



SRI MANAKULA VINAYAGAR
ENGINEERING COLLEGE
(An Autonomous Institution)

Puducherry

SCHOOL OF ARCHITECTURE
B.ARCH ACADEMIC REGULATIONS-2020
(R-2020)

B.Arch – Bachelor of Architecture
(X- Semesters)

PREAMBLE

As per the recommendation of Council of Architecture, institutions of higher education need to carry out academic reforms in all arenas including admission policy, uniform academic calendar, introduction of Choice Based Credit System, continuous assessment and grading system. In keeping with the recommendation, SCHOOL OF ARCHITECTURE - SRI MANAKULA VINAYAGAR ENGINEERING COLLEGE has introduced Choice Based Credit System (CBCS) from the academic year 2020-21.

“ANNEXURE-I”

SRI MANAKULA VINAYAGAR ENGINEERING COLLEGE

Madagadipet, Puducherry 605107

SCHOOL OF ARCHITECTURE

B. ARCH REGULATIONS – 2020

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B. ARCH REGULATIONS- 2020

(For students admitted from the academic year 2020-21)

R.1.0 PROGRAMME EDUCATIONAL OBJECTIVES (PEOs):

Bachelor of Architecture curriculum is designed to prepare the graduates having attitude and knowledge

1. To enable a successful professional and technical career.
2. To enable a strong foundation in Humanities and Sciences, Engineering Sciences and Architectural Design Skills.
3. To impart knowledge of the theories and practices in the field of Architecture.
4. Engage in life-long learning to keep themselves abreast of new developments.
5. To put into practice and inspire high ethical values and technical standards.

R.2.0 PROGRAMME OUTCOME (PO):

- a. Ability to gain knowledge of Humanities, Sciences and Architecture.
- b. Ability to understand elements of Architecture and apply basic principles in Architectural Design.
- c. Ability to identify social, economic and cultural issues in Architectural Design.
- d. Ability to analyze and apply theoretical knowledge to achieve Architectural Design solutions.
- e. Ability to understand ethical and professional responsibilities.
- f. Ability to review, comprehend and report technological developments.
- g. Ability to understand real life situation of Architectural Practice.
- h. Ability to communicate effectively and work in inter disciplinary groups.

R.3.0 Admission

R.3.1 All candidates need to qualify an Aptitude Test conducted by Council (i.e. NATA) for admission to B.Arch, Course. Therefore, all candidates who have passed in any other aptitude test in Architecture conducted by other authorities **shall also be required to qualify NATA in order to be eligible for admission to the B.Arch. Course.**

R.3.2 “ 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 with Physics, Chemistry & Mathematics subjects or passed 10+3 Diploma Examination with Mathematics as Compulsory subject.”

NOTE: The above Eligibility is applicable for this Academic Year 2021-2022 due to Pandemic Situation; this may vary if the Council of Architecture is Revising the eligibility criteria again in Upcoming Years.

R.4.0 Structure of the B. Arch Programme

R.4.1The complete Programme of study will consist of 6 categories of courses distributed over 10 semesters with two semesters per year as listed below:

- 1. BS- BASICSCIENCES**
- 2. HS - HUMANITIES and SOCIAL SCIENCES**
- 3. ES- ENGINEERING SCIENCES**
- 4. PC- PROFESSIONALCORE**
- 5. PE- PROFESSIONALELECTIVE**
- 6. PAEC-PROFESSIONAL ABILITY ENHANCEMENT COURSES**

R.4.2 The B. Arch Programme will have a curriculum and course contents (syllabus) proposed by the Boards of Studies in Architecture and approved by the Academic Council.

1. Theory Courses such as Mathematics, Mechanics of Structure, Human Settlement, History of Architecture etc.
2. Theory cum Studio Courses such as Building Services, Site Surveying and Planning and Climate Responsive Architecture.
3. Design and Construction based Studio Courses comprising of Visual Arts, Architectural Graphics, Building Materials and Construction, Basic Design and Architectural Design.
4. Elective Courses for Specialization in related fields.
5. A Practical Training in the VIII Semester for exposure in the Architectural Profession.
6. Architectural Thesis in the X Semester.
7. Compulsory Educational Tour and Study / field / site visits.
8. NCC/NSS/NSO/YRC activities for character development.

R.4.2.1 Professional Training

Students have to undergo practical training for duration of one semester with minimum of 90 working days, during the VIII semester of the course in an approved Architectural firm under an Architect Registered with Council of Architecture India with a minimum of 5 years Professional Standing with the approval of Principal of the Institution. The training can also be undertaken in registered government organization such as CMDA, PWD and INTACH etc. The portfolio of the drawings done during the training period will be assessed at the end of the semester by internal faculty member. Moreover, it has to be certified by the concerned Architect/organization for the successful completion of the professional training. The students should arrange to send monthly progress reports from the respective offices imparting training and completion certificate after the Training.

Architectural Practical Training in Foreign Country shall be done under the registered Architect of that Country and to be approved and monitored by the Head of the Institution.

The college will provide 50% mark as internal whereas the external examiner will provide 50% mark in the Viva Voce at the end of Semester.

R.4.2.2 Educational Tour

Every student is required to undertake an educational tour approved by the department to various places in India.

South India Tour will be on Fourth Semester.

North India Tour will be on Seventh Semester.

The Educational tour should be evaluated internally based on an assignment submitted individually.

R.4.2.3 Site / Field Visit

Every student is required to undergo site or field visits each semester for all Theory cum Studio and Studio Courses as per Council of Architecture Norms, starting from the first semester of the Programme.

R.4.2.4 Value Added Course / Industry Relevant Course / Online Course

Training in the following Certification Courses on Latest Software Tools that are useful and industry relevant for the Architecture Professionals to bridge the gap between Academia and Industry.

1. Photoshop.
2. 3D Studio Max.
3. Auto CAD.
4. REVIT.
5. Sketch Up.
6. Lumion.
7. V-Ray.
8. Grasshopper.
9. Illustrator.
10. Rhino 3D.

R.4.3 Credits are assigned to the courses based on the following general

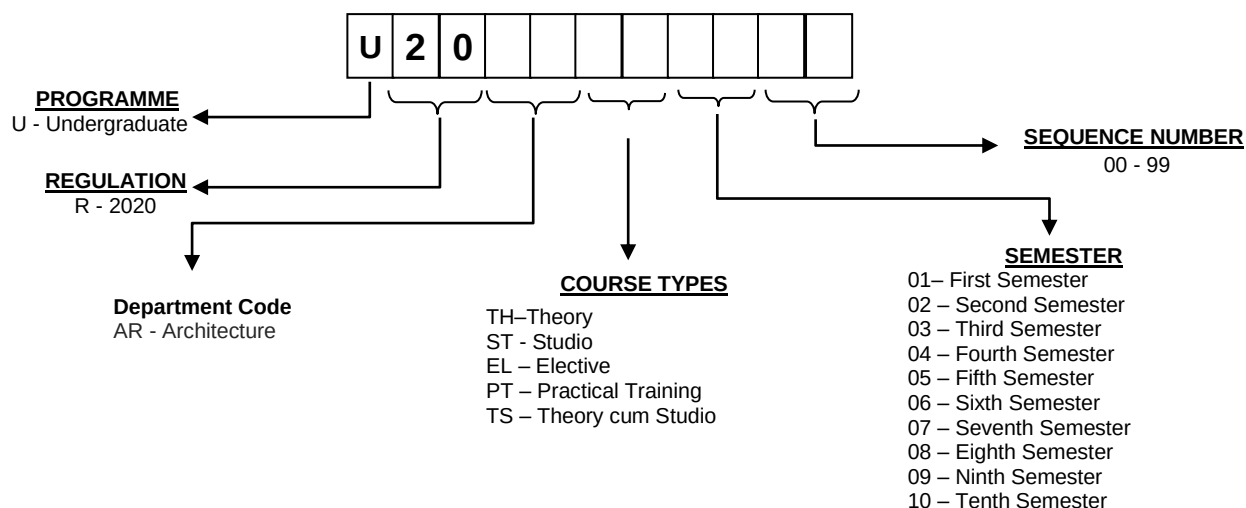
Sl.NO	Subject Area	Credit per Semester										Credits Total
		I	II	III	IV	V	VI	VII	VIII	IX	X	
1	HS	9		3		3	3	3		6		27
2	BS	3		3	3							9
3	ES	3	6	3	6	6		3				27
4	PC	6	15	13	10	11	11	11		11		88
5	PE					3	6	6		3	3	21
6	PAEC				3		3		14		18	38
TOTAL		21	21	22	22	23	23	23	14	20	21	210
Non-Credit / mandatory		NCC / NSS /YSR Rotaract		Rural Study Tour		All India Tour						

R.4.4 The curriculum of any branch of the B. Arch Programme is designed to have 210 credits for the award of the B. Arch degree.

R.4.5 The medium of instruction, examination and project reports will be in English.

R 5.0 Classification and numbering of courses:

11-character alphanumeric coding of courses:



R 6.0 Category of courses

Core Courses:

There will be a Professional Core Course in every semester. This is the course which should compulsorily be studied by a candidate as a core requirement

to complete the requirement of a degree in a said discipline of study.

Elective Courses: -

Elective course is a course which can be chosen from a pool of papers. It may be:

- Supportive to the discipline of study
- Providing an extended scope
- Enabling an exposure to some other discipline/domain
- Nurturing candidate's proficiency/skill.

An elective may be "Discipline centric" called "Professional Elective."

R.7.0 Discontinuation of Course

If a candidate wishes to temporarily discontinue the course for valid reasons, he/she shall apply through the Head of the Institution in advance and obtain a written order from the College permitting discontinuance. A candidate after temporary discontinuance may rejoin the course only at the commencement of the semester at which he / she discontinued, provided he/she pays the prescribed fees to the Institution. However it may be noted the fees/Charges once paid shall not be refundable. The total period of completion of the course reckoned from the commencement of the first semester to which the candidate was admitted shall not in any case exceed 8 years, excluding the period of discontinuance.

R.7.1 Provision for Withdrawal.

A Candidate may, for valid reason, and on the recommendation of the Head of Institution to withdraw from the writing the entire semester examination as one unit. The Withdrawal application is valid only if applied before 15 days to the commencement of End Semester examination. Withdrawal shall be permitted only once during the entire course. Other condition being satisfactory, candidates who withdraw are also eligible to be awarded DISTINCTION whereas they are not eligible to be awarded a rank.

In case of any emergency situation for withdrawing from the end semester

examination without Prior Intimation, final decision can be taken by Principal and Controller of Examination.

R.8.0 Minimum and Maximum Duration of the Programme

R.8.1 Each semester shall normally consist of 90 working days or 450 hours. A student is ordinarily expected to complete the B.Arch. programme in ten semesters for regular programme. However, a student may complete the programme at a slower pace by taking more time but in any case, not more than 16 semesters under regular programme excluding semester withdrawn on medical grounds.

R 8.2 In compliance with the rules and norms of COA, no student will be allowed to complete the B.Arch. degree in less than 10 full-semesters.

R.9.0 Discipline

R.9.1 Every student is required to maintain discipline and decorous behavior both inside and outside the College campus and not to indulge in any activity that will tend to bring down the prestige of the Organization.

R.9.2 Any act of indiscipline of a student is first to be considered by the Discipline and Welfare Committee of the Department/School for necessary action. If the issue demands more serious consideration, the act of indiscipline will be reported to the Head of the Institution, The Committee will enquire into the charges and recommend suitable action if the charges are substantiated. The Head of the Institution will take appropriate action on the recommendation of the Discipline and Welfare Committee of the Organization.

R.10.0 Requirement for appearing Semester Examination:

R.10.1 A Candidate shall be permitted to appear for semester examination only if:

1. He/ She secures not less than 75% overall attendance arrived at by taking into account the total number of periods in all subjects put together offered by the institution for the semester under consideration. (Candidate who secure overall attendance greater than 60% and less than 75% have to pay a condonation fee as prescribed by the Institution along with a medical certificate obtained from a

medical officer not below the rank of Asst Director)

2. He/ She earn a progress certificate from the Head of the Institution for having satisfactorily completed the course of study in all the subjects pertaining to that semester.
3. His/ Her conduct is found to be satisfactory as certified by the Head of the Institution. A candidate who has satisfied the requirement (1) to (2) shall be deemed to have satisfied the course requirements for the semester.

R.10.2 Scribe for End Semester Examination.

If any student is not in position to write end semester examination on account of temporary physical disability or injury due to accident and applies for a scribe (writer) with medical certificate obtained from a medical officer not below the rank of Assistant Director level, then a scribe shall be allowed / assigned by COE to such student. Normally, such scribe shall neither be a student or a degree holder of any technical programme having similar competency. The student shall, however, apply in a prescribed proforma to COE asking for permission letter to the student for using the scribe well in advance, not the day of examination to make necessary arrangements (Scriber, Separate Examination Hall etc.). COE shall then take the undertaking from the scribe in a prescribed proforma. Such student shall produce the permission letter from COE for using scribe to the invigilator. He/She should pay the TA/DA and other charges to the scribe. Scribe shall be allowed extra time as per norms of Controller of Examinations.

R.10.3 Differently Abled Candidate Examination.

In case any student is admitted with differently abled category. Students who can write but at much slower speed as compared to normal student, he/she may be allowed as extra time of 30 minutes for 50 marks paper and 60 minutes for 100 marks paper to write the examination for all the courses, provided he/she seeks permission from COE for extra writing time on account of his/her percentage of disability by producing necessary medical certificate from medical officer.

R.11.0 Assessment Procedure

Every teacher is required to maintain an “ATTENDANCE AND ASSESSMENT RECORD” which consists of attendance marked in each theory, theory cum studio class or studio, the test marks and the record of class work (topic covered), separately for each course. At the end of the semester, the record should be verified by the Head of the Institution who will keep this document in safe custody for five years.

5 Marks for class attendance in the particular subject. The distribution of marks for attendance is as follows:

5 marks for 95% and above

4 marks for 90% and above but below 95%

3 marks for 85% and above but below 90%

2 marks for 80% and above but below 85%

1 mark for 75% and above but below 80%

R.11.1 The assessment method is further detailed below:

Theory Based Courses (Course without any Practical/Studio component)

R.11.1.1 In Theory courses for all semesters, there will be a three continuous Assessment Test (CAT-1, CAT-2, and CAT-3) and a Model Exam

Assessment tool	Weight age	Remarks
Best out of two Test marks secured in Four Assessment	45marks (200 reduced to 45)	CAT-1, CAT-2, CAT-3 and Model Exam (2 x 100 = 200)
Total in-semester assessment	45% + 5% for attendance	
End semester Examination	50% (100 reduced to 50)	Duration – 3 hours

Theory cum studio-based courses (Course with Theory and Studio component – Building Services)

R.11.1.2 For theory cum studio courses, there will be three continuous Assessment Test (CAT-1, CAT-2, CAT-3) and a Model Exam. The Third assessment (CAT-3) will

be in the form of Assignment/Portfolio

Assessment tool	Weight age	Remarks
Best out of two Test marks secured in Three Assessment	20 marks (200 reduced to 20)	CAT-1, CAT-2 and Model Exam (2 x 100 = 200)
Continuous Assessment Test-3	25 marks (100 reduced to 25)	Assignment/Portfolio
Total in-semester assessment	45% + 5% for attendance	
End semester Examination	50% (100 reduced to 50)	Duration – 3 hours

R.11.1.3 Studio-based courses (Course with Full Studio component – Visual Arts, Architectural Graphics, Basic Design, Building Materials and Construction, Architectural Workshop, Architectural Design, Computer Aided Design, Architectural Design Development and Architectural Thesis)

The portfolio of work will be evaluated individually for the total sessional marks of 50. End semester assessment will be done by **two numbers of duly appointed External examiners for Two days** through Viva –voce exam for the remaining 50 marks.

Assessment tool	Weight age	Split up of marks		
Continuous Assessment	45 Marks (100 reduced to 45)	Concept	Design Development	Presentation
		10	20	15
Total in-semester assessment	45% + 5% for attendance			
End semester viva/voce	50% (100 reduced to 50)	Concept	Design Development	Presentation
		15	20	15

R.11.1.4 Professional Training

At the completion of a Professional Training the student will submit a portfolio duly signed by the Training Architect, which will be evaluated by **Two numbers of duly appointed examiner(s) for Two Days**.

Assessment Tool	Weightage	Split up of Marks	
Total in-semester Assessment	100%	Internal	External Viva-voce
		45 + 5 for attendance (100 reduced to 45)	50(100 reduced to 50)

R.11.1.5 Thesis

B.Arch Thesis as far as possible should be socially relevant and attempt to improve existing Design standards in buildings. B.Arch. thesis work will be carried out individually by the students. The internal assessment for 50% of the marks will be done by a thesis review committee, comprising of a renowned practicing architects Panel, the Head of institution and the guide at least once in a month to monitor the progress. At the completion of a Thesis the student will submit a Thesis report, the presentation drawings and models, which will be evaluated by Two numbers of duly appointed examiner(s) for Two Days. The evaluation will be based on a viva voce examination of the project at the end of the semester for the remaining 50% of the marks. The grade will be awarded to the student on the basis of the total marks obtained by him/her out of 100.

The Thesis shall be submitted within **30 calendar days** from the last working day of the semester. If a student fails to submit, he/she will not be allowed to appear for the End Semester Viva Voce Examination.

Assessment tool	Weightage	Remarks		
Review 1	5 marks			
Review 2	10 marks			
Review 3	10 marks			
Review 4	10 marks			
Internal Review	10 marks			
Total in-semester assessment	45%(100 reduced to 45)	45% + 5% for attendance		
End semester viva-voce	50% (100 reduced to 50)	Split up of marks		
		Concept	Design Development	Presentation
		15	20	15

R.12.0 SCHEME OF EXAMINATION

Course	Duration of End Semester Examinations (In Hours)	Internal Assessment Marks	End Semester Exam marks	Total	Attendance Code
All Theory Courses	3 hrs.	50	50	100	Applicable
All Theory cum Studio Based courses	3 hrs.	50	50	100	Applicable
All Studio Based courses	Two Days (viva-voce)	50	50	100	Applicable
Professional Training	Two Days (viva-voce)	50	50	100	Applicable
Thesis	Two Days (viva-voce)	50	50	100	Applicable

R.12.1 MARKS REQUIREMENT TO PASS THE COURSE

	Theory/ Elective courses			Theory cum Studio courses Drawing & construction- based studio courses			Design Based studio courses			Architectural Thesis			Professional Training		
	IA	ESE	TM	IA	ESE	TM	IA	ESE	TM	IA	ESE	TM	IA	ESE	TM
Max	50	50	100	50	50	100	50	50	100	50	50	100	50	50	100
Min pass %	-	23	50	-	23	50	-	23	50	-	23	50	-	23	50

R.13.0 Letter Grades and Grade Points(GP)

Based on the aggregate of marks obtained through internal assessment and external assessment, each student is awarded a final letter grade at the end of the semester in each Course.

Range of Total Marks	Letter Grade	Grade Points
90 to 100	S	10
80 to 89	A	9
70 to 79	B	8
60 to 69	C	7
55 to 59	D	6
50 to 54	E	5
0 to 49	F	0
Incomplete	FA	

R.13.1 'F' Denotes failure in the Course. 'FA' denotes absent / detained.

After results are declared, grade sheets will be issued to the students. The Grade sheets will contain the Following details:

- The College in which the candidate has studied.
- The list of courses enrolled during the Semester and the grades scored.
- The Grade Point Average (GPA) for the semester and The Cumulative Grade Point Average (CGPA) for all enrolled subjects from first semester onwards.
- GPA is the ratio of sum of the products of the number of credits © of courses registered and the corresponding grade points (GP) scored in those courses, taken for all the courses and sum of the number of credits

of all the courses

$$\text{GPA} = (\text{SUM OF } (C \times GP) / \text{SUM OF } C)$$

CGPA will be calculated in a similar manner, considering all the courses enrolled from first semester. FA grades are to be executed for calculating GPA and CGPA.

The conversion of CGPA into percentage marks is as given below

$$\% \text{ MARKS} = (\text{CGPA} - 0.5) \times 10$$

- (e) COA Student Enrolment number will be mentioned in the Final Consolidated mark sheet.

R.14.0 Revaluation for Theory and Theory cum Studio.

A Candidate can apply for Revaluation for a theory course and theory cum studio course, within 2 weeks from the declaration of results, on payment of a prescribed fee through proper application to the Controller of Examination through the Head of Institution. Based on the recommendation, the candidate can register for revaluation through proper application to the Controller of Examination. The Controller of Examination will arrange for the revaluation and the results will be intimated to the candidate concerned through the Head of the Institution. Candidate can apply for revaluation of answer scripts not exceeding 5 subjects at a time.

Students can Apply Photocopy of Answer Scripts before applying revaluation.

Revaluation shall not be permitted for all Studio Courses, Professional training and Thesis where Viva- Voce Examination is involved.

R.14.1 Review for Theory and Theory cum Studio.

Candidates not satisfied with Revaluation can apply for Review of his/her examination answer paper in a theory course and theory cum studio, within the prescribed date on payment of a prescribed fee through proper application to controller of Examination through the Head of the institution. Candidates applying for photocopy-cum-Revaluation only are eligible to apply for review.

R.14.2 Provision to conduct the supplementary Exams for Studio Courses.

The Supplementary exams to be conducted to all Theory cum Studio and Studio courses within 30 days from declaration of the results, the improved portfolio

will be submitted to the External in Viva Voce. However, the internal marks secured by the students earlier will be retained. R.15.0 Grade Card

R.15.1 The grade card issued by the Controller of Examinations to each student, after the announcement of the results will contain the following:

1. The credits for each course registered for that semester,
2. The letter grade obtained in each course
3. The total number of credits earned by the student up to the end of that semester in each of the course categories
4. The Cumulative Grade Point Average (CGPA) and GPA of all the courses taken from the semester onwards.
5. In Consolidated Mark sheet Council of Architecture Student Enrolment Number to be printed.

R.15.2 Class/Distinction will be awarded to the students after they successfully complete the B.Arch. programme as per the norms stipulated in the following table:

Category	CGPA (From I-X semesters)	Class / Distinction
Students who successfully complete the B.Arch. programme within the time duration of 10 semesters	< 6.5	Second Class
	≥ 6.5 & < 8.5	First Class
	≥ 8.5	First Class with Distinction (only if no arrear history)
Students who cannot complete the B.Arch. programme in 10 semesters but complete it successfully within the time duration of 16 semesters.	≥ 6.5 & < 8.5	First Class
	< 6.5	Second Class

R.15.3 For the Award of Gold Medal for each branch of study, the CGPA secured from 1st to 10th semester alone should be considered and it is mandatory that the candidate should have passed all the subjects from 1st to 10th semester in the first attempt. Rank certificates would be issued to the first ten candidates.

R 16.0 Academic dishonesty

When a student is found responsible for a violation of the School of Architecture – Sri Manakula Vinayagar Engineering College code of conduct pertaining to academic dishonesty (Malpractice in Examinations), the Office of

Controller of Examinations will initiate action based on the pre-approved procedures. Appropriate penalty or punishment will be awarded to the student and communication sent to the concerned Head of the Institution.

R.17.0 Eligibility for Award of the B. Arch Degree

A student shall be declared to be eligible for the award of the B.Arch. degree if he/she has

Registered and successfully completed all the courses and Thesis, Professional Training as per the curriculum.

- a) Successfully acquired the minimum required credits as specified in the curriculum.
- b) No disciplinary action pending against him/her.
- c) Two Compulsory Educational Tours apart from the site / field visit.**

R.18.0 QUESTION PAPER PATTERN (END SEMESTER EXAMINATION)

1. The questions in the End Semester Examinations of Theory and Theory cum Studio courses will cover the following three aspects
 - Remembrance
 - Understanding
 - Application / Design/ Analysis/ Evaluation/ Creativity/ Case Study (whichever is suitable to the subject.)
2. The percentage and way in which these aspects should be incorporated will be broadly based on the nature of each subject and its unique content.
3. The distribution of questions will be broadly based on weightage of each unit/ number of periods in a unit.
4. There will be no subdivisions in a Part A question.
5. There will be a maximum of two subdivisions in a Part B question.
6. In order to cover content as per weightage of units as well as not to leave a unit in choice, a Part B question (especially in the case of Theory cum Studio where the number of questions is not equal to the number of units), if required, can integrate knowledge across units or have subdivisions with questions from related units.
7. Care should be taken to give choices between questions of broadly similar nature (in terms of remembrance/ understanding/ application/ design/ analysis/ evaluation/ creativity/ case study) in Part B.

