.	PO7, PO8	2
CO2	To teach students the essential components of working drawings, notations, drawing standards,	PO3, PO9	2
CO3	To preparation of integrated services drawings, and detailing for various types of drawings and methods of transmittals and record keeping.	PO6, PO8 PO7	3
CO4	To update the latest materials knowledge with specifications	PO10	5

Working drawing details, schedules, development drawings, services layouts

Syllabus:

An overview of site marking procedure, “techniques/thumb rules” to ensure effective translation from “working drawings” to actual site execution, and developing Site Plan , Site Marking Plan , Site Grading / Levelling Plan.

Integration with schedule of joinery, schedule of hardware, finishing materials, method of dimensioning, appropriate section line markings.

Developing elevations, sections, part sections, wall sections integrated with finishing materials, etc. Construction details for lifts, dumb waiters, escalators, travelators.

External Plumbing Layout and details. 6. Details of Septic tank. An overview of “all service systems integrated drawings” and the effectiveness of “Building Information modeling – BIM” to achieve the same.

“Working drawing titles”, drawing documentation/record keeping, drawing transmittals, revision updating / superseded drawings, and “as built drawings”

Reference Books:

1. Building and Construction Authority. (2005). CONQUAS-21. Singapore : The BCA Construction Quality Assessment System.
2. Jefferis, A. and Madsen, D.A. (2005). Architectural Drafting and Design. 5th Ed. New York : Thomson Delmar Learning.
3. Jeong, K-Y. (2010) Architecture Annual. Seoul :Archiworld Co.
4. Joe, B. (Ed). (2002). Details in Architecture: Vol. I-V. Victoria : The Images Publishing group.
5. Osamu, A. W., Linde, R. M. and Bakhoun, N. R. (2011). The professional practice of architectural working drawings. 4th Ed. Hoboken : John Wiley & Sons.
6. Weston, R. (2004). Plans Sections Elevations – Key buildings of the twentieth century. London : Laurence King Publishing

21AR5154 PRACTICAL TRAINING

Course code	21AR5154
L-ST-P-S	0-0-4-0
Credits	20
Contact Hours	40
Prerequisite	21AR4253

Course Outcomes for 21AR5154

CO	Course Outcome	PO/PSO	BTL
CO1	To expose students to the daily realities of an architectural practice through Practical Training	PO7, PO8	2
CO2	To facilitate an understanding of the evolution of an architectural project from design to execution.	PO3, PO9	2
CO3	To enable an orientation that would include the process of development of conceptual ideas, presentation skills.	PO6, PO8 PO7	3
CO4	Involvement in office discussions, client meetings, development of the concepts into working drawings, tendering procedure.	PO10	5
CO5	Site supervision during execution and coordination with the agencies involved in the construction process.	PO6, PO8 PO7	5

Orientation under an architect that would include the process of development of conceptual ideas, presentation skills, involvement in office discussions, client meetings, development of the concepts into working drawings, tendering procedure, site supervision during execution and coordination with the agencies involved in the construction process and to facilitate the understanding of the evolution of an architectural project from design to execution.

Syllabus:

Practical Training will be done in offices/ firms in India in which the principal architect is registered with the Council of Architecture. If students opt for offices/ firms abroad, they need to check that the Principal Architect is registered with the Country/ Region's Approving Authority. The students are expected to work on presentation/ working drawings, specifications, and quantity estimation. The students are also expected to familiarise themselves with coordination of structural and services drawing with architectural drawings. It is desired that the students undertake site visits and understand construction practices.

The progress of practical training will be assessed periodically internally through submission of

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logbooks along with work done by the students in terms of drawings, reports, etc., along with the regular

progress report from the employers. The students are also required to submit a report describing various concepts learnt during training, experiences of site visit and estimation / costing activities etc.

21AR5228 ARCHITECTURAL PROFESSIONAL PRACTICE

Course code	21AR5228
L-ST-P-S	3-0-0-0
Credits	3
Contact Hours	3
Prerequisite	Nil

Course Outcomes for 21AR5255

CO	Course Outcome	PO/PSO	BTL
CO1	To expose students to the daily realities of an architectural practice through Practical Training	PO7, PO8	2
CO2	To facilitate an understanding of the evolution of an architectural project from design to execution.	PO3, PO9	2
CO3	To enable an orientation that would include the process of development of conceptual ideas, presentation skills.	PO6, PO8 PO7	2
CO4	Involvement in office discussions, client meetings, development of the concepts into working drawings, tendering procedure.	PO10	2

The architectural profession and the role of professional bodies and statutory bodies; Code of Conduct and ethics in professional practice and the mandatory provisions of the Architects Act 1972; Building bye-laws, Important legislations which have a bearing on the practice of architecture; Arbitration and other legal aspects; Project Management- tender and contract; Implications of globalization on professional practice with particular reference to WTO and GATS.

Syllabus:

2021-22 B. Arch Curriculum

Introduction: Architecture profession Importance of Architecture Profession, role of Architects in the society, Architects' Act 1972, Amendments & Provisions, registration of architects, relations with clients, contractors, consultants, public authorities. Ways of getting works; types of works, works partly executed by other architect; precautions to take before taking up the work; conditions of engagement between the architect and client. Role of Council of Architecture and Indian Institute of Architects, functions, constitution, and rules & regulations. Code of professional conduct & Ethics, Social responsibility, Publications.