TABLE 1- SEMESTER I**A. THEORYCOURSES**

Code	Subject	Duration	Part A	Part B
U20TH0100	Mathematics	3 hrs	10 questions X 2 marks = 20	5 questions X 16 Marks = 80
U20TH0101	History of Architecture and Culture - I	3 hrs	1. Objective type questions covering all units depending on the weightage of the units 2. All questions compulsory	1. Essay type questions covering all units depending on the weightage of the units 2. Questions in Either/Or pattern

B. THEORY CUM STUDIOCOURSES

Code	Subject	Duration	Part A	Part B
U20TS0102	Communication English	3 hrs	10 questions X 2 Marks=20 1. Objective type questions covering all units depending on the weightage of the units 2. All questions compulsory	4 questions X 20 Marks=80 1. Essay type questions covering first four units depending on the weightage of the units, whereas fifth unit is practical based. 2. Questions in Either/Or pattern

C. STUDIOCOURSES

Code	Subject	Duration	
U20ST0103	Visual Arts	2 days	Portfolio examined through a Viva Voce Examination by two External Examiners (of which one shall be a Practicing Architect) unique for each batch of 40 students and appointed by COE.
U20ST0104	Architectural Graphics I	3 hrs	
U20ST0105	Basic Design Studio	2 days	

TABLE 2- SEMESTER II**A. THEORYCOURSES**

Code	Subject	Duration	Part A	Part B
U20TH0206	Mechanics of Structures -I	3 hrs	10 questions X 2 Marks= 20	5 questions X 16 Marks= 80
U20TH0207	Theory of Architecture	3 hrs	1. Objective type questions covering all units depending on the weightage of the units 2. All questions compulsory	1. Essay type questions covering all units depending on the weightage of the units 2. Questions in Either/Or pattern

B. STUDIOCOURSES

Code	Subject	Duration	
U20ST0208	Building Materials and Construction I	2 days	Portfolio examined through a Viva Voce Examination by two External Examiners (of which one shall be a Practicing Architect) unique for each batch of 40 students and appointed by COE.
U20ST0209	Architectural Graphics - II	2 days	
U20ST0210	Architectural Workshop	2 days	
U20ST0211	Architectural Design I	2 days	

TABLE 3- SEMESTER III**A. THEORYCOURSES**

Code	Subject	Duration	Part A	Part B
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U20TH0312	Mechanics of Structures II	3 hrs	10 questions X 2 Marks=20	5 questions X 16 Marks=80
U20TH0313	History of Architecture -II	3 hrs	1. Objective type questions covering all units depending on the weightage of the units 2. All questions compulsory	1. Essay type questions covering all units depending on the weightage of the units 2. Questions in Either/Or pattern

B. THEORY CUM STUDIOCOURSES

Code	Subject	Duration	Part A	Part B
U20TS0314	Site Surveying and Planning	3 hrs	10 questions X 2 Marks=20	4 questions X 20 Marks=80
U20TS0315	Climate and Built Environment	3 hrs	1. Objective type questions covering all units depending on the weightage of the units 2. All questions compulsory	1 Essay type questions covering first four units depending on the weightage of the units, whereas fifth unit is practical based. 2 Questions in Either/Or pattern

C. STUDIOCOURSES

Code	Subject	Duration	
U20ST0316	Building Materials and Construction-II	2 days	Portfolio examined through a Viva Voce Examination by two External Examiners (of which one shall be a Practicing Architect) unique for each batch of 40 students and appointed by COE.
U20ST0317	Architectural Design-II	2 days	

TABLE 4- SEMESTER IV

A. THEORYCOURSES

Code	Subject	Duration	Part A	Part B
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U20TH0418	Design of Structure I	3 hrs	10 questions X 2 Marks=20	5 questions X 16 Marks=80
U20TH0419	Environmental Science for the Built Environment	3 hrs	1. Objective type questions covering all units depending on the weightage of the units 2. All questions compulsory	1. Essay type questions covering all units depending on the weightage of the units 2. Questions in Either/Or pattern

THEORY CUM STUDIOCOURSES

Code	Subject	Duration	Part A	Part B
U20TS0420	Building Services I	3 hrs	10 questions X 2 Marks=20 1. Objective type questions covering all units depending on the weightage of the units 2. All questions compulsory	4 questions X 20 Marks=80 1. Essay type questions covering first four units depending on the weightage of the units, whereas fifth unit is practical based. 2. Questions in Either/Or pattern

B. STUDIOCOURSES

Code	Subject	Duration	
U20ST0421	Building Materials and Construction III	2 days	Portfolio examined through a Viva Voce Examination by two External Examiners (of which one shall be a Practicing Architect) unique for each batch of 40 students and appointed by COE.
U20ST0422	Computer Aided Visualization	2 days	
U20ST0423	Architectural Design Studio III	2 days	

TABLE 5- SEMESTER V

A. THEORYCOURSES

Code	Subject	Duration	Part A	Part B
U20TH0524	Design of Structures II	3 hrs	10 questions X 2 Marks=20	5 questions X 16 Marks=80
U20TH0525	History of Architecture and Culture III	3 hrs	1. Objective type questions covering all units depending on the weightage of the units 2. All questions compulsory	1. Essay type questions covering all units depending on the weightage of the units 2. Questions in Either/Or pattern
	Professional Elective I	3 hrs		

B. THEORY CUM STUDIOCOURSES

Code	Subject	Duration	Part A	Part B
U20TS0526	Building Services II	3 hrs	10 questions X 2 Marks=20 1. Objective type questions covering all units depending on the weightage of the units 2. All questions compulsory	4 questions X 20 Marks=80 1. Essay type questions covering first four units depending on the weightage of the units, whereas fifth unit is practical based. 2. Questions in Either/Or pattern

C. STUDIOCOURSES

Code	Subject	Duration	
U20ST0527	Building Materials and Construction-IV	2 days	Portfolio examined through a Viva Voce Examination by two External Examiners (of which one shall be a Practicing Architect) unique for each batch of 40 students and appointed by COE.
U20ST0528	Architectural Design IV	2 days	

TABLE 6- SEMESTER VI

A. THEORYCOURSES

Code	Subject	Duration	Part A	Part B
U20TH0629	History of Architecture -IV	3 hrs	10 questions X 2 Marks=20 1. Objective type questions covering all units depending on the weightage of the units 2. All questions compulsory	5 questions X 16 Marks=80 1. Essay type questions covering all units depending on the weightage of the units 2. Questions in Either/Or pattern
U20TH0630	Specification and Estimation	3 hrs		
	Professional Elective II	3 hrs		
	Professional Elective III	3 hrs		

B. STUDIOCOURSES

Code	Subject	Duration	
U20ST0631	Architectural Design Detailing	2 days	Portfolio examined through a Viva Voce Examination by two External Examiners (of which one shall be a Practicing Architect) unique for each batch of 40 students and appointed by COE.
U20ST0632	Architectural Design V	2 days	

TABLE 7- SEMESTER VII

A. THEORYCOURSES

Code	Subject	Duration	Part A	Part B
U20TH0733	Professional Practice and Ethics	3 hrs	10 questions X 2 Marks=20 1. Objective type questions covering all units depending on the weightage of the units 2. All questions compulsory	5 questions X 16 Marks=80 1. Essay type questions covering all units depending on the weightage of the units 2. Questions in Either/Or pattern
U20TH0734	Landscape and Ecology	3 hrs		
	Professional Elective - IV	3 hrs		
	Professional Elective -V	3 hrs		

B. THEORY CUM STUDIOCOURSES

Code	Subject	Duration	Part A	Part B
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U20TS0735	Building Services -III	3 hrs	10 questions X 2 Marks=20 1. Objective type questions covering all units depending on the weightage of the units 2. All questions compulsory	4 questions X 20 Marks=80 1. Essay type questions covering first four units depending on the weightage of the units, whereas fifth unit is practical based. 2. Questions in Either/Or pattern
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B.STUDIOCOURSES

Code	Subject	Duration	
U20ST0736	Architectural Design VI	2 days	Portfolio examined through a Viva Voce Examination by two External Examiners (of which one shall be a Practicing Architect) unique for each batch of 40 students and appointed by COE.

TABLE 8 – SEMESTER VIII

A. PRACTICAL TRAINING

Code	Course Title	Duration	
U20PT0837	Practical Training	2 days	Portfolio examined through a Viva Voce Examination by one External Examiner (who shall be a Practicing Architect) unique for each batch of 40 and appointed by COE.

TABLE 9- SEMESTER IX

A. THEORYCOURSES

B.

Code	Subject	Duration	Part A	Part B
U20TH0938	Human Settlement and Planning	3 hrs	10 questions X 2 Marks=20 1. Objective type questions covering all units depending on the weightage of the units 2. All questions compulsory	5 questions X 16 Marks=80 1. Essay type questions covering all units depending on the weightage of the units 2. Questions in Either/Or pattern
U20TH0939	Urban Design	3 hrs	1. Objective type questions covering all units depending on the weightage of the units 2. All questions compulsory	1. Essay type questions covering all units depending on the weightage of the units 2. Questions in Either/Or pattern
U20TH0940	Urban Housing	3 hrs		
	Professional Elective IV	3 hrs		

C. STUDIOCOURSES

Code	Subject	Duration	
U20ST0941	Architectural Design VII	2 days	Portfolio examined through a Viva Voce Examination by two External Examiners (of which one shall be a Practicing Architect) unique for each batch of 40 students and appointed by COE.

TABLE 10 – SEMESTER X

A. THEORYCOURSES

Code	Course Title	Duration	Part A	Part B
U20TH1042	Disaster Management Architecture	3 hrs	10 questions X 2 Marks=20 1. Objective type questions covering all units depending on the weightage of the units 2. All questions compulsory	5 questions X 16 Marks=80 1. Essay type questions covering all units depending on the weightage of the units 2. Questions in Either/Or pattern

B. THESIS

Code	Course Title	Duration	
U20ST1043	Architectural Thesis	2 days	Portfolio examined through a Viva Voce Examination by two External Examiners (of which one shall be a Practicing Architect) unique for each batch of 40 students and appointed by COE.

R.19.0 Change of Regulations.

The School of Architecture may from time to time revise, amend or change the regulation, curriculum and syllabus as and when found necessary.

SRI MANAKULA VINAYAGAR ENGINEERING COLLEGE

SCHOOL OF ARCHITECTURE

CURRICULUM FOR B.ARCH- 2020

R.20.0 I TO X SEMESTER CURRICULUM:

I SEMESTER

S.NO	CODE	COURSE TITLE	CATEGORY	CT HRS	L	T	P/S	C	Marks		
									IA	ESE	TM
THEORY											
1	U20TH0100	Mathematics	BS	3	3	0	0	3	50	50	100
2	U20TH0101	History of Architecture and culture-I	HS	4	2	2	0	3	50	50	100
THEORY CUM STUDIO											
3	U20TS0102	Communication English	HS	4	2	0	2	3	50	50	100
STUDIO											
4	U20ST0103	Visual Arts	HS	6	0	0	6	3	50	50	100
5	U20ST0104	Architectural Graphics - I	ES	5	1	0	4	3	50	50	100
6	U20ST0105	Basic Design Studio	PC	12	0	0	12	6	50	50	100
		TOTAL		34	8	2	24	21	300	300	600

II SEMESTER

S.NO	CODE	COURSE TITLE	CATEGORY	CT HRS	L	T	P/S	C	Marks		
									IA	ESE	TM
THEORY											
1	U20TH0206	Mechanics of Structures -I	ES	4	2	2	0	3	50	50	100
2	U20TH0207	Theory of Architecture	PC	3	3	0	0	3	50	50	100
STUDIO											
3	U20ST0208	Building Materials & Construction - I	PC	5	1	0	4	3	50	50	100
4	U20ST0209	Architectural Graphics - II	ES	5	1	0	4	3	50	50	100
5	U20ST0210	Architectural Model Making Workshop	PC	6	0	0	6	3	50	50	100
6	U20ST0211	Architectural Design Studio - I	PC	12	0	0	12	6	50	50	100
		TOTAL		35	7	2	26	21	300	300	600

III SEMESTER

S.NO	CODE	COURSE TITLE	CATEGORY	CTHRS	L	T	P/S	C	Marks		
									IA	ESE	TM
THEORY											
1	U20TH0312	Mechanics of Structures - II	ES	4	2	2	0	3	50	50	100
2	U20TH0313	History of Architecture and culture -II	HS	3	3	0	0	3	50	50	100
THEORY CUM STUDIO											
3	U20TS0314	Site Surveying and Planning	PC	4	2	0	2	3	50	50	100
4	U20TS0315	Climate and Built Environment	BS	4	2	0	2	3	50	50	100
STUDIO											
5	U20ST0316	Building Materials & Construction - II	PC	5	1	0	4	3	50	50	100
6	U20ST0317	Architectural Design studio - II	PC	14	0	0	14	7	50	50	100
		TOTAL		38	10	2	22	22	300	300	600

IV SEMESTER

S.NO	CODE	COURSE TITLE	CATEGORY	CTHRS	L	T	P/S	C	Marks		
									IA	ESE	TM
THEORY											
1	U20TH0418	Design of Structures -I	ES	4	2	2	0	3	50	50	100
2	U20TH0419	Environmental Science for the Built Environment	BS	3	3	0	0	3	50	50	100
THEORY CUM STUDIO											
3	U20TS0420	Building Services - I	ES	4	2	0	2	3	50	50	100
STUDIO											
4	U20ST0421	Building Materials & Construction - III	PC	5	1	0	4	3	50	50	100
5	U20ST0422	Computer Aided Design	PAEC	5	1	0	4	3	50	50	100
6	U20ST0423	Architectural Design Studio - III	PC	14	0	0	14	7	50	50	100
		TOTAL		31	10	0	21	22	300	300	600

V SEMESTER

S.NO	CODE	COURSE TITLE	CATEGO RY	CTHRS	L	T	P/S	C	Marks		
									IA	ESE	TM
THEORY											
1	U20TH0524	Design of Structures -II	ES	4	2	2	0	3	50	50	100
2	U20TH0525	History of Architecture -III	HS	3	3	0	0	3	50	50	100
ELECTIVE											
3		Professional Elective - I	PE	3	3	0	0	3	50	50	100
THEORY CUM STUDIO											
4	U20TS0526	Building Services -II	ES	4	2	0	2	3	50	50	100
STUDIO											
5	U20ST0527	Building Materials & Construction- IV	PC	5	1	0	4	3	50	50	100
6	U20ST0528	Architectural Design Studio - IV	PC	14	0	0	14	8	50	50	100
		TOTAL		33	11	2	22	23	300	300	600

VI SEMESTER

S.NO	CODE	COURSE TITLE	CATEGORY	CTHRS	L	T	P/S	C	Marks		
									IA	ESE	TM
		THEORY									
1	U20TH0629	History of Architecture and culture -IV	HS	3	3	0	0	3	50	50	100
2	U20TH0630	Specification and Estimation	PAEC	3	3	0	0	3	50	50	100
		ELECTIVE									
3		Professional Elective - II	PE	3	3	0	0	3	50	50	100
4		Professional Elective - III	PE	3	3	0	0	3	50	50	100
		STUDIO									
5	U20ST0631	Architectural Design Detailing	PC	5	1	0	4	3	50	50	100
6	U20ST0632	Architectural Design Studio - V	PC	16	0	0	16	8	50	50	100
		TOTAL		33	13	0	20	23	300	300	600

VII SEMESTER

S.N O	CODE	COURSE TITLE	CATEGORY	CTHRS	L	T	P/S	C	Marks		
									IA	ESE	TM
THEORY											
1	U20TH0733	Professional Practice and Ethics	HS	3	3	0	0	3	50	50	100
2	U20TH0734	Landscape and Ecology	PC	3	3	0	0	3	50	50	100
ELECTIVE											
3		Professional Elective - IV	PE	3	3	0	0	3	50	50	100
4		Professional Elective -V	PE	3	3	0	0	3	50	50	100
THEORY CUM STUDIO											
5	U20TS0735	Building Services -III	ES	4	2	0	2	3	50	50	100
STUDIO											
6	U20ST0736	Architectural Design Studio - VI	PC	16	0	0	16	8	50	50	100
		TOTAL		29	11	0	18	23	300	300	600

VIII SEMESTER

S.N O	CODE	COURSE TITLE	CATEGORY	CT HRS	L	T	P/S	C	Marks		
									IA	ESE	TM
STUDIO											
1	U20PT0837	Professional Training	PAEC	0	0	0	0	14	50	50	100
		TOTAL		0	0	0	0	14	50	50	100

IX SEMESTER

S.NO	CODE	COURSE TITLE	CATEGORY	CT HRS	L	T	P/S	C	Marks		
									IA	ESE	TM
THEORY											
1	U20TH0938	Human Settlement and Planning	HS	3	3	0	0	3	50	50	100
2	U20TH0939	Urban Design	PC	3	3	0	0	3	50	50	100
3	U20TH0940	Urban Housing	HS	3	3	0	0	3	50	50	100
ELECTIVE											
4		Professional Elective - VI	PE	3	3	0	0	3	50	50	100
STUDIO											
5	U20ST0941	Architectural Design Studio - VII	PC	16	0	0	16	8	50	50	100
		TOTAL		28	12	0	16	20	250	250	500

X SEMESTER

S.N O	CODE	COURSE TITLE	CATEGORY	CT HRS	L	T	P/S	C	Marks		
									IA	ESE	TM
THEORY											
1	U20TH1042	Disaster Management Architecture	PC	3	3	0	0	3	50	50	100
STUDIO											
2	U20ST1043	Architectural Thesis	PC	36	0	0	36	18	50	50	100
		TOTAL		39	3	0	36	21	100	100	200

Total no.of credits : 210.

R.21.0 CATEGORY OF COURSES AND ITS CREDITS:

HUMANITIES AND SOCIAL SCIENCES (HS)

Sl. No.	Course Code	Course title	C/P	L	T	P/S	C	Marks		
								IA	ESE	TM
1	U20TH0101	History of Architecture and Culture I	3	3	0	0	3	50	50	100
2	U20TS0102	Communication English	4	2	0	2	3	50	50	100
3	U20ST0103	Visual Arts	5	1	0	4	3	50	50	100
4	U20TH0313	History of Architecture and Culture II	3	3	0	0	3	50	50	100
5	U20TH0525	History of Architecture and Culture III	3	3	0	0	3	50	50	100
6	U20TH0629	History of Architecture and Culture IV	3	3	0	0	3	50	50	100
7	U20TH0938	Human Settlements Planning	3	3	0	0	3	50	50	100
8	U20TH0733	Professional Practice and Ethics	3	3	0	0	3	50	50	100
9	U20TH0940	Urban Housing	3	3	0	0	3	50	50	100

BASIC SCIENCES (BS)

Sl. No.	Course Code	Course title	C/P	L	T	P/S	C	Marks		
								IA	ESE	TM
1	U20TH0100	Mathematics	4	2	2	0	3	50	50	100
2	U20TS0315	Climate and Built Environment	4	2	0	2	3	50	50	100
3	U20TH0419	Environmental Science for the Built Environment	3	3	0	0	3	50	50	100

ENGINEERING SCIENCES (ES)

Sl. No.	Course Code	Course title	C/P	L	T	P/S	C	Marks		
								IA	ESE	TM
1	U20ST0104	Architecture Graphics I	5	1	0	4	3	50	50	100
2	U20TH0206	Mechanics of Structures -I	4	2	2	0	3	50	50	100
3	U20TH0312	Mechanics of Structures -II	4	2	2	0	3	50	50	100
4	U20ST0209	Architecture Graphics II	5	1	0	4	3	50	50	100
5	U20TS0420	Building Service, I	4	2	0	2	3	50	50	100
6	U20TH0418	Design of Structures I	4	2	2	0	3	50	50	100
7	U20TS0526	Building Services II	4	2	0	2	3	50	50	100
8	U20TH0524	Design of Structures II	4	2	2	0	3	50	50	100
9	U20TS0735	Building Services III	4	2	0	2	3	50	50	100

PROFESSIONAL CORE (PC)

Sl. No.	Course Code	Course title	C/P	L	T	P/S	C	Marks		
								IA	ESE	TM
1	U20ST0105	Basic Design Studio	12	0	0	12	6	50	50	100
2	U20ST0208	Building material and Construction I	5	1	0	4	3	50	50	100
3	U20ST0210	Architectural Model Making Workshop	6	0	0	6	3	50	50	100
4	U20TH0207	Theory of Architecture	4	2	0	2	3	50	50	100
5	U20ST0211	Architectural Design Studio I	12	0	0	12	6	50	50	100
6	U20ST0316	Building Materials and Construction II	5	1	0	4	3	50	50	100
7	U20ST0317	Architectural Design Studio II	14	0	0	14	7	50	50	100
8	U20ST0421	Building Materials and Construction III	5	1	0	4	3	50	50	100
9	U20ST0423	Architectural Design Studio III	14	0	0	14	7	50	50	100
10	U20ST0527	Building Materials and Construction IV	5	1	0	4	3	50	50	100
11	U20ST0528	Architectural Design Studio IV	14	0	0	14	7	50	50	100
12	U20TS0314	Site Surveying and Planning	3	3	0	0	3	50	50	100
13	U20ST0631	Architectural Design Detailing	5	1	0	4	3	50	50	100
14	U20ST0632	Architectural Design Studio V	16	0	0	16	8	50	50	100
15	U20TH0939	Urban Design	3	3	0	0	3	50	50	100
16	U20ST0736	Architectural Design Studio VI	16	0	0	16	8	50	50	100
17	U20TH0734	Landscape and Ecology	3	3	0	0	3	50	50	100
18	U20ST0941	Architectural Design Studio VII	16	0	0	16	8	50	50	100
19	U20TH1042	Disaster Management Architecture	3	3	0	0	3	50	50	100

PROFESSIONAL ELECTIVES - I

Sl. No.	Course Code	Course title	C/P	L	T	P/S	C	Marks		
								IA	ESE	TM
1	U20EL0500	Theory of Design	3	3	0	0	3	50	50	100
2	U20EL0501	Vernacular Architecture	3	3	0	0	3	50	50	100
3	U20EL0502	Art Appreciation	3	3	0	0	3	50	50	100

PROFESSIONAL ELECTIVES -II

Sl. No.	Course Code	Course title	C/P	L	T	P/S	C	Marks		
								IA	ESE	TM
4	U20EL0603	Interior Design	3	3	0	0	3	50	50	100
5	U20EL0604	Structure and Architecture	3	3	0	0	3	50	50	100
6	U20EL0605	Evolution of Human Settlements	3	3	0	0	3	50	50	100

PROFESSIONAL ELECTIVES -III

Sl. No.	Course Code	Course title	C/P	L	T	P/S	C	Marks		
								IA	ESE	TM
7	U20EL0606	Contemporary Building Materials	3	3	0	0	3	50	50	100
8	U20EL0607	Glass Architecture and Design	4	2	2	0	3	50	50	100
9	U20EL0608	Steel Architecture and Design	3	3	0	0	3	50	50	100

PROFESSIONAL ELECTIVES - IV

Sl. No.	Course Code	Course title	C/P	L	T	P/S	C	Marks		
								IA	ESE	TM
10	U20EL0709	Contemporary Process in Architectural Design	3	3	0	0	3	50	50	100
11	U20EL0710	Energy Efficient Architecture	3	3	0	0	3	50	50	100
12	U20EL0711	Architectural Conservation	3	3	0	0	3	50	50	100

PROFESSIONAL ELECTIVES - V

Sl. No.	Course Code	Course title	C/P	L	T	P/S	C	Marks		
								IA	ESE	TM
13	U20EL0712	Advanced Structures	3	3	0	0	3	50	50	100
14	U20EL0713	Sustainable Architecture and Planning	3	3	0	0	3	50	50	100
15	U20EL0714	Dissertation	6	0	0	6	3	50	50	100

PROFESSIONAL ELECTIVES - VI

Sl. No.	Course Code	Course title	C/P	L	T	P/S	C	Marks		
								IA	ESE	TM
16	U20EL0915	Architectural Photography and Journalism	3	3	0	0	3	50	50	100
17	U20EL0916	Construction and Project Management	3	3	0	0	3	50	50	100
18	U20EL0917	Earthquake Resistant Architecture	3	3	0	0	3	50	50	100

PROFESSIONAL ABILITY ENHANCEMENT COURSES (PAEC)

Sl. No.	Course Code	Course title	C/P	L	T	P/S	C	Marks		
								IA	ESE	TM
1	U20ST0422	Computer Aided Visualization	5	1	0	4	3	50	50	100
2	U20TH0630	Specification Estimation and Valuation	3	3	0	0	3	50	50	100
3	U20PT0837	Professional Training	0	0	0	0	14	50	50	100
4	U20ST1043	Architectural Thesis	36	0	0	36	18	50	50	100

SUMMARY

Sl. No.	Subject Area	Credits per Semester										Credits Total
		I	II	III	IV	V	VI	VII	VIII	IX	X	
1	HS	9		3		3	3	3		6		27
2	BS	3		3	3							9
3	ES	3	6	3	6	6		3				27
4	PC	6	15	13	10	11	11	11		11		88
5	PE					3	6	6		3		21
6	PAEC				3		3		14		18	35
Total		21	21	22	22	23	23	23	14	20	18	210
Non-credit / Mandatory		NCC / NSS / YRC Rotaract		Rural Study Tour		All India Tour						

B. Arch. SYLLABUS- 2020

(For students admitted from the academic year 2020-21)

R.22.0 FULL PROGRAMME SYLLABUS

I SEMESTER

THEORY		L	T	P/S	C
U20TH0100	MATHEMATICS	3	0	0	3

OBJECTIVES

- Identifying practical problems to obtain solutions involving trigonometric and exponential functions.
- Studying the properties of lines and planes in space, along with sphere and providing a tool too.
- Understand 3D material.
- Understand functions of more than one variable, along with differentiation under integral sign.
- Solving differential equation of certain type.
- Analyzing data collection and interpretation of results using statistical tools.

COURSE OUTCOME

After Completion of the Course, the Students will be able to

CO1- The aim of the course is to develop the skills of the students in architectural drawing. **(K1,K2)**

CO2- The students will be trained on the basis of the topics of Mathematics necessary for effective understanding of architecture subjects. **(K1,K2).**

CO3- Understanding the Concept of Trigonometric functions, Maxima and Minima **(K1,K2).**

CO4- Understanding the Concept of Homogeneous Equation and Euler's Theorem **(K1,K2).**

CO5- At the end of the course, the students would have an understanding of the appropriate role of the mathematical concepts learnt **(K1,K2).**

UNIT - I TRIGONOMETRY AND MENSURATION 9

- Trigonometric (sine, cosine and tan functions) and exponential functions
- De-Moivre's theorem.
- Area of plane figures, computation of volume of solid figures.

UNIT - II THREE-DIMENSIONAL ANALYTICAL GEOMETRY 9

- Direction cosines and ratios
- Angle between two lines
- Equations of a plane
- Equations of a straight line – Coplanar lines – Shortest distance between skew lines.

UNIT III INTEGRATION AND FUNCTIONS OF TWO VARIABLES 9

- Integration of rational, trigonometric and irrational functions
- Properties of definite integrals
- Reductions formulae for trigonometric functions
- Taylor's Theorem
- Maxima and Minima (Simple Problems)

UNIT IV ORDINARY DIFFERENTIAL EQUATIONS 9

- Linear equations of second order with constant coefficients
- Simultaneous first order linear equations with constant coefficients
- Homogeneous equation of Euler type
- Equations reducible to homogeneous form.

UNIT V**BASIC STATISTICS AND PROBABILITY****9**

- The arithmetic mean, median, mode, standard deviation and variance
- Regression and correlation
- Elementary probability
- Laws of addition and multiplication of probabilities
- Conditional probability
- Independent events

TOTAL PERIODS 45**TEXT BOOK**

Grewal B.S., "Higher Engineering Mathematics", Khanna Publishers, New Delhi, 41st Edition, 2011.

REFERENCES

1. Bali N., Goyal M. and Watkins C., "Advanced Engineering Mathematics", Firewall Media (An imprint of Lakshmi Publications Pvt., Ltd.) 7th Edition, New Delhi, 2009.
2. Ramana B.V., "Higher Engineering Mathematics", Tata McGraw Hill Co.Ltd., New Delhi, 11th Reprint, 2010.
3. Greenberg M.D., "Advanced Engineering Mathematics", Pearson Education, 2nd Edition, New Delhi, 5th Reprint, 2009.
4. Gupta S.C and Kapoor V.K., "Fundamentals of Mathematical Statistics", Sultan Chand & Sons, 9th Edition, New Delhi, 1996.

Cos/POs MAPPING'

COs	Program Outcomes (POs)							
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
1	1	-	-	-	-	-	-	-
2	1	-	-	-	-	-	-	-
3	1	-	-	-	-	-	-	-
4	1	-	-	-	-	-	-	-
5	1	-	-	-	-	-	-	-

Correlation Level: 1 - Low, 2 - Medium, 3 - High

THEORY	HISTORY OF ARCHITECTURE AND	L	T	P/S	C
U20TH0101	CULTURE - I	2	2	0	3
OBJECTIVES					

- To inform about the development of architecture in the Ancient Western World and the cultural and contextual determinants that produced that architecture.
- To understand architecture as evolving within specific cultural contexts including aspects of politics, society, religion and climate.
- To gain knowledge of the development of architectural form with reference to Technology, Style and Character in the prehistoric world, Ancient Egypt, West Asia, Greece, Rome, Medieval times and Renaissance period.

COURSE OUTCOME

After Completion of the Course, the Students will be able to

CO1- An understanding about the spatial and stylistic qualities associated with architecture in River Valley Civilization **(K1,K2)**.

CO2- An Understanding of architecture as an outcome of various social, political and economic upheavals, and as a response to the cultural and context **(K1,K2)**.

CO3- An understanding about the Early Christianity and its Kingdoms and Romanesque Architecture **(K1,K2)**.

CO4- An understanding about the Gothic Style Christian Architecture **(K1,K2)**.

CO5- An understanding about the Renaissance Style Architecture in Europe and idea of Rebirth. **(K1,K2)**.

UNIT - I WISDOM OF THE ANCIENTS THRO RIVER VALLEY CIVILIZATION 7

- Response to culture and context in building shelter in the Neolithic period
- Development of Shelter during prehistoric age. Factors influencing Architecture.

ANCIENT EGYPT:

- Architecture of Egypt

Tomb architecture

- Mastabas –The Great Pyramid of Cheops, Gizeh

TEMPLE:

- Karnak
- Urban form in the Indus Valley and Euphrates basin and relevant examples of architecture.
- Study of the city of Mohenjo-daro, Indus Valley with reference to its great bath and great granary
- Prominent features of town planning.

UNIT - II CLASSICAL WORLD 10

GREEK ARCHITECTURE

- Outline of Culture, Architectural character and Style

CITY PLANNING

- Acropolis at Athens

GREEK TEMPLE

- Evolution of the Greek temple
- Detail study of Parthenon–Erechthion.

PUBLIC ARCHITECTURE

- Theatre of Epidaurus and Agora of Athens

ROMAN ARCHITECTURE

- Outline of culture, architectural character and style
- Roman urban planning
- Pantheon Rome
- Forum of Trajan and basilica of Aemilia`
- Amphitheatre - Colosseum Rome.
- Structural forms: Materials and construction techniques.

UNIT III**EARLY CHRISTIANITY AND CHRISTIAN KINGDOMS****10**

- Birth and spread of Christianity
- Church planning
- Basilica concept (St. Peter's, Rome).
- Centralized plan concept (St. Sophia, Constantinople).
- The Carolingian Renaissance
- Feudalism and rural manorial life.
- Monasticism
- Medieval domestic architecture (Monastery of Cluny III)

ROMANESQUE

Architectural characters of Italy, France and England during Romanesque period.

- Development of vaulting

Italy - Detail study of the Pisa Cathedral with Baptistry and Campanile

France - Abbey Aux Hommes

England - Tower of London

UNIT IV**GOTHIC ARCHITECTURE****8**

- Outline of Architectural character in Italy, France and England during Gothic period
- Evolution of Church plan and structural developments.

France

- Notre Dame in Paris

England

- Westminster Abbey

Italy

- Venice - Milan Cathedral

UNIT V**IDEA OF RE-BIRTH AND RENAISSANCE IN EUROPE****10**

- Idea of rebirth and revival

- Humanism

Study of life history, philosophy and contributions of the Renaissance architects in Europe.

ITALY

Brunelleschi - Foundling Hospital, Florence

Michelangelo - Laurentian Library, Florence

ENGLAND

Sir Christopher Wren - Hampton Court / St. Paul's Cathedral, London

Inigo Jones - Queen's House at Greenwich, London

FRANCE

Pierre Lescot - Palais du Louvre

Jean Bullant - Bullant pavilion at the [Tuileries](#)

BAROQUE

Baroque architecture - St. Peter's, Rome.

TOTAL PERIODS 45**TEXT BOOKS**

1. Sir Banister Fletcher, A History of Architecture, CBS Publications (Indian Edition), 20th Edition 2002.
2. Spiro Kostof - A History of Architecture - Setting and Rituals, Oxford University Press, London, 1986.
3. Francis D.K. Ching et al; A global history of Architecture; John Wiley's sons, 2nd edition 2010.

REFERENCES

1. Leland M Roth; Understanding Architecture: Its elements, history and meaning; Westview press, 3rd revised edition; 2014.
2. S. Lloyd and H.W. Muller, Ancient Architecture: History of World Architecture - Series, Phaidon Press, London, 2004.
3. Gosta, E. Samdstrom, Man the Builder, McGraw Hill Book Company, New York, 1970.

4. Bussagh; Marco; Understanding Architecture; I.B.Tauris& co. Ltd; 2005.

Cos/POs MAPPING'

COs	Program Outcomes (POs)							
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
1	1	-	-	-	-	-	-	-
2	1	-	-	-	-	-	-	-
3	1	-	-	-	-	-	-	-
4	1	-	-	-	-	-	-	-
5	1	-	-	-	-	-	-	-

Correlation Level: 1 - Low, 2 - Medium, 3 - High

The English Language Course for students of architecture would,

- Enhance their communication skills in English by developing their listening, speaking, reading and writing skills.
- Develop their speaking skills with specific reference to prospective/actual clients, suppliers, business partners and colleagues.
- Enhance their reading particularly, rules and regulations, catalogues, architecture journals and textbooks.
- Develop their writing skills especially writing emails, proposals and reports.

COURSE OUTCOME

After Completion of the Course, the Students will be able to

CO1- Speak convincingly, express their opinions clearly, initiate a discussion, negotiate, and argue using appropriate communicative strategies **(K1,K2)**.

CO2- Read different genres of texts, infer implied meanings and critically analyze and evaluate them for ideas as well as for method of presentation **(K1,K2)**.

CO3- Listen/view and comprehend different spoken excerpts critically and infer unspoken and implied meanings **(K1,K2)**.

CO4- Write effectively and persuasively and produce different types of writing such as narration, description, exposition and argument as well as creative, critical, analytical and evaluative writing **(K1,K2)**.

CO5- An Understanding to how to Handle the Client independently with a Project Proposal **(K1,K2)**

UNIT - I

INTRODUCTION

10

Listening

- Short talks, interviews and discussions from various media

Speaking

- Negotiating meaning, convincing people
- Describing places

Reading

- Texts on architecture

Writing

- Process descriptions
- Vocabulary Development
- Abbreviations and Acronyms.

Grammar

- Suitable tenses to write descriptions and describe.

UNIT - II

SPEAKING, READING AND WRITING

10

Listening

- listen to talks for specific information

Speaking

- Preparing a presentation using the computer, participating in small group discussion

Reading

- lengthy articles related to architecture and construction Writing- writing formal emails, vocabulary appropriate words to describe topics in architecture,

Grammar

- Suitable grammar for writing a report.

UNIT III

DESCRIPTIVE PRESENTATION

10

Listening

- Descriptions of place, conversations and answering questions

Speaking

- Making a power point presentation on a given topic

Reading- architecture manuals,

Writing

- Writing a report, writing essays-descriptive essays,

Vocabulary

- Adjectives of comparison, Grammar collocations.

UNIT IV**ANALYTICAL PRESENTATION****15****Listening**

- TED talks,

Speaking

- Participating in group discussions,

Reading

- Reading and interpreting visual information,

Writing

-Analytical essays and argumentative,

Vocabulary

- Suitable words to be used in analytical and argumentative essays,
Grammar subject- verb agreement.

UNIT V**PROJECT PROPOSAL PRESENTATION****15****Listening**

- Ink talks and longer talks,

Speaking

- Talking about one's project proposal,

Reading

- reading essays on construction, buildings, different schools of architecture,

Writing

- Proposals

Vocabulary- related vocabulary, Grammar- Cohesive devices.

TOTAL PERIODS 60**TEXT BOOK**

1. English for Architects and civil Engineers - Sharon Hendenreich Springer, 2014

ISBN 978-3-658-030-63- (e-book).

2. www.cambridgescholars.com

3. www.robertdwatkins.com/Englishworkbook.pdf

4. arkenglish.com.

REFERENCES

1. Chris Mounsey: **Essays and Dissertation** (Oxford University Press) February 2005.

2. Sidney Green baum: **The Oxford English Grammar** (Oxford University Press)

March 2005.

3. Krishna Mohan and Meera Banerji: **Developing Communication Skills** (Mac Millan india Ltd)[2000].

4. Krishna Mohan and Meenakshi Raman: **Effective English Communication** (Tata Mc-Graw Hill)[2000].

Cos/POs MAPPING'

COs	Program Outcomes (POs)							
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
1	1	-	-	-	-	-	-	2
2	1	-	-	-	-	-	-	2
3	1	-	-	-	-	-	-	2
4	1	-	-	-	-	-	-	2
5	1	-	-	-	-	-	-	2

Correlation Level: 1 - Low, 2 - Medium, 3 - High

- To develop presentation skills, visual expression and representation, imaginative thinking and creativity through a hand on working with various mediums and materials.
- To familiarize the students with the various mediums and techniques of art through which artistic expression can be achieved
- To involve students in a series of exercises which will look at graphic and abstract representations of art
- To sensitize students to the grammar of visual perception by involving them in a series of freehand exercises to understand form, proportion, scale, figure ground etc.,

COURSE OUTCOME

After Completion of the Course, the Students will be able to

CO1-The students are exposed to various mediums, techniques and tools **(K1,K2)**.

CO2- The students gain mastery in sketching, visualizing and expression through manual drawing.

CO3- Sensitized to culture, craft and context **(K1,K2)**.

CO4- Skill Development in Handling Materials and in Making Products **(K2,K3)**.

CO5- Skill Development in Craft and Technology by using Wood, Metal, Clay and Printing **(K2,K3)**.

UNIT - I	BASICS OF DRAWING	15
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- Introduction to Drawing through various period of History
- Seeing (Observation / Proposition / Scale /Texture through study of still life and natural objects)
- Visualizing (Memory Drawing / Exploratory Drawing)
- Expressing (Qualities of Lines / Drawing tools and Quality of Expressions - Pen – Pencil – Charcoal - Marker)
- Abstraction and communication (Sketching and Free hand perspective Drawing)

UNIT - II	DRAWING FROM OBSERVATION	15
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The processes of seeing, Imagining and Representing

- Observations on Line and Shape
- Observation on Tone and Texture
- Observations on Form and Structure
- Observations on Space and Depth
- Sketching Exercises related to the contents specified above.

UNIT III	GRAPHIC DESIGN	15
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- Introduction to history of Graphic Design
- Visual perception theory (Gestalts) – Principle of Compositions
- Color Theory
- Type Design and Typography (Layouts / Format / Calligraphy)
- Environmental Graphics (Signage / Logo / enhancing the built environment)
- Exercises in environmental graphic design, color and composition

UNIT IV	PAINTING	15
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- Introduction to Art / Artists.
- Mediums, Techniques and Tools (Water colors / Posters /Acrylic / Inks / Brushes / Knives / Mixed Media)
- Exercises using various techniques and mediums.

UNIT V	CULTURE - CRAFT - TECHNOLOGY	30
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- Understanding Craft and Technology
- Material exploration (Wood/ Metal / Clay / Printing)
- Print Making / Wood Carving / Clay Sculpting / Casting / Sheet Metal etc.,

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. Envisioning Architecture – an analysis of drawing , Iain Fraser & Rod Henmi, 1991

REFERENCES

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.
5. Caldwell peter, "Pen and Ink Sketching", B.T. Bats ford Ltd., London, 1995.

Cos/POs MAPPING'

COs	Program Outcomes (POs)							
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
1	1	2	-	1	-	-	-	-
2	1	2	-	1	-	-	-	-
3	1	2	-	1	-	-	-	-
4	1	2	-	1	-	-	-	-
5	1	2	-	1	-	-	-	-

Correlation Level: 1 - Low, 2 - Medium, 3 - High

STUDIO
U20ST0104
OBJECTIVES

ARCHITECTURAL GRAPHICS - I

L	T	P/S	C
1	0	4	3

- To introduce the concepts and fundamentals of architectural drawing, to develop representation skills and to nurture the understanding of the nature of geometrical forms and simple building forms and to teach the language of architectural and building representation in two- and three dimensions.
- To introduce the basics of measured drawing.

COURSE OUTCOME

After Completion of the Course, the Students will be able to

CO1- An understanding on the concepts of architectural drawing as well as representation skills are imparted. **(K1,K2).**

CO2- An understanding on the building representation in 2D Planar surface and Multi View Projection Drawings of Solids **(K2,K3).**

CO3- An understanding on Architect's Sketches translated as Drawing systems through Pictorial Systems **(K2,K3).**

CO4- An understanding on Isometric and Axonometric Detailed Drawings **(K2,K3).**

CO5- An understanding on Measuring Drawings of Furniture's and Building Components **(K2,K3).**

UNIT - I GEOMETRICAL DRAWING: INTRODUCTION TO DRAFTING 15

- **Introduction to fundamentals of drawing/ drafting**
- Construction of lines, line value, line types, lettering, dimensioning, representation, format for presentation, etc.
- **Use of scales**
- **Construction**

Triangles - Circles - Tangents - Curves -Conic sections.

UNIT - II PLANE GEOMETRY AND SOLID GEOMETRY 20

Construction and development of planar surface

- Square - Rectangle - Polygon

Introduction of multi- view projection

- Projection of points, lines and planes.

Multi- view projection of solids

- Cube - Prism - Pyramids - Cones - Cylinders.
- Sections of solids.

UNIT III ARCHITECTURAL DRAWING SYSTEMS 10

- Communicating Architectural Design Ideas from Concept to Construction
- Case studies of Architect's Sketches translated as Drawing systems
- Types of Projection systems.
- Types of Pictorial systems such as Multi view, Para line and Perspective drawings.

UNIT IV MULTIVIEW AND PARALINE DRAWINGS 10

- Principles of Orthographic views – Reading multi view drawings - Representing materials in Architectural Design and Construction drawings
- Drafting of Building Components in Plans – Elevations – Sections through Case studies of Architects' drawings
- Construction of Paraline drawings – Isometric and Axonometric.

UNIT V MEASURED DRAWING 20

Fundamentals of measured drawing

- Format for presentation methods
- Techniques of measuring buildings and their details

Measured drawing of simple objects

- Furniture and building components.

TEXT BOOKS

1. Morris I.H., "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

REFERENCES

1. Francis D.K.Ching with Steven P.Juroszek, "Design Drawing" John Wiley & Sons, Inc. Second edition, reprint 2012.
2. Fraser Reekie, Reekie's, "Architectural Drawing", Edward Arnold, 1995.
3. Scidler & Korte; Hand drawings for Designers - Communications ideas through area graphics; Four child books NY; 2012.

Cos/POs MAPPING'

COs	Program Outcomes (POs)							
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
1	1	2	-	1	-	-	-	-
2	1	2	-	1	-	-	-	-
3	1	2	-	1	-	-	-	-
4	1	2	-	1	-	-	-	-
5	1	2	-	1	-	-	-	-

Correlation Level: 1 - Low, 2 - Medium, 3 - High

STUDIO
U20ST0105
OBJECTIVES

BASIC DESIGN STUDIO

L	T	P/S	C
0	0	12	6

- To understand the elements and principles of Basic Design as the building blocks of creative design through exercises that will develop originality, expression, skill and creative thinking.
- To involve students in a number of exercises to understand the grammar of Design and Visual composition.
- To enable the 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.
- To understand architecture as a craft, of making and of putting together.
- To sensitize students to materials both planar and plastics and Processes involved in working with them.
- To draw inspiration and clues from nature.
- To introduce Drawing as an analytical tool.
- To introduce students to History of Design and craft.

COURSE OUTCOME

After Completion of the Course, the Students will be able to

CO1- An understanding of the qualities of different elements as well as their composite fusions **(K1, K2)**.

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 **(K2, K3)**.

CO3- Development of required skills – observation / analysis / abstractions / interpretation / representations / expressions through models and drawings **(K1, K2, K3)**.

CO4- An ability to design and study evolution of craft through iconic designs like Eames Chair, Rietvelt Chair **(K4, K5, K6)**.

CO5- An Analytical appraisal of building form in terms of visual character, form and function, play of light and shade, solids and voids, colors and texture **(K4, K5, K6)**.

CONTENTS

Introduction to Spatial Design, Form and Structures through Basic Design

Elements of Design: Properties, qualities and characteristics of point, line, direction shape, form, color and texture

Principles of Design: Scale, Proportion, Balance, Harmony, Rhythm and Contrast.

Concepts of Visual perception – Material and processes.

The course shall be conducted by giving a number of exercises in the form of Design studios, Seminars and Creative workshops that are aimed at teaching the following:

- Elements and Principles of Visual Composition and Pattern making.
- Exploring Color theories and their application in a Visual composition.
- Study of texture and schemes of texture both applied and stimulated and their application.
- Material and Form / Structures – Nature based enquiry into form both Linear and Planar, fluid and plastic forms using simple material like Mount Board, metal foil, box boards, wire string, thermocol, clay, plaster of Paris etc.
- Study of Solids and voids to evolve sculptural forms and spaces using specific process
- oriented methods like casting, moldings etc.,
- Analytical appraisal of an iconic Design like a rietvelt chair, Eames chair etc., for form, function, visual characteristics, ergonomics etc. / evolution of a craft.
- Analytical appraisal of building form in terms of visual character, form and function, play of light and shade, solids and voids, colors and texture.

TOTAL PERIODS 180

TEXT BOOKS

1. Owen Cappleman & Michael Jack Jordon, Foundations in Architecture: An Annotated Anthology of Beginning Design Project, Van Nostrand Reinhold New York, 1993.
2. Charles Wallschlagger & Cynthia Busic-Snyder, Basic Visual Concepts and Principles for Artists, Architects and Designers, McGraw Hill, New York 1992.

REFERENCES

1. Pramod V.S., Design fundamentals in Architecture, Somaiya Publications Pvt. Ltd., New Delhi, 1973.
2. Francis D.K. Ching, "Architecture: Form, Space and Order, Van Nostrand Reinhold Co., (Canada), 1979.
3. Elda Fezei, Henry Moore, Hamlyn, London, New York, Sydney, Toronto, 1972.
4. Lawrence Burchy C. Acrylic for Sculpture and Design, 450, West 33rd Street, New York, N.Y. 10001, 1972.
5. Exner V., Pressel D., "Basics Spatial Design", Birkhauser, 2009.

Cos/POs MAPPING'

COs	Program Outcomes (POs)							
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
1	1	2	-	1	-	-	-	-
2	1	2	-	1	-	-	-	-
3	1	2	-	1	-	-	-	-
4	1	2	-	1	-	-	-	-
5	1	2	-	1	-	-	-	-

Correlation Level: 1 - Low, 2 - Medium, 3 - High

II SEMESTER

THEORY		L	T	P/S	C
U20TH0206	MECHANICS OF STRUCTURES- I	2	2	0	3

OBJECTIVES

- To make students aware of how structural resolutions are important in realization of architectural design concept. At this stage, students shall be exposed to forces, moments, and resolution of forces.
- To make the students understand basic properties of solids and sections which influence their behavior under the effect of various types of forces.

COURSE OUTCOME

After Completion of the Course, the Students will be able to

CO1- Apply the concepts of action of forces on a body and should be able to apply the equilibrium concepts. **(K1, K2).**

CO2- An understanding about the Plane Trusses. **(K1, K2).**

CO3 - Students are taught basic geometric properties and the behavior of materials under effect of forces. **(K1, K2, K3).**

CO4- Understand the Elastic properties of solids **(K1, K2, K3).**

CO5- Applying and understanding the relationship between the Constants **(K1, K2, K3).**

UNIT - I FORCES AND STRUCTURAL SYSTEMS 16

Principles of statics

- Forces and their effects

Types of force systems

- Resultant of concurrent and parallel forces

Theorems

Lami's theorem- principle of moments -Varignon's theorem -principle of equilibrium

- Types of supports and loadings
- Determination of reactions for simply supported beams - simple problems.

UNIT - II ANALYSIS OF PLANE TRUSSES 12

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

UNIT III PROPERTIES OF SECTION 12

Properties of section -Centroid- Moment of Inertia - Section modulus – Radius of gyration - Theorem of perpendicular axis - Theorem of parallel axis –simple problems.

UNIT IV ELASTIC PROPERTIES OF SOLIDS 10

Elastic properties of solids

- Concept of stress and strain
- Deformation of axially loaded simple bars

Types of stresses

- Concept of axial and volumetric stresses and strains (excluding composite bar).

UNIT V ELASTIC CONSTANTS 10

Elastic constants –Elastic Modulus-Shear Modulus- Bulk Modulus-Poisson's ratio - Relation between elastic constants - Application to problems.

TOTAL PERIODS 60

TEXT BOOKS

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

REFERENCES

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

Cos/POs MAPPING'

COs	Program Outcomes (POs)							
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
1	1	2	-	-	-	-	-	-
2	1	2	-	-	-	-	-	-
3	1	2	-	-	-	-	-	-
4	1	2	-	-	-	-	-	-
5	1	2	-	-	-	-	-	-

Correlation Level: 1 - Low, 2 - Medium, 3 - High

THEORY
U20TH0207
OBJECTIVES

THEORY OF ARCHITECTURE

L	T	P/S	C
3	0	0	3

- To introduce the various facets of architecture and its influencing factors. To introduce the formal vocabulary of architecture as one of the ways to experience the built environment.
- To understand and appreciate the universals of architectural form and space in terms of elements and principles within particular historical, cultural and geographic contexts.

COURSE OUTCOME

After Completion of the Course, the Students will be able to

CO1- A thorough understanding on the definition of architecture; elements of architectures of form and space **(K1,K2)**.

CO2- Understanding and exploring the basic principles of design **(K2)**.

CO3- Understanding and exploring the components of building circulation **(K2)**.

CO4- Understanding and exploring the principles of architectural exploration **(K2)**.

CO5- An exposure to the principles of architecture and applications of the same in buildings **(K2)**.

UNIT - I	ARCHITECTURAL SPACE AND MASS	8
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- Definition of architecture
- Elements of architecture
- 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

UNIT - II	AESTHETIC COMPONENTS OF DESIGN	7
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- Exploration of the basic principles of design such as Proportion, scale, balance, rhythm, symmetry, hierarchy, axis with building examples.

UNIT III	CIRCULATION	12
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- Components of building circulation
- The building approach, the building entrance, Configuration of path, Path space relationship, Form of circulation space
- Circulation diagram for residence and restaurant.

UNIT IV	PRINCIPLES OF COMPOSITION	8
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- Involves the study of the basic principles that govern an architectural composition such as Unity, Harmony, Dominance, Fluidity, Emphasis, and Contrast etc.

UNIT V	DESIGN PROCESS AND ANALYSIS OF BUILDING	10
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- 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 Notre-dame DuHaut by Le corbusier.

TOTAL PERIODS 45

TEXT BOOKS

1. Francis D.K. Ching, "Architecture-Form, Space and Order", Van Nostrand Reinhold Company, New York, 2007.
2. Simon Unwin, "Analysing Architecture", Roulledge, London, 2003.
3. Pramara V.S., "Design Fundamentals in Architecture", Somaiya Publications Private Ltd., NewDelhi, 1973.
4. YatinPandya," Elements of Space making", Mapin 2007.