Practicing Architecture Scope of work of an architect, Schedule of services, drawings to prepare, Terms & conditions of engagement, letter of appointment. Private practice, types of offices/firms, responsibilities & liabilities. Salaried appointment in public & private sector jobs, Architectural Competitions procedure. Scale of charges, applicable building byelaws, municipal approvals, development controls, zoning regulations, NBC, Master plan, Zonal plan.

Architect's Office Architect's office management, organization structure, responsibility towards employees, consultants & associates, maintenance of accounts, filing of records, balance sheet, Income tax, Service tax, Professional tax. Copy rights and patenting, correspondence, documentation, drawings, conducting meetings, Clerk of works, inspection, works measurement, certificate of payment to contractors, applicable legislations, registration of properties, stamp duty; insurance for new work and additions; insurable value of property, claim for damages.

Arbitration, Valuation and Easements Need/Scope of Arbitration, Indian Arbitration act, arbitrators, umpires, appointment, conduct, powers, duties, Sole/Joint arbitrators, Arbitration procedure, awards & impeachment. Techniques/elements of valuation, factors affecting valuation of land/building, compensation on acquisition, lease renewal/extension, standard rent, Cost of sale, Purchase & Mortgage. Easements, types, rights & features; acquisition/extinction/protection; Interim/permanent/ mandatory injunctions. dilapidation, insurance, estate development. Consumer protection act.

Architectural profession in the global market International Architectural competitions, Globalization, meaning & advantages, WTO/GATS, their relevance to architectural profession in India, Architectural practices in US, UK, Middle East & South Asian countries, Pre-requisite for Indians to work in other countries & vice versa, impact of IT on architectural practice, emerging trends in architectural collaborations.

References:

1. Apte, V. S. (2008). Architectural Practice and Procedure. Pune : PadmajaBhide.
2. Chappell, D. M. And Willis, A. (2005). The architect in practice. 9th Ed. Oxford : Blackwell Publications.
3. Charles, E. (1996). TQM and ISO 9000 for architects and designers. New York : McGraw-Hill.
4. COA. (1989). Architects (Professional conduct) Regulations, Architectural Competition guidelines. Council of Architecture Publications.
5. COA. (2005). Handbook of Professional Documents. Council of Architecture.
6. Eldred, G. W. (2008). The Beginner's Guide to Real Estate Investing. John Wiley & Sons.
7. Lewis, R. K. (1985). Architect? : a candid guide to the profession. Cambridge : MIT Press.
8. Namavati, R. (1984). Professional practice. Mumbai : Lakhani Book Depot.
9. Rangwala, S. C. Valuation of Real Properties. Charotar Publications.
10. Piotrowski, A. and Williams, J. (2001). The Discipline of Architecture. University of Minnesota Press.
11. Scott, J. J. (1985). Architect's Practice. London : Butterworth. &'WTO and GATT guidelines.

21AR5255 ARCHITECTURAL THESIS

Course code	21AR5255
L-ST-P-S	0-12-0-0
Credits	18
Contact Hours	12
Prerequisite	21AR5154

Course Outcomes for 21AR5255

CO	Course Outcome	PO/PSO	BTL
CO1- CO5	Culmination of the development of the student's knowledge, attitudes and skills over the course of studies in architecture.	PO7,PO8	5

This is culmination of undergraduate studies and hence shall display the capability of the candidate to conceive/ formulate a design project and provide solution, aptly demonstrated through supporting research. The main areas of study and research can include advanced architectural design, including contemporary design processes, urban design including urban in fill, environmental design, conservation and heritage precincts, housing etc. However, the specific thrust should be architectural design of built environment. Preparation of presentation drawings, working drawings, detailed drawings and study model are part of the requirements for submission.

Syllabus:

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 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. Students can choose a topic of their choice in terms of design potential and/ or idea exploration to be taken up for completion. The topic could be project based with specific areas of study/ approach or study/ approach based leading to a project. If the latter, care should be taken to choose topics that can lead to sufficient architectural design component. Students should submit the topic for approval with a rough outline of the nature of the project, area of interest, study and design scope, challenges, possible case studies, methodology and outcome.

TENTATIVE TOPICS OF STUDY

The areas of study/research/design can include any of the broad areas of the discipline – contemporary needs of society, history, theory, sustainability, structural or service-oriented design, projects that involve complex planning and integration of several aspects, appropriate architecture, urban design, contemporary processes, social housing, urban oriented architectural design, conservation oriented architectural design, etc.

SUBMISSION REQUIREMENTS

The progress of work will be reviewed periodically throughout the semester. At the end of the semester, students should submit the final thesis project for the viva voce exam. The final submission will comprise of study sheets, optional study models, design approach sheets, optional design process models, design presentation sheets, final model, detailed drawings of an important part of the project, project report summarising the entire thesis work and soft copy of all the work.

Required Readings:

1. Linda Grant and David Wang, “Architectural Research Methods”, John Wiley Sons, 2002.

Reference books:

1. Stephen A. Kliment, Editor 'Building Type Basics' Series, Wiley.
2. Igor Marjanović, Katerina Rüedi Ray, Lesley Naa Norle Lokko, 'The Portfolio – An Architecture Student's Handbook', Routledge, 2003.
3. Arvind Krishnan & Others, “Climate Responsive Architecture”, A Design Handbook for Energy Efficient Buildings, TATA McGraw Hill Publishing Company Limited, New Delhi, 2007.