5. Juhani Pallasma : The Eyes of the skin: Architecture & the senses: Wiley 3rd edition:2012

REFERENCES

1. Leland M.Roth, "Understanding Architecture: Its Experience History and Meaning", Craftsmanhouse, 1994.
2. Peter von Meiss, "Elements of architecture – from form to place", Spon Press 1977.
3. Rudolf Arnheim, "The dynamics of architectural form", University of California Press, 1977.
4. NeilsPrak, "The language of Architecture", Mounon& Co., 1968.
5. Paul Alan Johnson, "The Theory of Architecture – Concepts and themes", Van Nostrand Reinhold Co., New York, 1994.
6. SimonUnwin, Analysing Architecture , Rouledge ,London , 2003.

Cos/POs MAPPING'

COs	Program Outcomes (POs)							
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
1	1	2	-	1	-	-	-	-
2	1	2	-	1	-	-	-	-
3	1	2	-	1	-	-	-	-
4	1	2	-	1	-	-	-	-
5	1	2	-	1	-	-	-	-

Correlation Level: 1 - Low, 2 - Medium, 3 - High

STUDIO
U20ST0208
OBJECTIVES

**BUILDING MATERIALS AND
CONSTRUCTION- I**

L	T	P/S	C
1	0	4	3

- To have an understanding of the properties, characteristics, strength and application of naturally occurring building materials such as Stone, Bamboo, Lime and Mud.
- To study the principles of designing components of load bearing structures – foundation, plinth, wall, openings etc. with naturally occurring building materials.

COURSE OUTCOME

After Completion of the Course, the Students will be able to

CO1-Students learn construction details using naturally occurring building materials such as stone, bamboo, mud and lime through drawing as well as doing a literature or live case study (**K1, K2**).

CO2-Understanding the details of foundations suitable for construction with stone, bamboo, lime and Mud(**K1, K2, K3**).

CO3-Students are to submit drawing plates comprising of technical plan, elevation and section along with sketches and details showing method of construction(**K1, K2, K3**)

CO4-An understanding of the details of Openings and Fenestration suitable for all types of construction(**K2, K3**).

CO5-An understanding of the materials for surface finishing and materials available in market for Paints, Plastering materials, Glazes and Varnishes.(**K2, K3**).

UNIT - I	BUILDING MATERIALS	10
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- Introduction to Building materials
- Naturally occurring building materials such as Stone, Bamboo, Lime and Mud
- Characteristics and Applications.
- The above-mentioned Theory topics will be given as assignment and submitted to the External Viva.

UNIT - II	BUILDING COMPONENTS – 01– FOUNDATIONS	20
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- Introduction to Building Components
- Foundations
- Foundations suitable for construction with stone, bamboo, lime and mud
- Exercises on Foundations in History and Today's context.

UNIT III	BUILDING COMPONENTS – 02-WALLS	20
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- Introduction to Building Components – Walls – Walls suitable for construction with stone, bamboo, lime and mud – Exercises on Walls in History and Today's context.

UNIT IV	BUILDING COMPONENTS – 03 – OPENINGS/FENESTRATIONS	15
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- Introduction to Building Components – Openings – Openings/Fenestrations suitable for construction with stone, bamboo, lime and mud
- Exercises on Openings / Fenestrations in History and Today's context.

UNIT V	FINISHES	10
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- Introduction to Finishes – Paints, Plastering, Putty, Glazes and Varnishes – Exercises on different finishes in History and Today's context for building components with stone, bamboo, lime and mud
- Market survey of Paints, Plastering materials, Glazes and Varnishes.
- The above-mentioned Theory topics will be given as assignment and submitted to the External Viva.

TEXT BOOKS

1. Arora S.P. and Bindra S.P., "Text book of Building Construction", Dhanpat Rai & Sons, New Delhi, 2012.
2. Klans Dukeeberg, Bambus – Bamboo, Karl Kramer Verlag Stuttgart Germany, 2000.
3. National Building Code Of India 2005- Part 6 Structural Design- Section 3 Timber and Bamboo.
4. Francis D.K. Ching, Building Construction Illustrated John Wiley & Sons 2000.

REFERENCES

1. Ghanshyam Pandya, M.P. Ranjan, Nilam Iyer Bamboo and Cane Crafts of Northeast India; National Institute of Design (2004).
2. Don A. Watson Construction Materials and Processes McGraw Hill 1972.
3. WB McKay Building construction, Vol 1,2, Longman UK 1981.
4. Barry, The Construction of Buildings; Affiliated East West press put Ltd New Delhi 1999.

Cos/POs MAPPING'

COs	Program Outcomes (POs)							
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
1	1	2	-	1	-	-	3	-
2	1	2	-	1	-	-	3	-
3	1	2	-	1	-	-	3	-
4	1	2	-	1	-	-	3	-
5	1	2	-	1	-	-	3	-

Correlation Level: 1 - Low, 2 - Medium, 3 - High

STUDIO
U20ST0209
OBJECTIVES

ARCHITECTURAL GRAPHICS II

L	T	P/S	C
1	0	4	3

- To involve students in a number of exercises that will help them develop the skill of representation in advance drawing techniques involving perspective and sciography.
- To involve students in a number of exercises that will help to understand the measured drawing method to document buildings of architectural interest using simple and advance techniques of representation.

COURSE OUTCOME

After Completion of the Course, the Students will be able to

CO1- Ability to construct a 3 dimensional simple geometrical shapes **(K2, K3)**.

CO2- Ability to construct the 3d views and perspective drawings of the buildings **(K2, K3)**.

CO3 - Ability to understand building exterior sciography and shadows of building components

CO4- Ability to document the Historic Building through pen and ink rendering **(K2, K3)**.

CO5- Understanding of advanced documentation and measured drawing techniques **(K2, K3)**.

UNIT - I **PERSPECTIVE METHODS** **15**

- Introduction to the concept of perspective drawing.
- One point and two-point perspective of simple geometrical shapes like cube, prism, combination of shapes using picture plane method and measuring point method.
- Introduction to three-point perspective.

UNIT - II **PERSPECTIVE: BUILDING INTERIOR** **10**

- Construction of one, two and three-point perspective grids
- Construction of one- and two-point perspective of building interiors.
- Adding of human figures, planters, furniture etc. in an interior perspective scene.
- Basic applications of shade and shadows and rendering techniques.

UNIT III **PERSPECTIVE: BUILDING EXTERIOR** **15**

Sciography

- Construction of sciography on building, shadows of architectural elements.

Short cut perspective method.

Construction of one, two- and three-point perspective of building exterior.

- Adding of human figures, trees etc.,
- Application of light and shadow and rendering techniques of building materials.

UNIT IV **MEASURED DRAWING: HISTORIC DOCUMENT STUDY** **20**

- Documentation and drawing of a simple historic building along with the relevant study of the building based on its history, morphology and context.
- Measured drawing using pen and ink rendering technique.

UNIT V **MEASURED DRAWING: BUILDING DOCUMENTATION** **15**

- Complete documentation of a building of special interest in terms of building construction, architectural excellence or technology using photographs, tapes etc.
- Measured drawing of plans, elevations, sections, isometric projections of building details etc. using pen and ink rendering technique.

TOTAL PERIODS 75

TEXT BOOKS

1. Francis D. K. Ching; Design Drawing; John Wiley & Sons; 2010
2. Rerdow Yee; Architecture Drawing - A Visual Compendium of Types & Methods; John Wiley & Sons; 2012

REFERENCES

1. John Montague; Basic Perspective Drawing - A Visual Approach; John Wiley & Sons; 5th edition 2010.
2. Mo Zell; The Architecture Drawing Course - Understand the principles & master the practices; Thames & Hudson; 2014

Cos/POs MAPPING'

COs	Program Outcomes (POs)							
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
1	1	2	-	1	-	-	-	-
2	1	2	-	1	-	-	-	-
3	1	2	-	1	-	-	-	-
4	1	2	-	1	-	-	-	-
5	1	2	-	1	-	-	-	-

Correlation Level: 1 - Low, 2 - Medium, 3 - High

STUDIO	ARCHITECTURAL MODEL MAKING	L	T	P/S	C
U20ST0210	WORKSHOP	0	0	6	3

OBJECTIVES

- To introduce students to analytical and illustrative drawing techniques as tools in the materialization and expression of thoughts.
- To introduce model making as a generative process, a tool in Design generation.
- To inculcate the dynamic act of constructing in thinking process.
- To understand the challenges of proper craftsmanship.

COURSE OUTCOME

After Completion of the Course, the Students will be able to

CO1- Exploration of conventional and less conventional techniques of representation in an attempt to creative visualization and to understand drawings as vehicles of thinking **(K1, K2, K3)**.

CO2- An understanding and applying a skill for making a conceptual sketch **(K2, K3)**.

CO3- An understanding and applying the Model making techniques in various materials **(K2, K3)**.

CO4- An understanding and Exploration in varying scales of models through instruction in Presentation techniques **(K2, K3)**.

CO5- Versatility in making models ranging from study to presentation and in varying scales and materials **(K2, K3)**.

UNIT - I	LINE, RENDER AND MIXED MEDIA	16
- Free hand sketching in architectural representation- pen, charcoal, ink, water color, paints, mixed media, collages, lino cutting, print making as tools.		
UNIT - II	DIAGRAMMING	18
- Conceptual sketches - Plan, section, elevation, perspectives, isometric / oblique projections, axonometric / parallel projection. - Unit I & II can be explored by way of assignments that require study, analysis, documentation with weightage given to representational expression and techniques.		
UNIT III	DESIGN PROCESSES AND MODEL MAKING TECHNIQUES	18
- Generative / geometry, fractals, parametric / material explorations (both in traditional materials like mount, foam, thermacoe, clay, plaster of Paris, paper Mache, wood and new age materials like polystyrene, Aerocon blocks, plastics, meshes, and processes like carpentry, casting, molding, welding, laser cutting etc. - Unit III can be explored with exercises that involve research through a process for example nature to structure and the evolution of a structural system that can be fabricated to scale.		
UNIT IV	PRESENTATION MODELS	18
- Exploration in varying scales of models through instruction in techniques- Residential to urban - Historic / Contemporary buildings - Exercises involving topography, textures, landscapes, human elements etc.		
UNIT V	STUDY MODELS AS A TOOL IN ARCHITECTURAL DESIGN PROCESS	20
- Exploration of the physical model as a tool through all phases of architectural design process, ranging from conceptual to specific design solutions- - This Unit will integrate with the Architectural Design course in this semester.		
TOTAL PERIODS		90

TEXT BOOKS

1. Mo Zell – The Architectural Design course, Understand the Principles and Master The Practices, Thames, and Hudson, 2008.
2. Neil Bingham – 100 Year of Architectural Drawings 1900 – 2000, Laurence King, 2013
3. Robert. W Gill – Rendering with Pen + Ink - Thames, and Hudson –2007.
4. Leon Krier Drawing for Architecture – Michael God well -2007

REFERENCES

1. Marco Frascari - Eleven Exercises in the art of Architectural Drawing, Routledge, 2011
2. Natascha Meuser, Construction and manual Architectural Drawings, DOM Publisher, 2012
3. Rendow Yee, Architectural Drawing A Visual Compendium of Types and Methods, Wiley, 2013
4. David Dernie, Architectural Drawing, Laurence King, 2010.
5. Lorraine Farrelly, Representational Techniques, AVA, 2011.

Cos/POs MAPPING'

COs	Program Outcomes (POs)							
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
1	1	2	-	-	-	-	-	-
2	1	2	-	1	-	-	-	-
3	1	2	-	1	-	-	-	-
4	1	2	-	1	-	-	-	-
5	1	2	-	1	-	-	-	-

Correlation Level: 1 - Low, 2 - Medium, 3 - High

- To enable the conceptualization of form, space and structure through creative thinking and to initiate architectural design process deriving from first principles.
- To involve students in a design project(s) that will involve simple space planning and the understanding of the functional aspects of good design.
- To involve students in a small-scale building project(s) which will sensitize them to intelligent planning that is responsive to the environmental context.
- To involve students in building case study by choosing appropriate examples to enable them to formulate and concretize their concepts and architectural program.
- To engage in discussion and analytical thinking by the conduct of seminars/ workshops.
- To enable the presentation of concepts through various modes and techniques that will move constantly between 2D representation and 3D modeling.

COURSE OUTCOME

After Completion of the Course, the Students will be able to

CO1- The students shall understand the basic functional aspect of designing simple building type and its relevant spatial organization.

CO2- The students shall be learning to reciprocate and sensitize the design/concept to the environment and the design skill of the project.

CO3- The students shall be learning Scale and Complexity in Architectural Form.

CO4- An understanding of Psychological and aesthetic experience of form and space in terms of scale, color, light, texture, etc.

CO5- An understanding of space requirement, anthropometrics, space standards, circulation.

CONTENT

- Scale and Complexity: projects involving small span, single space, single use spaces with simple movement, predominantly horizontal, as well as simple function public buildings of small scale; passive energy.
- **Areas of focus/ concern:**
- 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: bedroom, bathroom, kitchen, shop, exhibition pavilion, children's environment, snack bar, residence, petrol bunk, fire station.

TOTAL PERIODS 180

TEXT BOOKS

1. Joseph De Chiara, Michael J Crosbie, Time Saver Standards for Building Types, McGraw Hill Education; 4th edition, 2014..
2. Joseph De Chiara, Julius Panero, Martin Zelnik, Time Saver Standards for Interior Design and Space Planning, McGraw Hill 2011.
3. Ernst Neuferts Architects Data, Blackwell 2012.
4. Ramsey et al, Architectural Graphic Standards, Wiley 2008.

REFERENCES

1. Will Jones; Architects Sketch books; Thames & Hudson; 2011.
2. Sam F. Miller, Design Process: A Primer for Architectural and Interior Design, VNR; 1995.

Cos/POs MAPPING'

COs	Program Outcomes (POs)							
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
1	1	2	-	1	-	-	-	-
2	1	2	-	1	-	-	-	-
3	1	2	-	1	-	-	-	-
4	1	2	-	1	-	-	-	-
5	1	2	-	1	-	-	-	-

Correlation Level: 1 - Low, 2 - Medium, 3 - High

THEORY
U20TH0312
OBJECTIVES

MECHANICS OF STRUCTURES- II

L	T	P/S	C
2	2	0	3

- To enable understanding of the basic concepts of shear force and bending moment acting on beams subjected to different loading conditions.
- To give knowledge about how to determine stresses in beams and strength of sections.
- To give knowledge about how to calculate deflection of beams.
- To enable study of theory of columns.
- To give an understanding of the concept of indeterminate structure and its analysis.

After Completion of the Course, the Students will be able to

CO1-Ability to apply the concepts/techniques of finding stresses. (K2)

CO2-Ability to use simple bending theory to find deflection in beams. (K1,K4)

CO3-Ability to analyze and solve different types of columns. (K1,K5)

CO4-Ability to analyze the different types of indeterminate beams. (K2)

CO5-Ability to analyze the cantilever Beams. (K1)

UNIT - I	SHEAR FORCE AND BENDING MOMENT	12
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- Basic concepts.
- Shear force and bending moment diagrams for cantilever and simply supported beams subjected to different types of loadings
- Point loads, uniformly distributed loads.
- Point of contra flexure.

UNIT - II	STRESSES IN BEAMS	12
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- Theory of simple bending. Bending stress distribution.
- Strength of sections.
- Shearing stress
- Distribution in beam sections.

UNIT III	STRESSES IN BEAMS	12
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- Slope and deflection at a point.
- Macaulay's method for simply supported and cantilever beams.

UNIT IV	COLUMNS	12
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- Short and long columns.
- Concept of elastic stability.
- Euler's theory.
- Assumptions and load carrying capacity of columns with different end conditions.
- Concept of effective length - Slenderness ratio - Limitations of Euler's theory - Rankine's formula.

UNIT V	STATICALLY INDETERMINATE BEAMS	12
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- Introduction. Determination of degree of statistical indeterminacy for beams.
- Analysis of propped cantilever using Moment Area method.
- Central point load, uniformly distributed loads.

TOTAL PERIODS 45

V. nanthanas

TEXT BOOKS

1. R.K. Bansal, 'A Text Book on Strength of Materials', Laxmi Publications, New Delhi, 2006.
2. B.C. Punmia et al, 'SMTS-I, Strength of Materials', Laxmi Publications, 2015.

REFERENCES

1. M.M. Ratwani & V.N. Vazirani, 'Analysis of Structures, Vol. 1', Khanna Publishers, Delhi, 2012.
2. Timoshenko, S.P. and D.H. Young, 'Elements of Strength of Materials', 5th edition, East
3. West Press, 2011.
4. A.R. Jain and B.K. Jain, 'Theory and analysis of structures', Vol. 1, Nemchand and Bros, Roorkee, 1987.
5. R.K. Rajput, 'Strength of Materials', S.Chand, 2006.

Cos/POs MAPPING'

COs	Program Outcomes (POs)							
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
1	1	2	-	-	-	-	-	-
2	1	2	-	-	-	-	-	-
3	1	2	-	-	-	-	-	-
4	1	2	-	-	-	-	-	-
5	1	2	-	-	-	-	-	-

Correlation Level: 1 - Low, 2 - Medium, 3 - High

THEORY
U20TH0313
OBJECTIVES

**HISTORY OF ARCHITECTURE AND
CULTURE - II**

L	T	P/S	C
3	0	0	3

- To give an overall understanding of the architecture in India up to the colonial period as parallel and sequential productions rising from the cumulative effect of forces operating and intersecting in the Indian subcontinent.
- To inform about specific and prominent modes of architecture in terms of evolution, function, morphology and character.
- To give exposure to works that are architecturally exemplary and/or representative.
- To appreciate architecture as giver of particular and universal meaning.

OUTCOMES

After Completion of the Course, the Students will be able to

CO1-An understanding of the diversity of architecture in India and sensitivity towards its Syncretic aspects **(K1,K2)**.

CO2-Ability to appreciate particular cultural, symbolic, spatial and material qualities in Architecture and cities as givers of meaning and continuity. **(K1,K2)**.

CO3-Ability to appreciate universal qualities of architecture and their effects. **(K1,K2)**.

CO4-An understanding of Islamic architecture of the India. **(K1,K2)**.

CO5-An understanding of Spread of Islam into other regions of India and their architectural expressions**(K1,K2)**.

UNIT - I EARLY INDIA AND ITS CULTURAL PRODUCTIONS

8

Vedic

Culture, settlements and architecture through textual and inscriptional sources as well as conjectures.

- Outline of textual sources related to architecture and town planning in ancient India.
- Evolution of Hinduism, Buddhism.

Architecture of early Mauryan empire.

- Barabar hill cave of Bihar – Ashoka pillar Vaishali

Buddhist architecture and art.

- Stupas - Sanchi, Madhya Pradesh
- Chaitya halls - Karla caves
- Viharas - Karli - Rani Gumpha

Hindu temple form

- Principles, morphology, meaning, symbolism, iconography and rituals, classification.
- Early Hindu temple architecture
- Guptas - Vishnu Temple of Tigawa and Ladkhan temple, Aihole
- Chalukyas - Durga temple Aihole.

UNIT - II

ARCHITECTURE OF SOUTHERN INDIA

11

- Outline history of South India with particular emphasis on Bhakti movement
- Evolution of temple town urbanism.

Pallavas - Rathas and Shore temple, Mamallapuram

Cholas - Brihadishwara temple

Pandyas - Madurai Meenakshi Amman temple

Vijayanagara kingdom - Vittala Swamy temple, Vijayanagara

Hoysala architecture - Chennakesava temple, Belur.

UNIT III

ARCHITECTURE OF NORTHERN INDIA

8

Architecture of Orissa, Rajasthan and Gujarat.

- Lingaraja Temple, Bhubaneswar - Sun temple, Konark.

- Architecture of step wells in Northern India and their socio-cultural importance
- Surya Kund Modhera - Adalaj step well
-

UNIT IV INTRODUCTION TO ISLAMIC ARCHITECTURE AND EARLY ISLAMIC ARCHITECTURE IN INDIA **8**

- Islamic architecture of the world as rising from Islam as a socio-cultural and political phenomenon.
- Evolution of building types in terms of forms and functions.
- Principles and characteristics of Islamic architecture - to include aspects of religion, geometry, structure, materials, decoration, light.
- Early political history of Islam in India.

Evolution of Islamic architecture under the Delhi Sultanate

- Slave, Khaji, Tughlaq, Sayyid and Lodi dynasties.
- Qutub Complex
- Square and Octogonal tombs of Sayyid and Lodi dynasties.

UNIT V REGIONAL ISLAMIC ARCHITECTURE, MUGHAL ARCHITECTURE AND AFTER **10**

- **Spread of Islam into other regions of India and their architectural expressions**

Development of Provincial style

Jaunpur - Atala masjid

Bengal- Adina masjid

Ahmedabad - Tin darwaza

Bijapur – Gol Gumbaz

Mughal architecture

Humayun - Humayun tomb

Akbar - Fathepur Sikri

Shahjahan - Taj Mahal ,Agra

Aurangzeb - Tomb of Sufi

Development of the Mughal gardens.

TOTAL PERIODS 45

TEXT BOOKS

1. Percy Brown, 'Indian Architecture (Buddhist and Hindu Period)', Taraporevala and Sons, Bombay, 2014.
2. Percy Brown, 'Indian Architecture (Islamic Period)', Taraporevala and Sons, Bombay, 2014.
3. Christopher Tadgell, 'The History of Architecture in India - From the Dawn of Civilization to the End of the Raj', Phaidon, 2002.
4. Robert Hillenbrand, 'Islamic Architecture - Form, Function and Meaning', Columbia University Press, 2004
5. Romila Thapar, 'The Penguin History of Early India', Penguin, 2015.
6. Burton Stein, A History of India, John Wiley & Sons, 2010.
7. K.A. Nilakanta Sastri, 'A History of South India: From the Prehistoric Times to the Fall of Vijayanagar', Oxford University Press, 2007.

REFERENCES

1. George Michell, 'The Hindu Temple', University of Chicago Press, 1988.
2. Stella Kramrisch, 'The Hindu Temple', Motilal Banarsidass, Vol I 2002, Vol II 1996.
3. Satish Grover, 'Buddhist and Hindu Architecture in India', CBS, 2008.
4. Satish Grover, 'Islamic Architecture in India', CBS, 2012.
5. Catherine Asher, 'Architecture of Mughal India', Cambridge University Press, 2001.

6. Ananda K. Coomaraswamy, 'The Dance of Siva: Essays on Indian Art and Culture', RupaPublications, 2013.
7. A.L.Basham, 'The Wonder that was India', Picador, 2004.

Cos/POs MAPPING'

COs	Program Outcomes (POs)							
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
1	1	2	-	-	-	-	-	-
2	1	2	-	-	-	-	-	-
3	1	2	-	-	-	-	-	-
4	1	2	-	-	-	-	-	-
5	1	2	-	-	-	-	-	-

Correlation Level: 1 - Low, 2 - Medium, 3 - High

- To inform about the ways in which the characteristics of sites can be understood.
- To enable an understanding of the macro and micro impact of buildings on it.
- To give understanding of the potential/ limitations site offers to the design of buildings.
- To give exposure to different terminologies and techniques associated with site, site surveying, site analysis and site planning.
- To explore all the above through a project.

OUTCOMES

After Completion of the Course, the Students will be able to

CO1 -Sensitivity towards aspects of site at macro and micro contexts. **(K1,K3).**

CO2 -Ability to exploit potential of site to design the built environment. **(K2,K3).**

CO3- Ability to measure, draw, analyses and plan a particular site for a specific purpose. **(K2,K3).**

CO4- An understanding of site layout and development. **(K2,K3).**

CO5- An understanding of , detailed site analysis, schematic site layout and development.. **(K2,K3).**

UNIT - I

INTRODUCTION TO SITE AND SITE SURVEYING

12

Definitions

- Plot, site, land and region
- Units of measurements.

Introduction to survey and need for surveying.

- Methods of surveying and context of use.
- Chain survey and Triangulation – instruments used, method of survey and plotting into survey drawing. Plain table, Compass and theodolite surveys - method, instruments used and application.
- Modern surveying Instruments such as EDMs and Total Stations and their application.

Understanding of administrative maps and site drawings, including FMB.

Introduction to measuring a site

- Drawing out a site plan from measurements and computing area by geometrical figures and other methods.

Introduction to marking plans, layout plans and centerline plans. Importance and procedure for making these drawings and dimensioning.

Procedure and precautions of setting out a plan on site.

Understanding the above through site visits to real projects.

UNIT - II

SITE ANALYSIS

12

Site as offering potential/ limitations to architectural design.

- Importance of site analysis.
- Onsite and off-site factors.
- Analysis of natural, cultural and aesthetic factors.

Factors

- Topography, hydrology, soils, vegetation, climate and microclimate, surface drainage, accessibility, size and shape, infrastructure, sources of water supply and means of disposal system, visual aspects, context of built environment.

Detailed analysis

- Contours, slope analysis, grading process, grading criteria, functional and aesthetic considerations.

-Maps of matrix analysis & composite analysis methods.

Understanding the above through real projects/ case studies.

UNIT III SITE CONTEXT AND REGULATIONS 10

- Detailed understanding of context of the site.
- Introduction to master plans, land use for cities, development control rules.
- Site selection criteria for different building typologies.
- Impact of building developments on the surroundings including aspects such as traffic, noise, pollution, microclimate, etc., especially in the context of large-scale projects.
- Understanding the above through real projects/ case studies.

UNIT IV PRINCIPLES OF SITE LAYOUT AND DEVELOPMENT 12

- Organization of pedestrian and vehicular circulation.
- Geometric calculation for movement. Types of roads, hierarchy of roads, networks, road widths and parking regulations.
- Principles of positive drainage and grading for drainage. Location and design of sewage treatment plants.
- Methods to control soil erosion.
- Location of utility lines to simplify maintenance.
- Planning for rain water harvesting.
- Incorporation of services such as drinking water pipelines, fire hydrants, communication and networking facilities at site.
- Vegetation, landforms and water as modifiers of microclimate.
- Understanding the above through real projects/ case studies.

UNIT V EXERCISE IN SITE SURVEYING AND PLANNING 14

- Application of all the knowledge gained in previous units through a real/ hypothetical project involving a real site. The process would involve choosing site for a building typology or vice versa, field exercise in measuring and drawing the site, detailed site analysis, schematic site layout and development.
- The project will be explored through analysis/ models/ sketches/ drawings.

TOTAL PERIODS 60

TEXT BOOKS

1. Kevin Lynch, 'Site Planning', Third Edition, MIT Press, 1984.
2. Edward. T. White, 'Site Analysis', Archi Basic Press, 2014.
3. B.C.Punmia et al, 'Surveying Vol.I', Seventeenth Edition, Laxmi Publications, 2016.

REFERENCES

1. Joseph De.Chiarra and Lee Coppleman, 'Urban Planning and Design Criteria', Van Nostrand Reinhold Co., 1982.
2. Strom Steven, 'Site Engineering for Landscape Architects', John Wiley & Sons, 2013.
3. P.B.Shahani, 'Text of Surveying Vol.I', Oxford and IBH Publishing Co, 1980
4. 'Development Control Rules', CMDA 2008.
5. Genevieve S. Baudoin, 'Interpreting Site: Studies in Perception, Representation, and Design', Routledge, 2015.graphics; Four child books NY; 2012.

Cos/POs MAPPING'

COs	Program Outcomes (POs)							
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
1	1	2	-	1	-	-	3	-
2	1	2	-	1	-	-	3	-
3	1	2	-	1	-	-	3	-
4	1	2	-	1	-	-	3	-
5	1	2	-	1	-	-	3	-

Correlation Level: 1 - Low, 2 - Medium, 3 - High

THEORY CUM

STUDIO

CLIMATE AND BUILT ENVIRONMENT

L T P/S C

U20TS0315

2 0 2 3

OBJECTIVES

- To introduce the concepts of human heat balance and comfort.
- To inform about the movement of sun and understand its impact on building design.
- To inform about the effects of wind and air with respect to siting and design of buildings.
- To give exposure to design strategies for building in different types of climatic zones.

OUTCOMES

After Completion of the Course, the Students will be able to

CO1 - An understanding of heat balance in human beings. **(K2).**

CO2 - An understanding of the effect of sun and wind on buildings. **(K2).**

CO3 - An understanding of material effects in buildings. **(K2,K3).**

CO4 - Ability to design buildings with respect to climate. **(K3).**

CO5 – An understanding of design strategies for various climates. **(K2).**

UNIT - I

CLIMATE AND HUMAN COMFORT

10

- Climate and Civilization.
- Factors that determine climate of a place.
- Components of climate.
- Classification of climate for building designers in tropics. Characteristics of climate. Human body heat balance and heat loss.
- Effects of climatic factors on human body heat loss.
- Effective temperature, human thermal comfort.
- Use of C. Mahony's tables.
- Exercise related to the above.

UNIT - II

DESIGN OF SOLAR SHADING DEVICES

14

- Movement of sun.
- Locating the position of sun. - Sun path diagram - Overheated period -Solar shading - Shadow angles.

Exercise in the design of shading devices through models/ calculations/ drawings/ software.

UNIT III

HEAT FLOW THROUGH BUILDING ENVELOPE- CONCEPTS

10

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. Material qualities of envelopes.

Exercise involving calculation/ software for design analysis.

UNIT IV

AIR MOVEMENT DUE TO NATURAL AND BUILT FORMS

12

- Wind and the effects of topography on wind patterns.
- Air currents around building.
- Air movement through buildings. The use of fans.

Thermally induced air currents – Stack effect, Venturi effect, use of court yard. Exercise exploring air movement in architecture with physical models/ simulation through software.

UNIT V**CLIMATE AND DESIGN OF BUILDINGS****14**

- Design strategies in warm humid climates, hot humid climates, hot and dry climates and cold climates.
- Climate responsive design exercise for different contexts through sketches/ drawings/ analysis/ detailing/ calculation.

TOTAL PERIODS 60**TEXT BOOKS**

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.

REFERENCES

1. Martin Evans, 'Housing Climate and Comfort', Architectural Press, London, 1980.
2. B. Givoni, Man, 'Climate and Architecture', Architectural Sciences Series, Applied Science Publishers Ltd., London, 1981.
3. B. Givoni, 'Passive and Low Energy Cooling of building', Van Nostrand Reinhold, New York, 1994.
4. Galloe Salam and Sayigh A.M.M, 'Architecture, Comfort and Energy', Elsevier Science Ltd., Oxford, 1998.
5. Arvind Krishnan, Szokolay et.al, 'Climate Responsive Architecture- A Design Handbook for Energy Efficient Buildings', Tata McGraw Hill, 2010.

COs	Program Outcomes (POs)							
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
1	1	2	-	3	-	-	-	-
2	1	2	-	3	-	-	-	-
3	1	2	-	3	-	-	-	-
4	1	2	-	3	-	-	-	-
5	1	2	-	3	-	-	-	-

Correlation Level: 1 - Low, 2 - Medium, 3 - High

- To give an introduction to brick, clay and timber products in building construction.
- To enable an understanding of the principles, methods of construction and applications of the above for structural and non-structural building components.
- To enable design and detail using all these materials in simple buildings.

After Completion of the Course, the Students will be able to

CO2 - Ability to design and detail structural and non-structural components of simple buildings
Using the above materials. **(K1.K6).**

CO3 - Ability to integrate knowledge of properties and construction methods of basic building materials in the design of simple projects(K1,K6).

CO5 -Ability to integrate knowledge and design exercise involving use of brick, clay and timber products(K1,K2,K6).

- **Brick and clay**

- Types of brick and clay products.

- Outline of their manufacture, characteristics and applications in building construction. Products to include different types of bricks for masonry.

Pot/pan tiles and Mangalore tiles, flooring tiles such as clay, ceramic and vitrified tiles, Hourdi tiles, current innovations.

- **Understanding of product literature.** Site visits with documentation in the form of sketches/drawings/photos.

- The above mentioned Theory topics will be given as assignment and submitted to the External Viva.

BRICK BONDING

- Basic principles of brick bonding and its types. Mortar, plastering, pointing, finishes for brick.

- Construction principles and procedures for building components using brick and clay products.

Foundation, load bearing walls, partition walls, compound walls, parapet walls, roofs, arches, lintels, coping, steps, flooring, paving of different types.

- Products to include prefabricated brick panels, precast curved brick arch panels, reinforced brick/ reinforced brick concrete slabs, prefabricated floor/ roof using structural clay units, Hourdi block roofing, current innovations.

Drawings/ models of the principles.

Understanding of detailed drawings/ published work. Site visits with documentation in the form of sketches/ photos

- Timber as basic building material and brief history of its use with examples. Timber sources, classification, characteristics, defects, conversion, seasoning, storage, uses, preservation, finishes (including paint, varnish, enamel, special paints and coatings). **Market forms of timber.**
- Types of industrial timber products. Outline of their manufacture, characteristics and applications in building construction.

- Products to include plywood, particle board, block board, fiber board, cement bonded particle board, sustainable products, current innovations.
- Understanding of product literature. Site visits with documentation in the form of sketches/ drawings/photos.
- The above-mentioned Theory topics will be given as assignment and submitted to the External Viva.

UNIT IV **TIMBER IN BUILDING CONSTRUCTION** **20**

- Joints in timber. Construction principles and procedures for timber wall, floor, roof trusses (to include lean to, couple, collar, king post, queen post and roof covering material), staircase.
- Construction principles and procedures for different types of timber doors, windows and ventilators.
- The types, whichever is applicable for each, will include materials (panelled, flush, glazed), swing, mechanisms of operation (fixed, openable, sliding, folding, sliding and folding, pivoted, revolving, top hung, bottom hung, louvered), nature - (french, corner, bay).
- Construction principles and procedures using timber/industrial timber/ gypsum products for partitions (fixed, sliding, sliding and folding), panelling, false ceiling, flooring. Hardware and fixing for all the above as applicable.
- Drawings/ models of the principles. Understanding of detailed drawings/ published work. Site visits with documentation in the form of sketches/ drawings/ photos.
- The above-mentioned Theory topics will be given as assignment and submitted to the External Viva.

UNIT V **DESIGN USING BRICK, CLAY, TIMBER AND TIMBER PRODUCTS** **15**

- A design exercise involving use of brick, clay and timber products in appropriate structural and nonstructural components in a simple, small project of any basic typology.

TOTAL PERIODS 75

TEXT BOOKS

1. Don A. Watson, 'Construction Materials and Processes', McGraw Hill, 1972.
2. W.B. McKay, 'Building Construction', Person India, Vol, 1 2013, Vol II, 2012.
3. S.C Rangwala 'Building Construction' Charotar Publishing House, India, 2016.
4. S.K.Sharma, 'A Text book of Building Construction', S. Chand & Co Ltd., New Delhi, 1998.
5. S.K. Duggal, 'Building Materials', New Age International Publishers, 2016.
6. R.J. S. Spence and D.J. Cook, 'Building Materials in Developing Countries', John Wiley and sons 1983.
7. S. C. Rangwala, 'Engineering Materials', Charotar Publishing House India, 2015.
8. Roy Chudley, Roger Greeno, 'Building Construction Handbook', Routledge, 2010.

REFERENCES

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. Willis H Wagner & Howard Bud Smith, 'Modern Carpentry', GoodHeart-Wilcox

Cos/POs MAPPING'

COs	Program Outcomes (POs)							
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
1	1	2	-	3	-	-	-	-
2	1	2	-	3	-	-	-	-
3	1	2	-	3	-	-	-	-
4	1	2	-	3	-	-	-	-
5	1	2	-	3	-	-	-	-

Correlation Level: 1 - Low, 2 - Medium, 3 - High

STUDIO	ARCHITECTURAL DESIGN STUDIO-	L	T	P/S	C
U20ST0317	II	0	0	14	7

OBJECTIVES

- To create understanding of human built environment as a holistic, living entity from macro to micro scales, and shaped by geographic and socio-cultural forces as well as by historic, political and economic factors, through study of and design within the context of rural settlements.
- To enable a comprehensive study of rural settlement and architecture in order to understand them as exemplar of collective design that evolved through various parameters.
- To observe changes in the above, analyze their nature and causes for them.
- If required, to explore possible policy and physical interventions towards positive changes within the context studied.
- To enable design process that engages context and community.

OUTCOMES

After Completion of the Course, the Students will be able to

CO1 - Ability to collect, assimilate and integrate knowledge in a holistic manner. **.(K1,K6)**

CO2 - Sensitivity towards the nature and values of unselfconscious and collective design as well as the interconnectedness of human society and environment. **.(K1,K6)**

CO3 - Ability to observe and analyze changes in the above. **.(K1,K6)**

CO4 - Ability to project future transformations and give possible/ appropriate ways to address issues, if any. **.(K1,K6)**

CO5 - Sensitivity in design approach in community-oriented projects with respect to context, collective values and needs.**(K1,K6)**

CONTENT

- Rural settlements offer an opportunity to understand basic aspects of human built environment and what goes into its making/ influences it. The interrelationship between built form and society will be studied, understood and established, starting from either end as required. Study of specific modes of rural/vernacular/traditional architecture including their morphology, local materials and construction techniques, details, meaning, etc., will be done to give an insight into the particulars and universals of architecture.
- Appropriate tools and processes can be used to aid the understanding. These include different methods of historical and socio-cultural study, oral history, discussions, information collection, surveys, maps, perceptual sketches, documentation through drawings, demographic study, assimilation and analysis.
- Transformations across time need to be traced to understand constants and dynamics in human society. They will also be critically evaluated through discussions with experts. Rising from this, future changes can be projected/ envisaged and if found required, policy and physical interventions can be suggested/ explored. The physical interventions found necessary will be taken up as design situations. This could range from individual to community level and involve any aspect of the physical environment (including building projects) as the situation/view point warrants.
- If the context does not warrant a building need, a small community-oriented building design will be given as a separate project in addition to the rural project. For building projects, the scale and complexity of planning and construction usually involved will be simple - small or medium span, ground plus two storied maximum, simple horizontal and vertical movement, simple/ local materials and construction, passive energy.

TOTAL PERIODS 210

TEXT BOOKS

1. Amos Rapoport, 'House, Form and Culture', Prentice Hall, 1969.
2. Bernard Rudofsky, 'Architecture without Architects', MoMA, 1964.
3. Rajendra Kumar Sharma, 'Rural Sociology', Atlantic, 2011.
4. Joseph De Chiara, Michael J Crosbie, 'Time Saver Standards for Building Types', McGraw Hill Professional 2001

REFERENCES

1. Ramachandran H, 'Village Clusters and Rural Development', Concept Publications, 1980.
2. Thorbeck D, 'Rural Design', Routledge, 2002.
3. Hassan Fathy, 'Architecture for the Poor', University of Chicago press, 1973.
4. R. C. Arora, 'Integrated Rural Development', S. Chand, 1979.

Cos/POs MAPPING'

COs	Program Outcomes (POs)							
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
1	1	2	-	1	-	-	3	-
2	1	2	-	1	-	-	3	-
3	1	2	-	1	-	-	3	-
4	1	2	-	1	-	-	3	-
5	1	2	-	1	-	-	3	-

Correlation Level: 1 - Low, 2 - Medium, 3 - High

IV SEMESTER

THEORY	L	T	P/S	C
U20TH0418	2	2	0	3

OBJECTIVES

- To get introduced to basic structural members in timber and steel.
- To give knowledge to design different timber components in a building.
- To enable an understanding of the types, efficiency and strength, advantages and disadvantages of rivet and welded joints in steel.
- To enable the design of tension (beams) and compression (columns) steel members in a building under different conditions.

OUTCOMES

After Completion of the Course, the Students will be able to

CO1-Ability to design timber beams and columns by applying the code provisions. (K1,K2,K3)

CO2-Ability to design steel joints for maximum efficiency and strength. **(K5,K6)**

CO3-Ability to design tension and compression members for different conditions by applying the code provisions. (K3,K4)

CO4-Ability to design different types of laterally unsupported & supported beams for different conditions. **(K3,K4)**

CO5-Ability to design different types of steel structures and its executions.(K5,K6)

UNIT - I	STEEL STRUCTURES - BOLTED JOINTS	12
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- Assumptions. Failure of bolted joints.
- Strength and efficiency of bolted joints.
- Types. Design of bolted joints for axially loaded members (excluding eccentric connections).

UNIT - II	STEEL STRUCTURES - WELDED JOINTS	12
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- Types of welded joints.
- Advantages and disadvantages.
- Design of fillet welds (excluding eccentric connections).

UNIT III	STEEL TENSION MEMBERS	12
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- Introduction.
- Net sectional area.
- Permissible stresses.
- Design of axially loaded tension member.
- Lug angle, tension splice.

UNIT IV	STEEL COMPRESSION MEMBERS	12
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- Introduction.
- Different sections.
- Built up section.
- Design of columns (excluding lacing, battening and other connections).

UNIT V	STEELBEAMS	12
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- Introduction.
- Laterally supported and unsupported beams.
- Design of laterally supported beams

TOTAL PERIODS 60

V. nanthanas

TEXT BOOK

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, 'Limit State Design of Steel Structures', 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.

Cos/POs MAPPING'

COs	Program Outcomes (POs)							
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
1	1	2	-	1	-	-	-	-
2	1	2	-	1	-	-	-	-
3	1	2	-	1	-	-	-	-
4	1	2	-	1	-	-	-	-
5	1	2	-	1	-	-	-	-

Correlation Level: 1 - Low, 2 - Medium, 3 - High

THEORY	ENVIRONMENTAL SCIENCE	L	T	P/S	C
U20TH0419	FORTHEBUILT ENVIRONMENT	3	0	0	3

OBJECTIVES

- To enable understanding of the environment, and its inter relationship with living organisms.
- To help understand the importance of environment by assessing its impact on humans and to envision the surrounding environment, its functions and its value.
- To give understanding of dynamic processes and features of the earth's interior and surface.
- To give awareness about integrated themes and biodiversity, natural resources, pollution control and waste management.
- To inform about scientific, technological, economic and political solutions to environmental problems.

OUTCOMES

After Completion of the Course, the Students will be able to

CO1-Sensitivity towards the environment as a totality and knowledge about its importance(**K1,K2**).

CO2-An understanding of the role of public awareness and participation with respect to environmental issues, apart from laws. (**K1,K2**).

CO3- An understanding of the Natural Resources (**K1,K2**).

CO4-An understanding of the social issues and Environment (**K1,K2**).

CO5-An understanding of the Human Population and Environment(**K1,K2**).

UNIT - I ENVIRONMENT, ECOSYSTEMS AND BIODIVERSITY 10

- Definition, scope and importance of environment. Need for public awareness. Concept of an ecosystem.
- Structure and function of an ecosystem – producers, consumers and decomposers. Energy flow in the ecosystem.
- Ecological succession. Food chains, food webs and ecological pyramids. Introduction to types, characteristic features, structure and function of the (a) forest ecosystem (b) grassland ecosystem (c) desert ecosystem (d) aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries).
- Introduction to biodiversity. Definition and types- genetic, species and ecosystem diversity.
- Bio geographical classification of India. Value of biodiversity - consumptive use, productive use, social, ethical, aesthetic and option values.
- Biodiversity at global, national and local levels. India as a mega-diversity nation. Hot-spots of biodiversity.
- Threats to biodiversity - habitat loss, poaching of wildlife, man wildlife conflicts.
- Endangered and endemic species of India. Conservation of biodiversity - In-situ and ex-situ conservation of biodiversity.
- Field study of common plants, insects, birds. Field study of simple ecosystems – pond, river, hill slopes, etc.

UNIT - II ENVIRONMENTAL POLLUTION 9

- Definition. Causes, effects and control measures of: (a) Air pollution (b) Water pollution (c) Soil pollution (d) Marine pollution (e) Noise pollution (f) Thermal pollution (g) Nuclear hazards.
- Soil waste management. Causes, effects and control measures of municipal solid wastes.
- Role of an individual in prevention of pollution.
- Pollution case studies. Disaster management - floods, earthquake, cyclone and landslides.
- Field study of local polluted site – Urban/ Rural/ Industrial/ Agricultural.

UNIT III**NATURAL RESOURCES****9**

- Forest resources - Use and over-exploitation, deforestation, timber extraction, case studies. Mining, dams and their effects on forests and tribal people.
- Water resources - Use and overutilization of surface and ground water.
- Floods, drought, conflicts over water.
- Dams-benefits and problem.
- Mineral Resources-Use and exploitation, environmental effects of extracting and using mineral resources, case studies.
- Food resources - World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies.
- Energy resources - Growing energy needs, renewable and non-renewable energy sources, use of alternate energy sources. case studies.
- Land resources - Land as a resource, land degradation, man induced landslides, soil erosion and desertification. Role of an individual in conservation of natural resources Equitable use of resources for sustainable lifestyles.
- Field study of local area to document environmental assets – river/ forest/ grassland/ hill/ mountain.

UNIT IV**SOCIAL ISSUES AND THE ENVIRONMENT****9**

- From unsustainable to sustainable development.
- Urban problems related to energy.
- Water conservation, rain water harvesting, watershed management.
- Resettlement and rehabilitation of people; problems and concerns, case studies.
- Role of non-governmental organizations.
- Environmental ethics - Issues and possible solutions.
- Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust, case studies.
- Wasteland reclamation.
- Consumerism and waste products.
- Environment protection act, Air (Prevention and Control of Pollution) act, Water (Prevention and control of Pollution) act, Wildlife protection act, Forest conservation act. Enforcement machinery involved in environmental legislation.
- Central and state pollution control boards. Public awareness.

UNIT V**HUMAN POPULATION AND THE ENVIRONMENT****8**

- Population growth, variation among nations.
- Population explosion.
- Family welfare programme. Environment and human health.
- Human rights.
- Value education.
- HIV/AIDS awareness.
- Women and child welfare.
- Role of information technology in environment and human health.
- Case studies.

TOTAL PERIODS 45

TEXT BOOKS

1. Gilbert M.Masters, 'Introduction to Environmental Engineering and Science', 2nd edition, Pearson Education,2004.
2. Benny Joseph, 'Environmental Science and Engineering', Tata McGraw-Hill, New Delhi,2006.

REFERENCES

1. R.K. Trivedi, 'Handbook of Environmental Laws, Rules, Guidelines, Compliances and Standards', Vol. I and II, EnviroMedia.
2. Cunningham, W.P. Cooper, T.H. Gorhani, 'Environmental Encyclopaedia', Jaico Publ., House, Mumbai,2001.
3. Dharmendra S. Sengar, 'Environmental Law', Prentice hall of India PVT LTD, NewDelhi,2007.
4. Rajagopalan, R, 'Environmental Studies-From Crisis to Cure', Oxford University Press,2005.

Cos/POs MAPPING'

COs	Program Outcomes (POs)							
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
1	1	-	2	-	-	-	1	-
2	1	-	2	-	-	-	1	-
3	1	-	2	-	-	-	1	-
4	1	-	2	-	-	-	1	-
5	1	-	2	-	-	-	1	-

Correlation Level: 1 - Low, 2 - Medium, 3 - High

**THEORY CUM
STUDIO**

U20TS0420

BUILDING SERVICES - I

L	T	P/S	C
2	0	2	3

OBJECTIVES

- To give information about water supply source, treatment and distribution.
- To give information about waste water disposal and sewerage systems.
- To give information about drainage system, refuse collection and disposal.
- To give exposure to sustainable practices in all the above contexts.
- To give an overall understanding of how to plan for all the above in small buildings, campuses and neighborhoods.

OUTCOMES

CO1- Understanding of water supply, sewage, drainage and waste systems in buildings **(K1,K2)**.

CO2-Ability to conceptually plan/ design the above for a given simple context **(K4,K6)**.

CO3- Understanding of storm water drainage and its applications**(K1,K2)**.

CO3- Understanding of solid waste management and its applications**(K1,K2)**.

CO3- Design in the form of choice, details of system and layout/ drawings. **(K4,K6)**.

UNIT - I WATER QUALITY, TREATMENT AND DISTRIBUTION 14

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.

Distribution of water.

- Water piping systems in all type of buildings.
- Choice of pipe materials.
- Types of fixtures and fittings.

Water consumption calculations for various contexts.

- Water meters.
- Design and calculations of OHTs, UG Sumps and fire fighting storage.
- Related mechanical equipment.
- Automation systems.
- Water heating systems, solar water heaters.

Energy efficient systems. Green and sustainable concepts in the above where relevant.

Understanding of service drawings. Site visits with documentation in the form of sketches/ drawings/ photos.

UNIT - II SULLAGE AND SEWAGE DISPOSAL 14

- Sewage and sullage. Their disposal.
- Primary treatment. Secondary treatment. Biological treatment
- Types of sewer systems
- Modern types of sewage treatment plants - neighborhood and site level.
- Related mechanical equipment. Sewer line, gradients, manholes, inspection chambers, septic tank, leach pits, traps.
- Byelaws for sanitation.
- Sanitary fittings and their requirements.
- Green and sustainable concepts in the above where relevant.

Understanding of service drawings. Site visits with documentation in the form of sketches/ drawings/ photos.

UNIT III STORM WATER DRAINAGE AND RAIN WATER HARVESTING 10 10

- Basic principles of storm water drainage.
- Drain pipes and type of pipe. Storm water gutter.

- Rain water harvesting principles, Storage sumps.
- Different types of pavements and details for water percolation.
- Current ideas of sustainability in the above.

Understanding of service drawings. Site visits with documentation in the form of sketches/ drawings/ photos.

UNIT IV

SOLID WASTE MANAGEMENT

10

Solid waste

- Types, segregation and refuse collection.
- Disposal - Incinerator, composting, vermicomposting, sanitary land filling, bio gas system, modern renewable energy system.

Current ideas of sustainability in the above.

Understanding of service drawings. Site visits with documentation in the form of sketches/ drawings / photos.

UNIT V

DESIGN OF SERVICES

12

- Schematic design of water supply, sewage, drainage and solid waste services in the context of a small building/ campus/ neighborhood.
- The project will integrate knowledge from all the previous units.
- Design in the form of choice, details of system and layout/ drawings.

TOTAL PERIODS 60

TEXT BOOKS

1. 'Manual of Water Supply and Treatment', second edition, CPHEEO, Ministry of works and housing, New Delhi, 1977.
2. AFE Wise, JA Swaffied Water, 'Sanitary & Waste Services in buildings', V Edition, Mitchell Publishing, Co. Ltd., 2002.
3. Punmia B.C., 'Waste Water Engineering', Laxmi Publications, 2009.
4. Arceivala S.J., 'Waste Water Treatment for Pollution Control', Tata McGraw Hill, 2008.
5. National Building Code - Bureau of Indian Standards.
6. Indian Standard Code of Practice for Water Supply in Buildings, IS :2065 – 1983'.

REFERENCES

1. G.M. Fair, J.C. Geyer and D.Okin, 'Water and Waste water engineering Volume II', John Wiley & Sons, Inc. New York, 1968.
2. S.C.Rangwala, 'Water Supply and Sanitary Engineering', Charotar publishing house,
3. 'Renewable Energy, Basics and Technology, Supplement Volume on Integrated energy systems', Solar Agni systems, Sri Aurobindo Ashram, Pondicherry 605002.

Cos/POs MAPPING'

COs	Program Outcomes (POs)							
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
1	1	-	-	2	-	-	-	-
2	1	-	-	2	-	-	-	-
3	1	-	-	2	-	-	-	-
4	1	-	-	2	-	-	-	-
5	1	-	-	2	-	-	-	-

Correlation Level: 1 - Low, 2 - Medium, 3 - High

STUDIO	BUILDING MATERIALS AND	L	T	P/S	C
U20ST0421	CONSTRUCTION -III	1	0	4	3

OBJECTIVES

- To give an introduction to metals as material for building construction.
- To give knowledge about the principles, methods of construction and applications of metals for structural and non-structural building components.
- To provide familiarity with market forms of metals and finishes for them.
- To enable design and detail using metals in buildings.

OUTCOMES

CO1-Knowledge of properties of ferrous and nonferrous metals as materials for buildings(**K1,K2**).
CO2-An understanding of possibilities of steel as an important building construction material(**K1,K2**).
CO3-Ability to design and detail structural and nonstructural components of simple buildings using metals. (**K3,K4**).
CO4-Ability to use metal innovatively in building projects(**K1,K2**).
CO5 -. Ability to Design and construction details in the form of sketches, drawings, models(**K4,K5**).

UNIT - I FERROUS METALS IN BUILDING CONSTRUCTION 10

- Types of iron and their uses in building.
- Their properties, types, uses, protection and finishes.
- Corrosion of ferrous metals and its prevention.
- Fire protection of steel.
- Steel sections and products for structural and non-structural use including current innovations.
- Joints in steel- welding, riveting, bolting.
- Stainless steel.
- Understanding of product literature. Site visits.

UNIT - II STEEL IN NON-STRUCTURAL BUILDING COMPONENTS 18

- Construction principles and procedures for nonstructural building components using steel.
- Components to include doors, windows, ventilators, rolling shutters of different types as applicable - openable, sliding, pivoted, fixed, louvered.
- Glazing, hardware and fixing for components.
- Sketching/ drawing/ models of the principles.
- Understanding of product literature/ shop drawings. Site visits with documentation in the form of sketches/ drawings/ photos.

UNIT III STEEL IN STRUCTURAL BUILDING COMPONENTS 20

- Construction principles and procedures for structural building components using steel.
- Components to include foundations, columns, beams, staircases, roofs (different types of trusses, space frames, etc), total structures such as geodesic dome.
- Connections between the different components and fixing.
- Materials for glazing, cladding, roof covering, etc., as required for particular components, and their fixing.
- Prefabrication in steel.
- Drawings/ models of the principles.
- Understanding of product literature/ shop drawings.
- Site visits with documentation in the form of sketches/ drawings/ photos

UNIT IV NON FERROUS METALS IN BUILDING CONSTRUCTION 12

- Aluminum and aluminum alloys in building construction.
- properties, durability, finishes and uses.
- Aluminum products such as extrusions, foils, castings, sheets, current innovations.

- Construction principles and procedures for nonstructural building components using aluminum.
- Components to include door, window, ventilator of different types - openable, sliding, pivoted, fixed, louvered, etc., as applicable.
- Aluminum for interior components such as paneling, partitions and false ceiling.
- Glazing, hardware and fixing for components. Introduction to Aluminum curtain wall glazing.
- Sketching/ drawing/ models of the principles. Understanding of product literature/ shop drawings. Site visits with documentation in the form of sketches/drawings/photos.
- Introduction to other non-ferrous metals such as copper, lead, zinc. Their manufacture, properties, uses and finishes.

UNIT V

DESIGN AND DETAILING USING METALS

15

- A design and detailing exercise involving metals, predominantly steel, as primary construction material in an appropriate typology involving a simple scale project.
- The project will integrate knowledge from all the previous units.
- Design and construction details in the form of sketches, drawings, models.

TOTAL PERIODS 75

TEXT BOOKS

1. P.C Vargheese, 'Building Materials', Prentice Hall of India, 2015.
2. S.K. Duggal, 'Building Materials', New Age International Publishers, 2016.
3. B.C. Punmia et al, 'Building Construction', Laxmi Publications, 2016.
4. Roy Chudley, Roger Greeno, 'Building Construction Handbook', Routledge, 2010.

REFERENCE

1. Gorenc, Tinyou, Syam, 'Steel Designer's Handbook', CBS Publishers and Distributors, New Delhi, Bangalore, 2005
2. Alan Blanc, 'Architecture and Construction in Steel', E&FN Spon, London, 1993
3. Allan Brookes, 'Cladding of Buildings', E&FN Spon, London, 1998.
4. Mark Lawson, Peter Trebilcock, 'Architectural Design in Steel', Taylor and Francis, 2004.
5. Terri Meyer Boake, 'Understanding Steel Design', Birkhauser, 2011.

Cos/POs MAPPING'

COs	Program Outcomes (POs)							
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
1	1	-	-	1	-	-	-	-
2	1	-	-	1	-	-	-	-
3	1	-	-	1	-	-	-	-
4	1	-	-	1	-	-	-	-
5	1	-	-	1	-	-	-	-

Correlation Level: 1 - Low, 2 - Medium, 3 - High

OBJECTIVES

- To introduce computer operation principles and explore image editing through a graphical composition.
- To impart training in computer aided 2D drafting and 3D modelling through projects.
- To enable the use of computer applications to develop a design from the initial stages to the final outcome.
- To enable the rendering of a building so as to create a photo realistic image.

OUTCOMES

After Completion of the Course, the Students will be able to

CO1-Ability to express using digital tools in the realm of visual composition, drafting, 3D visualization and rendering **(K5,K6)**.

CO2 -Ability to do 2D Drafting exercise of a simple building **(K5,K6)**.

CO3 -Ability to understand the viewing of the Model **(K1,K2)**.

CO4 -Ability to do 3D-modelling technique and construction planes, drawing objects, 3D surfaces**(K5,K6)**.

CO5 -Ability to do 3D Rendering and settings**(K5,K6)**.

UNIT - I**INTRODUCTION TO COMPUTER AND IMAGE EDITING****12**

- Technology of small computer system.
- Computer terminology. Operation principles of P.C.
- Introduction to application software, graphic system, 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.
- Exercise in creating visual compositions using digital graphics (pixels/vector).

UNIT - II**THE BASICS OF BUILDING MODELLING****15**

- Creating a basic floor plan.
- Temporary dimensions.
- Adding and modifying walls.
- Working with compound walls. Using editing tools.
- Adding and modifying doors. Adding and modifying windows
- 2D Drafting exercise of a simple building.

UNIT III**VIEWING THE BUILDING MODEL****9**

- Understanding the drawing unit's settings, scales, limits, drawing tools, drawing objects, object editing, and text, dimensioning.
- Transparent overlays, hatching utilities, line type, line weight and colour. Multiline, polyline, etc. Styles, blocks and symbol library.
- Drafting exercise on the above.

UNIT IV**INTRODUCTION TO 3D MODELLING****9**

- Slide facilities script attributes, V-port, editing session.
 - Introduction to 3D-modelling technique and construction planes, drawing objects, 3D surfaces setting up elevation thickness and use of dynamic projections.
 - Solid modelling with primitive command and Boolean operation.
- 3D sculpture exercise using 3D primitives (cubes, spheres etc.)

UNIT V**3D RENDERING AND SETTING****9**

- Rendering and scene setting to create a photo realistic picture, understanding material mapping, environment setting and image filling.
- Exercise on visualizing a building and exploring the potential of lights and camera.- Conditional probability
- Independent events.

TOTAL PERIODS 45**TEXT BOOK**

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. Mohammed Saleh Uddin, 'Digital Architecture – 3D Computer Graphics from 50 top designers', 1999.

REFERENCES

1. Scott Onstott, 'AutoCAD 2015 and AutoCAD LT 2015 Essentials', AutoDesk Official press, 2014.
2. Fiorello. J. A., 'CAD for Interiors beyond the basics', Wiley publications, 2011.
3. Ryan Duell and Tobias Hathorn, 'AutoDesk Revit Architecture 2015: No Experience Required', AutoDesk Official Press, 2014.

Cos/POs MAPPING'

COs	Program Outcomes (POs)							
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
1	1	1	-	2	-	-	-	3
2	1	1	-	2	-	-	-	3
3	1	1	-	2	-	-	-	3
4	1	1	-	2	-	-	-	3
5	1	1	-	2	-	-	-	3

Correlation Level: 1 - Low, 2 - Medium, 3 - High

- To enable an understanding of the fundamental possibilities of architectural form and space in relation to human experience and use within the context of the immediate living environment.
- To get the above understanding through personal, first hand exploration as well as through theoretical and literature studies.
- To use this understanding to create meaningful built environment in the context of small scale projects that involve simple function and experience.

OUTCOMES

After Completion of the Course, the Students will be able to

CO1-Ability to perceive, understand and represent fundamental attributes of form- space with respect to human experience and use(**K1,K2**).

CO2-Ability to ideate, innovate and create meaningful built environment in basic human situations(**K1,K2**).

CO3-Ability to design projects are small buildings or small campuses involving civic/ cultural use. (**K5,K6**).

CO4-Ability to do cognitive maps, sketches, manual drawings, physical models with simple materials(**K5,K6**).

CO5-Ability to Study and designing projects of small scale (**K5,K6**).

CONTENT

- Designing a built environment requires the development of individual capacity for thought with respect to subjective and objective aspects.
- Studying and designing projects of small scale that involve a more immediate and basic experience is important in this context.
- The study and project exploration will involve the following aspects from first principles as well as through live studies and theory – human behavior, activities and needs for various purposes, role of specific form/space in creating particular experiences and effects, built form-open space relationships, spatial organization, environment behavior aspects (especially those relating to children), site as a positive tool in all scales, potential of materials and construction. Through this, both the qualitative and quantitative attributes of design can be understood and engaged. This would give training in the ingenious use of architecture to fulfil goals towards a responsive and stimulating environment.
- The techniques used for study and presentation can align themselves towards the above, such as cognitive maps, sketches, manual drawings, physical models with simple materials.
- The scale and complexity of projects will be commensurate with this - small to medium size projects involving buildings/ small campuses with simple circulation, passive energy, multiples of single unit space, single use buildings.
- Some suggestive projects are small buildings or small campuses involving civic/ cultural use, uses related to children such as schools, facilities for people with special requirements. The number of projects is left to the discretion of the faculty based on scale and complexity.

TOTAL PERIODS 210

TEXT BOOK

1. Joseph De Chiara, Michael J Crosbie, 'Time Saver Standards for Building Types', McGraw Hill Professional, 2001.
2. Kevin Lynch, 'Site Planning', MIT Press, Cambridge, 1967.
3. Steen Eiler Rasmussen, 'Experiencing Architecture', MIT Press; 1959.
4. Kent C. Bloomer and Charles W. Moore, 'Body, Memory, and Architecture', Yale University Press, 1977.
5. Juhani Pallasmaa, 'The Eyes of the Skin - Architecture and the Senses', John Wiley: New York, 2005.

REFERENCES

1. Julius Panero, Martin Zelnik, 'Human Dimension and Interior Space', Whitney Library of Design, 1975.
2. Richard P. Dober, 'Campus Planning', Reinhold Book Corporation, 1963.
3. Sam F. Miller, 'Design Process: A Primer for Architectural and Interior Design', Van Nostrand Reinhold, 1995.
5. Dudek M, 'Schools and Kindergartens', Birkhauser 2007.

Cos/POs MAPPING'

COs	Program Outcomes (POs)							
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
1	1	1	-	2	-	-	-	-
2	1	1	-	2	-	-	-	-
3	1	1	-	2	-	-	-	-
4	1	1	-	2	-	-	-	-
5	1	1	-	2	-	-	-	-

Correlation Level: 1 - Low, 2 - Medium, 3 - High

V SEMESTER

THEORY	L	T	P/S	C
U20TH0524				
	2	2	0	3

DESIGN OF STRUCTURES -II

OBJECTIVES

- To inform about structural design through working stress and limit state methods.
- To enable use of the above two methods for the design of concrete beams and slabs under Different conditions.
- To enable use of limit state method for design of a concrete staircase.

COURSE OUTCOME

After Completion of the Course, the Students will be able to

CO1- To understand the different concepts of WSM and LSD methods using the code provisions. **(K1, K2)**

CO2- To design RCC beams and slabs by applying the above concepts. **(K1, K2)**

CO3- To Understand the design of short columns subjected to axial load. **(K1, K2)**

CO4- To understand the different concepts in designing footing using LSD methods **(K1, K2)**

CO5- To design RCC dog legged staircase using LSD method. **(K1, K2, K3)**

UNIT - I LIMIT STATE DESIGN OF CONCRETE BEAMS 14

- Concept of elastic method, Ultimate load method and limit state method.
- Advantages of limit state method over other methods.
- Analysis and design of singly and doubly reinforced rectangular beam for bending.

UNIT - II LIMIT STATE DESIGN OF CONCRETE SLABS 12

Analysis and design of one way and two-way rectangular slab subjected to uniformly distributed load for various boundary conditions and corner effects.

UNIT III LIMIT STATE DESIGN OF CONCRETE COLUMN 12

- Types of Column
- Design of short columns subjected for axial load.

UNIT IV LIMIT STATE DESIGN OF CONCRETE FOOTING 12

- Types of Footing.
- Design of Axially loaded square and rectangular footings.

UNIT V DESIGN OF CONCRETE STAIRCASE BY LIMIT STATE METHOD 10

- Types of staircases.
- Design of dog legged staircase.

TOTAL PERIODS 60

TEXT BOOK

1. S.N. Sinha, "Reinforced Concrete Design", Tata McGraw Hill, 2002.
2. Shah H.J, , 'Reinforced Concrete', Charotar, Vol. 1 2016, Vol.2 2014.

REFERENCES

1. P. Dayaratnam, 'Design of Reinforced Concrete Structures', Oxford and IBH Publishing Co., 1983.
2. C. Sinha and S.K. Roy, 'Fundamentals of Reinforced Concrete', S. Chand & Co., New Delhi, 1983.
3. Dr. B.C. Punmia, 'Reinforced Concrete Structures' Vol, 1 & 2', Laxmi publication, Delhi, 2004.
4. IS 456 'Indian Standard, Plain and Reinforced Concrete, Code of Practice', Bureau of Indian Standards, 2000.
5. S. Unnikrishnan Pillai and Devados Menon, 'Reinforced Concrete Design', Tata McGraw Hill Publishing Co. Ltd., New Delhi, 1999.

Cos/POs MAPPING'

COs	Program Outcomes (POs)							
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
1	1	-	-	2	-	-	-	-
2	1	-	-	2	-	-	-	-
3	1	-	-	2	-	-	-	-
4	1	-	-	2	-	-	-	-
5	1	-	-	2	-	-	-	-

Correlation Level: 1 - Low, 2 - Medium, 3 - High

THEORY	HISTORY OF ARCHITECTURE AND	L	T	P/S	C
U20TH0525	CULTURE- III	3	0	0	3

OBJECTIVES

- To introduce the condition of modernity and outline its impact on society, cities and architecture.
- To give a detailed understanding of modern architecture as new expression with different strands rising from various aspects and effects of modernity.
- To create an overall understanding of the architectural developments in India rising out of colonial modernity and nationalism.

COURSE OUTCOME

After Completion of the Course, the Students will be able to

CO1- To create awareness of the spread and varied later directions of modern architecture across the world. **(K1)**

CO2- To understand the architectural production from the 1960s as driven by large scale changes across the world. **(K1, K2)**

CO3- To explore familiarity with contemporary forces and directions in architecture across the world.

CO4- To understand post-independence architecture in India contemporaneous with rest of the world, along with its own particular influences. **(K1, K2)**

CO5- To diverse directions and searches in early 20th century architecture of India and also to understand Art Deco and modern architecture in pre independence India. **(K1, K2)**

UNIT - I MODERNITY AND ARCHITECTURE

10

Outline of various strands of modernity in architecture.

Neo- Classical Architecture:

- Enlightenment ideals
- Works of Etienne Louis Boullee and Claude Nicolas Ledoux
- Neo Classical architecture and its types.

Industrial revolution:

- Outline of Industrial Revolution and associated changes.
- Urban transformations in Europe and America.
- Industrial material of steel, glass and concrete.
- New construction techniques and standardization.
- Split of design education into architecture and engineering streams.
- Industrial exhibitions.

Chicago School, skyscraper development and Louis Sullivan.

UNIT - II REACTIONS TO INDUSTRIALISATION

07

Reactions to industrialization in design.

Arts and Crafts in Europe and America.

- Works of Morris and Webb.

Art Nouveau

- Works of Horta, Gaudi, Guimard and Mackintosh.
- Vienna Secession.

UNIT III EVOLUTION OF MODERN ARCHITECTURE - IDEOLOGIES, MOVEMENTS AND STYLES

10

Early modernism in Europe and America.

- Critique of ornamentation and Raumplan of Adolf Loos.
- Peter Behrens and Werkbund.

Modern art and architecture

- Expressionism, Futurism, Constructivism, Cubism, Suprematism and De-Stijl.

Art Deco. Functionalism. Bauhaus. CIAM. International Style.

UNIT IV MODERNIST ARCHITECTS AND THEIR WORKS

8

- Ideas, works and evolution of Gropius, Corbusier, Aalto, Wright, Mies, Neutra.
-

UNIT V ARCHITECTURE OF COLONIALISM, MODERNITY AND NATIONALISM 10

IN INDIA

Colonial architecture and urbanism

- Forts, bungalows, cantonments, colonial urbanism, civic buildings, buildings of infrastructure, education, power, trade and other typologies.
- Characteristics and styles of colonial architecture based on chronology and changing intent/typology

Neo-Classicism - Gothic Revival - Indo-Saracenic.

- Building of New Delhi showcasing imperial power.
- Diverse directions and searches in early 20th century architecture of India.

Art Deco and modern architecture in pre-independence India.

TOTAL PERIODS 45

TEXT BOOK

1. Kenneth Frampton, 'Modern Architecture: A Critical History', Thames & Hudson, London, 2007.
2. William J. Curtis, 'Modern Architecture since 1900', Phaidon Press, 1996.
3. Manfredo Tafuri, 'Modern Architecture', Harry N. Abrams Inc, 1980.
4. Leonardo Benevolo, 'History of Modern Architecture Vol 1 & 2', Reprint, MIT Press, 1977.
5. G. H. R. Tillotson, 'The Tradition of Indian Architecture: Continuity, Change, and the Politics of Style since 1850', Yale University Press, 1989.
6. Miki Desai et. al., 'Architecture and Independence: The Search for Identity- India 1880 to 1980', Oxford University Press, 2000.

REFERENCES

1. Thomas Metcalf, 'An Imperial Vision', Oxford University Press, 2002.
2. Christian Norburg-Schulz., 'Meaning in Western Architecture', Rizzoli, Revised Edition, 1993.
3. Bill Risebero, 'Modern Architecture and Design: An Alternative History', MIT Press, 1985.
4. Norma Evenson, 'The Indian Metropolis: A View Toward the West', Yale University Press, 1989.
5. Francis D. K. Ching, Mark M. Jarzombek, Vikramaditya Prakash, 'A Global History of Architecture', John Wiley & Sons, 2017.
6. K.R.Sitalakshmi, 'Architecture of Indian Modernity- The Case of Madras', Palaniappa Brothers, 2015.

Cos/POs MAPPING'

COs	Program Outcomes (POs)							
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
1	1	2	-	1	-	-	2	-
2	1	2	-	1	-	-	2	-
3	1	2	-	1	-	-	2	-
4	1	2	-	1	-	-	2	-
5	1	2	-	1	-	-	2	-

Correlation Level: 1 - Low, 2 - Medium, 3 - High

**THEORY CUM
STUDIO**

U20TS0526

BUILDING SERVICES -II

L T P/S C

2 0 2 3

OBJECTIVES

- To inform about the principles and laws of electricity and wiring systems in buildings.
- To inform about the principles and laws of lighting systems in buildings.
- To inform about the principles and laws of acoustics in buildings.
- To give exposure to the design of electrical, lighting and acoustic systems in buildings of small scale.

COURSE OUTCOME

After Completion of the Course, the Students will be able to

CO1- To gain knowledge of basic electrical, lighting and acoustic systems in buildings. **(K1, K2)**

CO2- To design buildings satisfying electrical, lighting and acoustic principles. **(K1, K2, K3, K6)**

CO3- To design basic electrical, lighting and acoustic systems for buildings. **(K5, K6)**

CO4- To understand acoustic properties of materials/products through study. **(K1, K2)**

CO5- To understand of drawings/details related to real acoustic design projects. **(K1, K2)**

UNIT - I GENERATION OF ELECTRICITY AND DISTRIBUTION IN BUILDINGS 12

Basics of electricity

- Ohms and Kirchoffs Laws.
- Units: watt, volt, amps.
- Generation of electricity.

Distribution from grid to facilities.

- Two phase and three phase systems.
- Substation, transformers, generators. Wires and conduits, types and applications.
- Lightning conductors and earthing.
- Distribution boards, meters, switch boards, earthing.

Energy efficient systems and renewable energy resources.

Understanding of service drawings. Site visits with documentation in the form of sketches/ drawings/ photos. Design of electrical layout for buildings of small scale through drawings.

UNIT - II INTRODUCTION TO LIGHTING 12

Basics of lighting

- Electromagnetic spectrum.
- Sources of light.
- Laws and terminologies of lighting.

Daylight

- Considerations for designing with daylight - typology, room dimensions, openings. Daylight Factor.

Artificial lighting

- Light from artificial sources, quantity and quality.
- Types of lamps and luminaires.
- Applications and choice of luminaires.

Energy efficient systems.

Understanding of product literature/ service drawings. Site visits with documentation in the form of sketches/ drawings/ photos.

UNIT III LIGHTING DESIGN FOR BUILDINGS 12

- Lighting level for different uses in outdoor and indoor environment.
- Lighting calculations.
- Design exercise involving lighting design for appropriate projects of simple scale through choice, calculations, layout, drawings, simulations, physical models.

Sketching/ drawing/ models of the principles. Understanding of product literature/ published work.
Site visits with documentation in the form of sketches/ photos.

UNIT IV

FUNDAMENTALS OF ACOUSTICS

09

Fundamentals- Sound waves, frequency, intensity, wave length, measure of sound, decibel scale, speech and music frequencies.

- NC curves.
- Permissible noise limits.

Material property

- Absorption, reflection, scattering, diffusion, transmission.
- Absorption co-efficient, NRC, Sound Transmission Class (STC), Impact Insulation Class (IIC).

Understanding acoustic properties of materials/ products through study of product literature/ site visits.

UNIT V

ENVIRONMENTAL ACOUSTICS

17

- Environmental noise and its control.
- Structure borne and air borne noise control.
- Site selection.

Sound in enclosed space: Reverberation time, optimum reverberation time, echo, early decay time.

Architectural acoustics

- Importance of shape volume, treatment for interior surfaces, etc.
- Basic principles in designing classroom, lecture and conference hall, offices, open air theatre, auditorium, concert hall, theatre, cinema, recording studio.

Calculations

Simple problems based on reverberation time and absorption coefficients. Understanding of drawings/ details related to real acoustic design projects. Site visits with Documentation in the form of sketches/ drawings/ photos. Acoustic design for simple and small projects including planning, constructional measures and sound reinforcement systems through calculations, conceptual sketches, drawings, models.

TOTAL PERIODS 60

TEXT BOOK

1. Phillips, 'Lighting in Architectural Design', McGraw Hill. New York, 1964.
2. David Egan, Victor Olgyay 'Architectural Lighting', McGraw-Hill, 2001.
3. Gary Gordon, 'Interior Lighting for Designers', 5th Edition, John Wiley & Sons Inc., New York, 2015.
4. David Egan, 'Architectural Acoustics', J.Ross Publishing, 2007.
5. David Lee Smith, 'Environmental Issues for Architecture', Wiley, 2011.
6. National Building Code - Bureau of Indian Standards.

REFERENCES

1. 'The Lighting Handbook', IES, 2011.
2. National Lighting Code 2010.
3. Descottes, Herve and Cecilia E. Ramos, 'Architectural Lighting: Designing with Light and Space', Princeton Architectural Press, Princeton, 2011.
4. A.K.Mittal, 'Electrical and Mechanical Services in High Rise Building: Design and Estimation Manual', CBS, 2009.

Cos/POs MAPPING'

COs	Program Outcomes (POs)							
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
1	1	-	-	2	-	-	3	-
2	1	-	-	2	-	-	3	-
3	1	-	-	2	-	-	3	-
4	1	-	-	2	-	-	3	-
5	1	-	-	2	-	-	3	-

STUDIO	BUILDING MATERIALS AND	L	T	P/S	C
U20ST0527	CONSTRUCTION- IV	1	0	4	3

OBJECTIVES

- To give an introduction to cement and concrete as materials for building construction.
- To help understand the principles, types, methods of construction and applications of concrete for structural and non-structural building components.
- To enable design and detail using concrete in buildings.

COURSE OUTCOME

After Completion of the Course, the Students will be able to

CO1- To use concrete as a versatile material in different methods. **(K1, K2, K3)**

CO2- To understand the concepts of concrete as a building construction material. **(K1, K2)**

CO3- To design and detail specific components in concrete where there is scope for architectural design. **(K2, K3, K4)**

CO4- To understand the basic principles for seismic design in concrete. **(K1, K2)**

CO5- To create ability to use concrete innovatively in simple projects. **(K1, K2, K3)**

UNIT - I INTRODUCTION TO CEMENT AND CONCRETE 12

Cement

- Composition, properties, types and uses of cement.
- Tests for cement.

Cement mortar and plastering

Concrete

- Composition.
- Mix design.
- Nature of aggregates for mix including classification, sources, shape, size, grading, sampling and analysis.
- Proportioning, water-cement ratio, workability.

Stages in concrete construction

- Formwork, mixing, placing, curing.
- Cement and concrete finishes including roughcast, dry dash, textured, stucco.

Water proofing and damp proofing of concrete.

Understanding of product literature. Site visits with documentation in the form of sketches/ photos.

UNIT - II CAST IN-SITU CEMENT CONCRETE IN BUILDING CONSTRUCTION 21

- Construction principles and procedures for building components using cast in situ cement concrete (plain and reinforced).
- Components to include different types of foundations, columns, beams, slabs, walls, lintels and sun shades, staircases, sump, water tank, flooring.

Drawings/ models of the principles.

- Understanding of detailed drawings/ published work. Site visits with documentation in the form of sketches/ photos.

UNIT III PRECAST CONCRETE PRODUCTS IN BUILDING CONSTRUCTION 15

- Types and characteristics of simple precast concrete products.
- Construction principles and procedures for structural and non-structural building components using precast concrete.
- Components to include different types of blocks/ tiles for walls, floors and roof, jali, parapet, paving.
- Laying/constructing and finishing.

Sketching/ drawing/ models of the principles. Understanding of product literature/ published work. Site visits with documentation in the form of sketches/ photos.

Types of special concretes

- Lightweight concrete - Aerated Concrete No-fines concrete - Polymer concrete
- pre-stressed concrete - Fiber-reinforced concrete - Ready-mixed concrete
- Ferrocement.

Building materials and components developed by research organizations

- CBRI, SERC, NBO, and BMTPC.
- Techniques for renovation and retrofitting.

Basic principles for seismic design in concrete.

Understanding of product literature/ published work. Site visits with documentation in the form of sketches/ photos.

- Design and detailing exercise involving concrete as primary construction material in an appropriate typology involving a simple scale project.
- The project will integrate knowledge from all the previous units.
- Design and construction details in the form of drawings, sketches and models.

TOTAL PERIODS 75

TEXT BOOK

1. M.S.Shetty, 'Concrete Technology', S.Chand, 2005.
2. S.K. Duggal, 'Building Materials', New Age International Publishers, 2016.
3. B.C.Punmia et al, 'Building Construction', Laxmi Publications, 2016.
4. T.D Ahuja and G.S. Birdie, 'Fundamentals of Building Construction', Dhanpat Rai Publishing Company Pvt. Ltd., New Delhi, 1996
5. S.P Arora and S.P Bindra, 'A Text Book of Building Construction', Dhanpat Rai Publishing Company Pvt. Ltd, 2010.
6. Roy Chudley, Roger Greeno, 'Building Construction Handbook', Routledge, 2010.

REFERENCES

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.
5. Alan Blanc, 'Stairs, Steps and Ramps', Butterworth, Heinemann Ltd., 1999
6. R. Chudley et al, 'Construction Technology', Heinemann, 2011.
7. 'Standards and Specifications for Cost Effective Innovative Building Materials and Techniques', BMPTC Publication, New Delhi.
8. Pamphlet and Manuals of SERC, BMPTC, HUDCO and other research organizations.

Cos/POs MAPPING'

COs	Program Outcomes (POs)							
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
1	1	-	-	2	-	-	3	-
2	1	-	-	2	-	-	3	-
3	1	-	-	2	-	-	3	-
4	1	-	-	2	-	-	3	-
5	1	-	-	2	-	-	3	-

Correlation Level: 1 - Low, 2 - Medium, 3 - High

STUDIO		L	T	P/S	C
U20ST0528	ARCHITECTURAL DESIGN - IV	0	0	14	8

OBJECTIVES

- To introduce the challenges involved in the design of projects related to diverse needs and ways of contemporary urban life.
- To enable exploration of the above projects with perception, socio-cultural awareness and innovation.

COURSE OUTCOME

After Completion of the Course, the Students will be able to

CO1- To create ability to understand nature, needs and ways of contemporary urban society as well as relate the existing built environment as a reflection of this. **(K2)**

CO2- To create ability to draw from this understanding and identify issues involving in contemporary urban life and the built environment. **(K2)**

CO3- To create ability to draw from this understanding and identify challenges involving in contemporary urban life and the built environment. **(K2, K3,K4)**

CO4- To address specific situations/scenarios characteristics of urban life and context. **(K2)**

CO5- To create ability to give appropriate/innovative design solutions in the above context. **(K2)**

CONTENT

Urban environment is synonymous with heterogeneity of populace and their diverse needs and lifestyles. Private and public spaces for varied programmes such as living, working and socio-cultural needs bring individuals and groups in intersection or proximity to each other. Further, current transformations in urban society have led to many changes in buildings. The challenge within the discipline of architecture is not only to create conducive spaces for contemporary ways of life within particular contexts, but also to identify issues and programmes and address them in innovative ways.

These would include urban living, urban working, socio-cultural life, urban recreation, etc.,

- Achieving comfort without sacrificing on density would also be a concern, along with exposure to building byelaws and barrier free environment. The approach and projects will be directed towards one or more of these aspects.
- The tools and techniques engaged for study and design can be those which are best suited to study the above, including mapping of urban patterns/ways of life and needs, demographics, socio-cultural aspects, densities, land use, etc.,
- Projects will address specific situations/scenarios characteristic of urban life and context, either single or mixed use. They will be of medium to large scale, involving repetitive or unique spaces, low or mid- rise buildings with passive/active energy.
- The number of projects is left to the discretion of the faculty based on scale and complexity.

TOTAL PERIODS 210

TEXT BOOK

1. Joseph De Chiara, Michael J Crosbie, 'Time Saver Standards for Building Types', McGraw Hill Professional, 2001.
2. 'Ernst Neuferts Architects Data', Blackwell ,2002.
3. Stephen A. Kliment, Editor 'Building Type Basics' Series, Wiley.
4. Wolfgang Preisner, Korydon H. Smith, 'Universal Design Handbook', 2nd Edition, McGraw-Hill, 2010.

REFERENCES

1. Rem Koolhaas et al, 'Project on the City II: The Harvard Guide to Shopping', Taschen, 2001.
2. Peter Coleman, 'Shopping Environments: Evolution, Planning and Design', Routledge, 2006.
3. LMVRDV, 'FARMAX- Excursions on Density', 010 Publishers, 2006.
4. Jos Boys, 'Disability, Space, Architecture: A Reader', Routledge, 2017.

V. Mantharan

5. Emily Talen, 'Design for Diversity', Routledge, 2012.
6. Luis Alexandre Casanovas Blanco (Ed), 'After Belonging: Objects, Spaces, and Territories of the Ways We Stay in Transit', Lars Muller Publishers, 2016.
7. Manuel Gausa, 'Housing: New Alternatives, New Systems', Birkhäuser Basel 1999
8. Mark Hutter, 'Experiencing Cities (The Metropolis and Modern Life)', Routledge, 2015.

Cos/POs MAPPING'

COs	Program Outcomes (POs)							
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
1	1	1	-	2	-	-	-	1
2	1	1	-	2	-	-	-	1
3	1	1	-	2	-	-	-	1
4	1	1	-	2	-	-	-	1
5	1	1	-	2	-	-	-	1

Correlation Level: 1 - Low, 2 - Medium, 3 - High

VI SEMESTER

THEORY	HISTORY OF ARCHITECTURE AND	L	T	P/S	C
U20TH0629	CULTURE -IV	3	0	0	3

OBJECTIVES

- To introduce the large-scale changes from 1960s as context for new thought in architecture.
- To give exposure to the critiques of modern architecture.
- To study in detail the different postmodern directions in architecture.
- To give an outline of architectural approaches across the world from late 20th century.
- To give an understanding of the trajectory of post-independence architecture of India till the Present.

COURSE OUTCOME

After Completion of the Course, the Students will be able to

CO1- To create awareness of the spread and varied later directions of modern architecture across the world. **(K1, K2)**

CO2- To understand the architectural production from the 1960s as driven by large scale changes across the world. **(K1, K2)**

CO3- To explore familiarity with contemporary forces and directions in architecture across the world. **(K2)**

CO4- To understand post-independence architecture in India contemporaneous with rest of the world, along with its own particular influences. **(K1, K2)**

CO5- To diverse directions and searches in early 20th century architecture of India and also to understand Art Deco and modern architecture in pre independence India. **(K1, K2)**

UNIT - I MODERN ARCHITECTURE – SPREAD AND LATER DIRECTIONS 10

Brutalism

Team X

Ideas, works and evolution

- Philip Johnson, Louis Kahn, Paul Rudolph, Eero Saarinen, I.M.Pei.

Modern architecture and post- independence India

- National building, institutions.
- Chandigarh.

Outline of evolution of the architectural profession in India, influences on architects.

- Works of Kanvinde, Habib Rehman. Corbusier and Kahn in India.
- Evolution and early works of Correa and Doshi.

UNIT - II AFTER MODERNISM I 9

- Critique of modernist cities by Jane Jacobs.
- Theories and works of Christopher Alexander.
- Aldo Rossi's ideas on the city.
- Neorationalism, Semiology and Postmodernism.
- Writings of Venturi and works of Venturi Scott Brown, Graves and Moore.

UNIT III AFTER MODERNISM III 09

Urban ideas and works

- Soleri, Archigram and Metabolism.

High Tech architecture

- Works of Stirling, Rogers and Piano.

Deconstructivism

- Ideas and works of Eisenmann, Hadid, Gehry, Libeskind, Tschumi.

-

Critical Regionalism as a category of architecture.

- Ideas and works of Fathy, Ando, Bawa, Barragan, Siza.

Outline of contextual approaches in Indian architecture after the 60s.

- Works of Doshi, Correa, Raj Rewal.
- Philosophy and works of Nari Gandhi, Laurie Baker.

- Overview of larger changes in society from late 20th century and their influence on architecture.
- Outline of architecture related to parametric design and digital processes, sustainability, globalization, phenomenology, complexity.
- Ideas and works of ZHA.

Contemporary architects

- Steven Holl, Yeong, Zumthor, Pallasma.

Dutch architects

- Bjarke Engels and BIG, OMA and Rem Koolhaas.

TOTAL PERIODS 45**TEXT BOOK**

1. Kenneth Frampton, 'Modern Architecture: A Critical History', Thames & Hudson, London, 2007.
2. William J. Curtis, 'Modern Architecture since 1900', Phaidon Press, 1996.
3. Diane Ghirardo, 'Architecture after Modernism', Thames & Hudson, London, 1990.
4. Elie G. Haddad, David Rifkind, 'A Critical History of Contemporary Architecture: 1960-2010', Routledge, 2016.
5. Bhatt and Scriver, 'Contemporary Indian Architecture- After the Masters', University of Washington Press, 1991
6. Bahga et al, 'Modern Architecture in India - Post Independence Perspective', Galgotia, 1993
7. Miki Desai et. al., 'Architecture and Independence', Oxford University Press, 2000.
8. Harry Francis Malgrave and David Goodman, 'An Introduction to Architectural Theory 1968 to the Present', Wiley Blackwell, 2011.
9. Rahul Mehrotra, 'Architecture in India since 1990', Hatje Cantz, 2011.

REFERENCES

1. Jane Jacobs, 'Deaths and Life of Great American Cities', Vintage, 2003.
2. Christopher Alexander, 'A Pattern Language', Oxford University Press, Oxford, 1977.
3. Robert Venturi, 'Complexity and Contradiction in Architecture', 1977.
4. Kate Nesbitt, Ed, 'Theorising a New Agenda for Architecture', Princeton University Press, 1996.
5. Jagan Shah, 'Contemporary Indian Architecture', Lustre, 2008.
6. Francis D. K. Ching, Mark M. Jarzombek, Vikramaditya Prakash, 'A Global History of Architecture', John Wiley & Sons, 2017.
7. 'Architecture in India', Exhibition Catalogue, Electa Moniteur, 1985.
8. 'Vistara- The Architecture of India', Festival of India, 1986.
9. K.R.Sitalakshmi, 'Architecture of Indian Modernity- The Case of Madras', Palaniappa Brothers, 2015.

Cos/POs MAPPING'

COs	Program Outcomes (POs)							
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
1	1	2	-	-	-	-	1	-
2	1	2	-	-	-	-	1	-
3	1	2	-	-	-	-	1	-
4	1	2	-	-	-	-	1	-
5	1	2	-	-	-	-	1	-

THEORY	L	T	P/S	C
U20TH0630	3	0	0	3

SPECIFICATION AND ESTIMATION

OBJECTIVES

- To enable understanding with respect to quality and quantity of materials, quantity and classes of skilled and unskilled labours, and tools and plants required for projects.
- To give an understanding of how to draw up specifications for the different items of a building project and also to prepare the schedule of programming of the project.
- To give knowledge on how to prepare approximate as well as detailed estimates and to have a clear picture of the project expenditure.
- To help calculate the exact quantities of items of work done for effecting payment especially when direct measurements are difficult and also to determine the quantities of different materials required for various items of work.
- To give understanding of how to prepare valuation report of real and landed property.
- To give exposure to budgeting in projects.

COURSE OUTCOME

After Completion of the Course, the Students will be able to

CO1- To understand the art of building construction through specification writing. **(K2)**

CO2- To create ability to work out the approximate estimate for small scale building projects and low cost housing. **(K2, K3)**

CO3- To create ability to work out the detailed estimate for small scale building projects and low cost housing. **(K2, K3, K5)**

CO4- To understand the valuation. **(K2)**

CO5- To understand the budgeting. **(K1, K2)**

UNIT - I SPECIFICATION AND SPECIFICATION WRITING 9

- Necessity of specification, importance of specification.
- How to write specification.
- Types of Specification. Principles of Specification writing.
- Important aspects of the design of specification.
- Sources of information.
- Classification of Specification.
- Brief Specification for 1st class, 2nd class, 3rd class building.
- Detailed specification for earthwork excavation, plain cement concrete, reinforced concrete, first class and second class brickwork, damp proof course, ceramic tiles/marble flooring and dado, woodwork for doors, windows frames and shutters, cement plastering, painting & weathering course in terrace.

UNIT - II ESTIMATION 9

- Types & purpose.
- Approximate estimate of buildings.
- Bill of quality, factors to be considered. Principles of measurement and billing.
- Contingencies.
- Measurement of basic materials like brick, wood, concrete and unit of measurement for various items of work.
- Abstract of an estimate.
- Costs associated with constructed facilities.
- Approaches to cost estimation.
- Type of construction cost estimates. Cost Indices.
- Applications of cost indices to estimating.
- Estimate based on engineer's list of quantities. Estimation of operating costs.

UNIT III**DETAILED ESTIMATE****11**

- Deriving detailed quantity estimates for various items of work for a single storied building.
- To include earthwork excavation, brick work, plain cement concrete, reinforced cement concrete works, wood work, iron works, plastering, painting, flooring, weathering course.

UNIT IV**VALUATION****8**

- Valuation. Explanation of terms.
- Types of values. Sinking fund.
- Years of purchase. Depreciation.
- Types of depreciation.
- Valuation of real properties.
- Types, methods and purpose of valuation.

UNIT V**BUDGETING****8**

- Elements of cash flow.
- Time value of money.
- Capital investment decision.
- Types of business firms.
- Budget and Budgetary Control.
- Types of Budgets.
- Preparation of financial budget.

TOTAL PERIODS 45**TEXT BOOK**

1. Rangwala. S.C, 'Estimating, Costing and Valuation (Professional practice)', Charotar Publishing House, 1984
2. M.Chakraborti, 'Estimating, Costing, Specification and Valuation in Civil Engineering, Chakraborti, 2010.
3. B.N. Dutta, 'Estimating and Costing' UBS Publishers and Distributors, 2000.
4. S.Sanga Reddi and P.L.Meiyappan, 'Construction Management', Kumaran Publication, Coimbatore.
5. Gurcharan Singh and Jagdish Singh, 'Estimating Costing and Valuation', Standard Publishers Distributors, 2012.

REFERENCES

1. 'I.S.1200-1968 Methods of Measurements of Buildings and Civil Engineering works'.
2. Latest schedule of rates of P.W.D.
3. Latest Data book of P.W.D.
4. PWD Standard Specifications. Govt Publication.

Cos/POs MAPPING's

COs	Program Outcomes (POs)							
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
1	1	-	-	2	-	-	3	-
2	1	-	-	2	-	-	3	-
3	1	-	-	2	-	-	3	-
4	1	-	-	2	-	-	3	-
5	1	-	-	2	-	-	3	-

Correlation Level: 1 - Low, 2 - Medium, 3 - High

STUDIO	ARCHITECTURAL DESIGN	L	T	P/S	C
U20ST0631	DETAILING	1	0	4	3

OBJECTIVES

- To introduce various aspects involved in the construction of buildings through the understanding of different types of architectural and technical drawings.
- To enable the understanding of architectural design as integrating spatial and technical concerns.
- To enable development of an architectural design project into schematic drawings through integrating concerns of structure, construction and services.
- To create architectural drawings for construction and as a base for structures and services drawings.
- To design, incorporate and detail architectural and interior components of the architectural design project.

COURSE OUTCOME

After Completion of the Course, the Students will be able to

CO1- To understand all the aspects that go into the making of a building through study of drawings related to construction **(K1, K2)**

CO2- To evolve a conceptual design projects into schematic design, balancing technical consideration. **(K1, K2)**

CO3- To prepare architectural working drawings for the resolved schematic design. **(K2, K3)**

CO4- To create ability to resolve spatial concerns with technical aspects of a building. **(K2)**

CO5- To create ability to design and detail components within a building. **(K2)**

UNIT - I UNDERSTANDING ARCHITECTURE THROUGH BUILDING DRAWINGS 16

- Understanding architecture as a physical, workable product through study of comprehensive set of drawings for any live building project, interpreting them and presenting their characteristics through seminars/ assignments.
- The drawings to be studied should include architectural working drawings from macro to micro scale- site plan, building plans, staircase details, kitchen and toilet detail of joinery, etc.,
- service drawings to include electrical, plumbing.

UNIT - II SCHEMATIC DESIGN INTEGRATING ARCHITECTURAL DESIGN WITH STRUCTURAL AND SERVICE CONSIDERATIONS 18

- Evolving a conceptual design project into schematic design, balancing different technical considerations.
- Considerations to include appropriate structural, plumbing, electrical, mechanical and HVAC systems.
- Working out schemes to decide and finalise on the best possible design that integrates everything together.
- Scale of the project could be small to medium and include any typology, involving a newly created, quick, simple design or an older design from previous academic years.

UNIT III ARCHITECTURAL WORKING DRAWINGS 18

- Preparation of architectural working drawings for the resolved schematic design.
- Drawings to include site plan, center line drawings, building drawings, detailed drawings of specific areas like staircases and wall sections, dimensions explaining the various components, joinery schedule.

UNIT IV**DETAILED DRAWINGS OF ROOMS AND ARCHITECTURAL COMPONENTS****15**

- Design and preparation of detailed drawings of joinery including doors, windows and ventilators.
- Design and preparation of layouts of service intensive rooms like kitchens and toilets.
- Design and detailing out of floor, wall and ceiling finishes/ construction/ laying.

UNIT V**DETAILED DRAWINGS OF BUILT IN COMPONENTS****8**

- Design and preparation of detailed drawings of built in furniture and components based on the room/ typology to include counters, cabinets, wardrobes, storage, fittings and fixtures, display units, workstation.

TOTAL PERIODS 75**TEXT BOOK**

1. Joseph De Chiara, Michael Crosby, 'Time Saver Standards for Building Types', McGraw Hill Co, 2001.
2. Richardson Dietrick, 'Big Idea and Small Building', Thames and Hudson, 2002.
3. Edward D Mills, 'Planning—The Architect's Handbook', Butterworths, 1985.
4. Roy Chudley, Roger Greeno, 'Building Construction Handbook', Routledge, 2010.

REFERENCES

1. Susan Dawson, 'Architect's Working Details -Volume 1-10', E- Map Construct, 2004.
2. Nelson L Burbank, 'House Carpentry Simplified', McGraw Hill, 1985.
3. David Sauter, 'Landscape Construction', Delmar Publishers, 2010.
4. Grant W. Reid, 'Landscape Graphics', Whitney Library of Design, 1987.
5. Francis. D. K. Ching, 'Building Construction Illustrated', John Wiley & Sons, 2011.

Cos/POs MAPPING'

COs	Program Outcomes (POs)							
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
1	1	2	-	3	-	-	1	-
2	1	2	-	3	-	-	1	-
3	1	2	-	3	-	-	1	-
4	1	2	-	3	-	-	1	-
5	1	2	-	3	-	-	1	-

Correlation Level: 1 - Low, 2 - Medium, 3 - High

STUDIO		L	T	P/S	C
U20ST0632	ARCHITECTURAL DESIGN - V	0	0	16	8
OBJECTIVES					

- To introduce buildings as consumers of resources for human needs and to enable responsible, creative addressing of this fact through design choices.
- To enable an understanding of architectural design as integrating diverse functional concerns in a building through analysis and innovation.
- To impart training in the resolving of spatial considerations with other physical aspects such as structures, services and climate.

COURSE OUTCOME

After Completion of the Course, the Students will be able to

CO1- To create ability to critically understand and address issue of resources. **(K1, K2)**

CO2- To create ability to balance diverse aspects/concerns of buildings by making informed choices and innovative design in the context of buildings with intense or complex programmes. **(K1, K2)**

CO3- To create ability to apply knowledge intensively in realms such as sustainable built environment, services. **(K1, K2)**

CO4- To address specific situations/scenarios characteristics of urban life and context. **(K2, K3)**

CO5- To create ability to give appropriate/innovative design solutions in the above context. **(K5, K6)**

CONTENT

- Architecture is a man-made addition to the world and is resource intensive. The questions in this regard are how to simplify needs and means. Further, architecture today is also required to integrate several physical concerns in a building as human needs in built environment have become more complex with respect to intensity, distribution and interdependency of activities/programs.
- Here the challenge is to address complex needs in an efficient manner so as to conserve/optimize resources without compromising on quality of life.
- The approach and projects will be directed towards one or more of these concerns.
- Appropriate tools and techniques related to the above can be used in study and design, especially in terms of technical aspects.

The nature of projects can be either or both of these-

1) simple scale, ordinary or special use projects examining design through resources of different types

2) Large, complex projects (multi storied buildings, office complexes, buildings for healthcare, performing art center, etc.) that need technical resolution and/or balance of various aspects. Aspects to be addressed can be urban land as resource, planning integration and detailing, sustainable building practices, green issues, alternative energy, intelligent building techniques and service integration, advanced building practices, appropriate materials and construction, sensitive and optimal use of resources.

The numbers of projects are left to the discretion of the faculty based on scale and complexity.

TOTAL PERIODS 210

TEXT BOOK

1. Daniel Williams, 'Sustainable Design, Ecology, Architecture & Planning', John Wiley & Sons Inc, NJ, 2007.
2. Mili Mazumdar, 'Energy Efficient Buildings in India', TERI, New Delhi, 2012.
3. 'Sustainable Building Design Manuals I & II', TERI, 2004.
4. Derek Clements-Croome, 'Intelligent Buildings: An Introduction', Routledge, 2013.
5. Stephen A. Kliment, Editor 'Building Type Basics' Series, Wiley.

REFERENCES

1. Lara Menzel, 'Office - Architecture + Design', Braua Publishers, 2009.
2. Sheri Koonos, 'Prefabulous+Sustainable, Building and Customizing an Affordable, Energy Efficient Home', ABRAMS, 2010.
3. Edward Ng, 'Designing High-density Cities for Social and Environmental Sustainability', Routledge, 2009.
4. Robin Guenther, Gail Vittori, 'Sustainable Healthcare Architecture', 2nd Edition, Wiley 2013.
5. Marian Keeler, Bill Burke, 'Fundamentals of Integrated Design for Sustainable Building', Wiley, John Wiley & Sons, 2009.
8. Mark Hutter, 'Experiencing Cities (The Metropolis and Modern Life)', Routledge, 2015.

Cos/POs MAPPING'

COs	Program Outcomes (POs)							
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
1	1	1	-	2	-	-	-	3
2	1	1	-	2	-	-	-	3
3	1	1	-	2	-	-	-	3
4	1	1	-	2	-	-	-	3
5	1	1	-	2	-	-	-	3

Correlation Level: 1 - Low, 2 - Medium, 3 - High

VII SEMESTER

THEORY	PROFESSIONAL	L	T	P/S	C
U20TH0733	PRACTICE AND ETHICS	13	0	0	3

OBJECTIVES

- To give an introduction to the architectural profession and the role of professional bodies and statutory bodies as well as ethics of the profession.
- To give familiarity with basic aspects of running an architectural practice.
- To give exposure to the processes involved in taking up and completing an architectural project.
- To inform about legal aspects and legislations associated with the profession.
- To give exposure to the larger implications of professional practice in the globalized world today.

COURSE OUTCOME

After Completion of the Course, the Students will be able to

CO1 -Knowledge of the role of professional and statutory bodies **(K1)**.

CO2 -An understanding of the provisions in Architects Act 1972 **(K2)**.

CO3 -An understanding of code of conduct **(K2)**.

CO4 -Familiarity with the process and role of an architect in project execution **(K2)**.

CO5 -Understanding the Government rules and regulations for successful practicing **(K2)**.

UNIT - I INTRODUCTION TO ARCHITECTURAL PROFESSION CODE OF CONDUCT AND ETHICS. 9

- Architectural profession and role of architects in society.
- Registration of architects. Role of the Indian Institute of Architects. -
- Architects Act 1972- intent, objectives, provisions with regard to architectural practice.
- Council of Architecture- role and functions.
- Importance of ethics in professional practice.
- Code of conduct for architects.
- Punitive action for professional misconduct of an architect.
- Architecture as a professional service towards clients.
- Architect's office and its management - organizational structure, infrastructure requirement, and skills required, elementary accounts, tax liabilities. Setting up architectural practice.

UNIT - II ARCHITECT'S SERVICES, SCALE OF FEES & COMPETITIONS 9

- Mode of engaging an architect.
- Comprehensive services, partial services and specialized services.
- Scope of work of an architect.
- Schedule of services.
- Scale of fees - Council of Architecture norms.
- Mode of payment.
- Terms and conditions of engagement.
- Letter of appointment.
- Importance of Architectural competitions.
- Types of competitions - open, limited, ideas competition, single and two stage competitions.
- Council of Architecture guidelines for conducting architectural competitions.
- National and international Competitions. Case studies.

UNIT III**PROJECT MANAGEMENT - TENDER&CONTRACT****12**

- Tender - Definition. Types of Tenders - open and closed tenders. Conditions of tender. Tender notice. Tender documents.
- Concept of EMD. Submission of tender. Tender scrutiny.
- Tender analysis. Recommendations. Work order. E-tendering - advantages, procedure, conditions.
- Contract – definition. Contract agreement and its necessity.
- Contents - articles of agreement, terms and conditions, bills of quantities and specifications, appendix.
- Certification of contractors.
- Bills at different stages.
- New trends in project formulation and different types of execution - BOT, DBOT, BOLT, BOO, etc., Role of architect in project execution stage.

UNIT IV**LEGALASPECTS****6**

- Arbitration - definition and advantages.
- Sole and joint arbitrators.
- Role of umpires, award.
- Arbitration clause in contract agreement -role of architect, excepted matters.
- Easement – meaning, types of easements.
- Copy rights and patenting – provisions of copy right acts in India, copy right in architectural profession.
- Consumer Protection Act - intent, architect's responsibility towards his clients.

UNIT V**IMPORTANT LEGISLATIONS ANDCURRENTTRENDS****9**

- Planning parameters at various scales.
- DTCP rules.
- Second Master Plan CMDA as case study.
- Chennai Corporation Building Rules 1972.
- Panchayat Rules.
- Building rules in National Building Code.
- H –Z Factories Act. Persons with Disabilities Act.
- Barrier Free Environment. Coastal Regulation Zone.
- Heritage Act.
- Globalization and its impact on architectural profession.
- Preparedness for international practice.
- Entry of foreign architects in India.
- Information technology and its impact on architectural practice.
- Emerging specializations in the field of architecture -architect as construction/ project manager, architectural journalism, architectural photography.

TOTAL PERIODS 45**TEXT BOOK**

1. Architects Act1972.
2. Publications of Council of Architecture
3. Roshan Namavati, 'Professional Practice', Lakhani Book Depot, Mumbai, 2016.
4. Ar. V.S. Apte, 'Architectural Practice and Procedure', Mrs. Padmaja Bhide,2008.
5. Madhav Deobhakta, 'Architectural Practice in India', COA,2007.

REFERENCES

1. J.J.Scott, 'Architect's Practice', Butterworth, London 1985.
2. Development Regulations of Second Master Plan for Chennai Metropolitan Area-2026. (Second Master plan of CMA).
3. Chennai City Corporation Building Rules 1972.
4. T.N.D.M. Buildings rules, 1972.
5. Consumer Protection Act, 1986.
6. Arbitration Act, 1996.
7. Factories Act, 1948.
8. Persons with Disabilities Act, 1995.
9. Tamil Nadu Cinematography Act. DTCP Act.

Cos/POs MAPPING.

COs	Program Outcomes (POs)							
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
1	1	-	-	-	3	-	3	2
2	1	-	-	-	3	-	3	2
3	1	-	-	-	3	-	3	2
4	1	-	-	-	3	-	3	2
5	1	-	-	-	3	-	3	2

Correlation Level: 1 - Low, 2 - Medium, 3 - High

THEORY**U20TH0734****LANDSCAPE AND ECOLOGY****L T P/S C****3 0 0 3****OBJECTIVES**

- To introduce the various aspects of outdoor design and site planning in enhancing and Improving the quality of built environment, functionally and aesthetically.
- To stress on the role of landscape design in sustainability, to provide an overview of ecological balance and impacts of human activities and the need for environmental protection and Landscape conservation.
- To provide familiarity with the various elements of landscape architecture and the principle of Landscape design.
- To give an outline of the evolution of landscape and garden design across history.
- To help develop and strengthen competence in dealing with the analytic, artistic and technical

Aspects of designing open spaces at different scales.

COURSE OUTCOME

After Completion of the Course, the Students will be able to

CO1 - Awareness of the role of landscape design with respect to macro scale of sustainability and Ecology as well as in the micro scale of shaping of outdoor environments **(K1)**.

CO2 - Knowledge about the elements of landscape design and their scope. **(K1)**.

CO3 - Sensitivity towards evolution of different garden and landscape design across time and context conduct **(K2)**.

CO4 - An understanding of landscape design with respect to site planning and different functional typologies of spaces. **(K2)**.

CO5 –Implementing the planning design in urban areas **(K2)**.

UNIT - I**INTRODUCTION****7****Introduction to landscape architecture.**

- Basic concepts of ecology and the impact of human activities on them.
- Bio, Geo, chemical cycles including water cycle, carrying capacity of an ecosystem.
- Environmental impact assessment.
- Reclamation and restoration of derelict lands.

UNIT - II**ELEMENTS IN LANDSCAPE DESIGN****10**

- Introduction to hard and soft landscape elements.
- Different types of hard landscape elements.
- Plant materials, water and landform - classification, characteristics, use and application in landscape design.

UNIT III**GARDEN DESIGN IN HISTORY****10**

- Japanese, Italian Renaissance, Mughal and English gardens.
- Outline of landscape and garden design in Indian history.
- Gardens depicted in Sanskrit literature, Nandavanams and residential gardens of South India. Moghul gardens.
- Public parks and residential gardens of the colonial period.

- Contemporary public landscape projects.
- Spatial development in landscape design.

UNIT IV

SITE PLANNING

10

- Organization of spaces in the outdoor environment.
- Role of circulation and built form in shaping the environment.
- Role of landscape design in design of neighborhood parks, children's play area and campus development.

UNIT V

LANDSCAPING OF FUNCTIONAL AREAS

8

- Urban open spaces and principle of urban landscape.
- Street landscaping, landscape design for waterfront areas and functional areas in urban centers.
- Green infrastructure including green roofs and walls.

TOTAL PERIODS 45

TEXT BOOK

1. Motloch, J.L., 'An Introduction to Landscape Design', US: John Wiley and Sons, 2001.
2. Michael Laurie, 'Introduction to Landscape Architecture', Elsevier, 1986.
3. Sauter D; 'Landscape Construction', Delmar Publishers; 2000.
4. Geoffrey And Susan Jellico, 'The Landscape of Man', Thames And Hudson, 1987.

REFERENCES

1. 'Time Saver Standards for Landscape Architecture', McGraw Hill, Inc, 1995.
2. Grant W Reid, 'From Concept to Form in Landscape Design', Van Nostrand Reinhold Company, 1993.
3. Albert J. Rutledge, 'Anatomy of a Park', McGraw-Hill Book Company, 1971.
4. Richard P. Dober, 'Campus Landscape', John Wiley and Sons; 2000.
5. Strom Steven, 'Site Engineering for Landscape Architects', John Wiley and Sons Inc., 2004.
6. Brian Hacket, 'Planting Design', Mc Graw Hill Inc, 1976.
7. T.K. Bose and Chowdhury, 'Tropical Garden Plants in Colour', Horticulture And Allied Publishers, Calcutta, 1991.
8. Rahoul B Singh, 'Gardens of Delight- Indian Gardens through the Ages', Lustre Press, Roli Books, 2008.

Cos/POs MAPPING.

COs	Program Outcomes (POs)							
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
1	1	2	-	1	-	-	-	-
2	1	2	-	1	-	-	-	-
3	1	2	-	1	-	-	-	-
4	1	2	-	1	-	-	-	-
5	1	2	-	1	-	-	-	-

Correlation Level: 1 - Low, 2 - Medium, 3 - High

BUILDING SERVICES -III

U20TS0735

L	T	P/S	C
2	0	2	3

OBJECTIVES

- To give exposure to the science behind air-conditioning systems, the different types and Applications.
- To enable understanding of architectural aspects related to air-conditioning systems and take appropriate design decisions.
- To inform about fire protection, fire safety and fire fighting in buildings and how to plan for the same
- To inform about mechanical transportation systems for buildings and how to plan for the same.

COURSE OUTCOME

After Completion of the Course, the Students will be able to

CO1 - Familiarity with different air conditioning systems, their context of use and basics of planning involved(**K1**).

CO2 -An understanding of fire safety, firefighting, fire prevention and installations in buildings. **(K1).**

C03 -An understanding of mechanical transportation systems in a building **(K2)**.

CO4 -Ability to integrate services in buildings (K2).

CO5—Integrating all the building services in design (K2).

UNIT - I

AIR CONDITIONING – PRINCIPLES AND SYSTEMS

14

- 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.
- Understanding all the above through product literature/ field visits.

UNIT - II

DESIGN ASPECTS OF AIRCONDITIONING SYSTEMS

10

- 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 and drawings.

UNIT III

FIRE AND SAFETY

12

- 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 multistory 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.

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Lifts and escalators

- Types and applications.
- Round trip time for lifts.
- Design of lift lobby and vertical transportation core.
- Conveyors, travellers, 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.,

UNIT V**INTEGRATION OF SERVICES INTO ARCHITECTURAL DESIGN****12**

- 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.

TOTAL PERIODS 60**TEXT BOOK**

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. 'ASHRAE 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.

REFERENCES

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. ASHRAE, '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.

Cos/POs MAPPING.

COs	Program Outcomes (POs)							
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
1	1	-	-	2	-	-	-	-
2	1	-	-	2	-	-	-	-
3	1	-	-	2	-	-	-	-
4	1	-	-	2	-	-	-	-
5	1	-	-	2	-	-	-	-

Correlation Level: 1 - Low, 2 - Medium, 3 - High

STUDIO**L T P/S C****U20ST0736****ARCHITECTURAL DESIGN STUDIO - VI****0 0 16 8****OBJECTIVES**

- To enable an understanding of architecture as having the capacity to critically interpret and transform status quo in the built environment and society through the act of design.
- To guide in the taking of critical/ philosophical/ ideological positions relating to specific design situations in the current world and to explore architectural morphology as an expression of those positions.

COURSE OUTCOME

After Completion of the Course, the Students will be able to

CO1 - Ability to understand the wider implication of design decisions and their interdependency with larger processes of society **(K3)**.

CO2 - Ability to take creative, critical and informed decisions in the context of significant projects that could shape society in positive ways **(K3)**.

CO3 – Ability to understand and handle a wide campus design **(K4)**.

CO4 – An understanding of new trends and technology in building designing **(K5)**.

CO5 – Exposure of advance building material and usage in the field of Architecture **(K5)**.

CONTENT

- Architecture as a discipline balances many concerns in the creation of buildings. However, it also represents ideas and production reacting to/ reinforcing/ anticipating/ transforming specific aspects of the existing world towards a more desirable future. This could spring from individual perspectives as well as through concerted efforts which then become movements. Architecture can thus seek to understand, reflect, strengthen, question, change status quo. The process of design can thus offer a possible, intended future.
- Projects/ design situations will be given in this regard which address issues/ programmes of current society with a larger impact in terms of scale or importance. Different realms/ aspects of contemporary life can be explored. Some possible projects/ area of inquiry are institutional campuses of significance, mixed use projects involving diverse user groups, culturally and socially important buildings, urban life, technological developments, culture, globalization, place, meaning, identity, appropriate architecture, etc.,
- Suitable processes can be engaged for critical and creative thinking which could include wide and interdisciplinary reading to take critical positions, contemporary processes such as mapping and diagramming, methods related to social, technical or empirical aspects, etc.,
- The particular line of thought will be taken through to completion through the processes. It is preferable to have one major project with small exercises under it if required.

TOTAL PERIODS 240**TEXT BOOK**

1. Kate Nesbitt, 'Theorizing a New Agenda for Architecture', Princeton Architectural Press, 1996.
2. Neil Leach, 'Rethinking Architecture', Routledge, 2000.
3. Harry Francis Mallgrave and David Goodman, 'An Introduction to Architectural Theory- 1968 to the Present', Wiley Blackwell, 2011.
4. Stephen A. Klimment, Editor 'Building Type Basics' Series, Wiley.

REFERENCES

1. Mitchell WJ, 'Imagining MIT: Designing a campus for the 21st century', MIT Press, 2007.

2. Himanshu Burte, 'Space for Engagement', Seagull Books, 2008.
3. Mark Garcia, 'The Diagrams of Architecture', Wiley 2010.
4. Bjarke Ingels, 'Yes is more', Taschen, 2009.
5. Steven Holl, Juhani Pallasmaa, Alberto Pérez Gómez, 'Questions of perception: Phenomenology of Architecture', William Stout, 2006.

Cos/POs MAPPING.

COs	Program Outcomes (POs)							
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
1	1	2	-	-	-	-	-	-
2	1	1	-	2	-	-	-	-
3	1	2	-	-	-	-	-	-
4	1	1	-	-	-	-	-	-
5	1	1	-	1	-	-	-	-

Correlation Level: 1 - Low, 2 - Medium, 3 - High

VIII SEMESTER

STUDIO

U20PT0837

PROFESSIONAL TRAINING

L	T	P/S	C
0	0	0	14

OBJECTIVES

- To introduce the challenges of architectural practice.
- To enable overall understanding of different stages in real life architectural projects in practice.
- To create involvement in these stages as much as possible within the scope of a specific architectural practice - initiation of project, development of concepts into schematic drawings, approval process, presentations and working drawings, involvement in office discussions and Client meetings, integrating structural and service concerns, estimation and tendering processes, site supervision and coordination in the construction process.

COURSE OUTCOME

After Completion of the Course, the Students will be able to

CO1- An overall idea of the nuances of architectural practice **(K3)**.

CO2- An understanding about the total process that goes into the making of a building **(K3)**.

CO3- Maturity in using the experience gained from internship in the thesis project **(K3)**.

CO4- Ability to understand the live project and execution in the site **(K4)**.

CO5- An understanding on preparing an estimation and Cost cutting in live project **(K6)**.

CONTENT

- Practical Training will be done in offices/ firms in India, empaneled by the institution, in which the principal architect is registered with the Council of Architecture.
- The student will attempt to learn as much of aspects outlined in the objectives, either first hand or indirectly.
- The progress of practical training will be assessed periodically internally through submission of log books along with work done by the students in terms of drawings, reports, etc., along with the regular progress report from the employers.
- The students will be evaluated based on the criteria related to their contribution in the office some of which are given below.
- Understanding and involvement in the process of architectural practice as mentioned in the Objectives within the scope of the specific office in which training is undertaken.
- Adherence to time schedule, overall responsibility and professional conduct.
- Ability to carry out the instructions on preparation of schematic drawings, presentation drawings, working drawings and skill in this regard.
- Ability to work as part of a team in an office and contribute to related activities.
- Ability to participate in client meetings and discussions.
- Involvement in supervision at project site.
- Involvement/ initiative/ participation in any other aspects during the course of the training.
- At the end of the Practical Training, a portfolio of work done during the period of internship along with certification from the office should be submitted for evaluation through a viva voce Examination.

Cos/POs MAPPING.

COs	Program Outcomes (POs)							
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
1	1	2	-	-	2	-	3	3
2	1	2	-	-	2	-	3	3
3	1	2	-	-	2	-	3	3
4	1	2	-	-	2	-	3	3
5	1	2	-	-	2	-	3	3

SEMESTER – IX

THEORY		L	T	P/S	C
U20TH0938	HUMAN SETTLEMENT AND PLANNING	3	0	0	3

OBJECTIVES

- To introduce the vocabulary, elements and classification of human settlements.
- To give exposure to planning concepts at different scales of settlements.
- To give an understanding of planning addressing current issues.

COURSE OUTCOMES

After Completion of the Course, the Students will be able to

CO1 - To understand the morphology of settlements and their generating forces and characteristics. **(K1)**

CO2 - An understanding of the role of planning processes in making positive changes to settlements. **(K1,K2)**

CO3 - An understanding of rural and regional development in India. **(K1)**

CO4 - Ability to understand the Urban Planning and Urban development. **(K1)**

CO5 - Awareness of planning interventions with respect to the current world. **(K1.K2)**

UNIT-I INTRODUCTION TO HUMAN SETTLEMENTS 9

- Introduction to planning as a discipline and brief evolution of the profession.
- Elements of human settlements.
- Human beings and settlements.
- Nature, shells and networks- their functions and linkages. Anatomy and classification of human settlements- locational, resource based, population size and occupational structure.

UNIT-II FORMS OF HUMAN SETTLEMENTS 9

- Linear, non- linear and circular, combinations.
- Reasons for development.
- Advantages and disadvantages. Case studies.
- Factors influencing the growth and decay of human settlements.

UNIT-III RURAL AND REGIONAL DEVELOPMENT IN INDIA 9

- Rural development plans, programmes and policies from case studies.
- Regional Plan.
- Area delineation, land utilization plan, hierarchical system of settlements, their sizes and functions.

UNIT-IV URBAN PLANNING AND URBAN RENEWAL 9

- Introduction to urban planning in India.
- Scope, content and limitations of masterplan.
- Structure plan, DDP/ZDP, planned unit development.
- Development control rules. Urban renewal, redevelopment, rehabilitation and conservation. Urban development projects – case studies.

UNIT-V ASPECTS IN CONTEMPORARY URBAN PLANNING IN INDIA 9

- Globalization and its impact on cities.
- Sustainable planning concepts.
- New forms of developments, to include self-sustained communities, SEZ, transit oriented development (TOD), integrated townships, smart cities. Case studies.

TOTAL PERIODS 45

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TEXT BOOK

1. C.L.Doxiadis, Ekistics, 'An Introduction to the Science of Human Settlements', Hutchinson, London,1968.
2. Thooyavan K R, 'Human Settlements- A Planning guide to Beginners', M.A.Publications,2005.
3. Ministry of Urban affairs and Employment, Government of India, New Delhi, 'Urban Development Plans: Formulation and Implementation- Guidelines', 1996.
4. Andrew D Thomas, 'Housing and Urban Renewal', Harper Collins,1986.

REFERENCES

1. S. B. Golahit, 'Rural Development Programmes In India', Neha Publishers & Distributors,2010.
2. 'CMDA Second Master Plan for Chennai Metropolitan Area 2026: Vision, Strategies and Action Plans (Vol.I, II &III)', Chennai, India,2008.
3. V. Nath, 'Regional Development And Planning In India', Neha Publishers & Distributors,2009.
4. Government of India, 'Report of the National Commission on Urbanisation',1988.
5. Hansen N., 'Regional Policy and Regional Integration', Edward Elgar, UK,1996.

Cos/POs MAPPING'

COs	Program Outcomes (POs)							
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
1	-	-	1	2	-	-	-	-
2	-	1	1	-	-	-	-	-
3	-	-	-	2	-	-	-	-
4	1	1	-	1	1	-	-	-
5	1	-	-	1	-	-	-	-

Correlation Level: 1 - Low, 2 - Medium, 3 - High

THEORY**URBAN DESIGN**

L	T	P/S	C
3	0	0	3

U20TH0939**OBJECTIVES**

- To create an understanding of urbanism and urban morphology as rising from various forces through history.
- To introduce the components of the modern city and their interdependencies.
- To introduce the scope and nature of urban design as a discipline
- To introduce key theories associated with urbanism and cities.
- To create awareness of contemporary urban issues and how they are addressed.
- To give exposure to ways of perceiving, documenting and analyzing cities.

COURSE OUTCOMES

After Completion of the Course, the Students will be able to

CO1 - Awareness of the evolution and characteristics of urban forms, their components and Inter- dependencies. **(K1)**

CO2 - Understanding of Modern urbanism. **(K1)**

CO3 - Understanding of urbanism through theories, aspects, issues and solutions. **(K1,K2)** **CO4**

- Understanding contemporary urbanism and Urban interventions. **(K1)**

CO5 - Knowledge of ways to look at and interpret urbanism today. **(K1,K2)**

UNIT-I**URBANISM IN HISTORY****10**

- Outline of forces shaping urbanism.
- Urbanism of river valley civilizations.
- Morphology of pre-industrial European cities to include Greek and Roman cities, medieval European towns, Renaissance urbanism and ideal cities.
- Outline of historic cities of India.
- Temple town urbanism of Tamil Nadu.
- Mughal city form - Medieval cities of India - Colonial urbanism in India.

UNIT-II**MODERN URBANISM****10**

- Industrialization and impact on urbanism.
 - American grid iron planning.
- Theories, ideas and practice of good urban planning/cities/urbanism in early 20th century. Outline of modernist cities and urbanism across the world. **Morphology of Indian modernist cities** Chandigarh, Bhuvaneshwar and Gandhi Nagar. **Components of modern urbanism**
- Blocks, density, neighborhood, streets etc., and the inter dependencies.
 - Evolution of urban design as a discipline, its scope and objectives.

UNIT-III**CITIES AND URBANISM THROUGH TEXTS AND THEORIES****10****Introduction to and discussion of key texts and theories of cities and urbanism**

- Imageability and Lynch, Townscape and Cullen, Genius Loci and Schulz, historic city and Rossi.
- Social aspects of urbanism and the works of Jane Jacobs, William Whyte and Jan Gehl, Collage City and Colin Rowe, current theories and texts.

UNIT-IV**CONTEMPORARY URBANISM AND URBAN INTERVENTIONS****7**

- Understanding aspects, issues and solutions related to urbanism today through study of literature and best practices/case studies in urban design.
- Topics to include urban decay, change and renewal, place making, heritage, conservation, identity, suburban sprawl, gated communities, generic form, privatization of public realm, role of real estate, transportation, zoning, globalization, technology, digital age, sustainability, community
- participation, gender, class, power.

UNIT-V**URBAN STUDIES****8**

- Introduction to study and interpretation of cities (especially Indian) through understanding published studies/ analysis.
- The focus will be on components/aspects as well as tools/ methods. Tools and methods to include different types of maps/mapping, drawings, sketches, photo documentations, reading, data collection, analysis.
- Aspects to include topography, geology, hydrology, micro climate, vegetation, urban density, growth, city limits/boundaries, history, urban architecture, typologies, infra- structure, land parcels, public space, demographics, patterns of usage, land use.

TOTAL PERIODS 45

TEXT BOOK

1. A.E.J. Morris, 'History of Urban Form before the Industrial Revolution', Prentice Hall, 1996.
2. Edmund Bacon, 'Design of Cities', Penguin, 1976.
3. Gordon Cullen, 'The Concise Townscape', The Architectural Press, 1978.
4. Michelle Provoost et al., 'Dutchtown', NAI Publishers, Rotterdam, 1999.
5. 'Time Saver Standards for Urban Design', Donald Natson, McGraw Hill, 2003.
6. Kevin Lynch, 'The Image of the City' MIT Press, 1960.
7. Rithchie. A, 'Sustainable Urban Design: An Environmental Approach', Taylor & Francis, 2000.
8. Tridib Banerjee, Anastasia Loukaitou-Sideris, Editors, 'Companion to Urban Design', Routledge, 2014

REFERENCES

1. Jonathan Barnett, 'An Introduction to Urban Design', Harper Row, 1982.
2. Lawrence Halprin, 'Cities', Reinhold Publishing Corporation, New York, 1964.
3. Gosling and Maitland, 'Concepts of Urban Design', St. Martin's Press, 1984.
4. Malcolm Moor, 'Urban Design Futures', Routledge, 2006.
5. Geoffrey Broadbent, 'Emerging Concepts in Urban Space Design', Taylor & Francis, 2003.
6. Anuradha Mathu, 'Deccan Traverses', Rupa, 2006.
5. Strom Steven, 'Site Engineering for Landscape Architects', John Wiley and Sons Inc., 2004.
6. Brian Hackett, 'Planting Design', McGraw Hill Inc, 1976.
7. T.K. Bose and Chowdhury, 'Tropical Garden Plants in Colour', Horticulture And Allied Publishers, Calcutta, 1991.
8. Rahoul B Singh, 'Gardens of Delight- Indian Gardens through the Ages', Lustre Press, Roli Books, 2008.

Cos/POs MAPPING'

COs	Program Outcomes(POs)							
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
1	1	2	-	-	-	-	-	-
2	1	2	-	-	-	-	-	-
3	1	2	-	-	-	-	-	-
4	1	2	-	-	-	-	-	-
5	1	2	-	-	-	-	-	-

Correlation Level: 1 - Low, 2 - Medium, 3 - High

THEORY**U20TH0940****URBAN HOUSING**

L	T	P/S	C
3	0	0	3

OBJECTIVES

- To introduce housing in the Indian context and the various agencies involved in the production of housing.
- To outline factors, aspects and standards related to housing.
- To inform about the various housing design typologies and the processes involved in housing project development.
- To inform about current issues
- and aspects in housing.

COURSE OUTCOMES

After Completion of the Course, the Students will be able to

CO1 – Knowledge of professional code of conduct and ethics. **(K1,K2)**

CO2 - Knowledge of various issues concerning housing & housing development in Indian & global context covering a cross section of income groups. **(K1,K2)**

CO3 - Ability to appreciate socio-economic aspects in housing. **(K1,K2)**

CO4 - An understanding of housing standards, site planning principles, housing concepts and types.

CO5 - An understanding of key issues in housing today. **(K1)**

UNIT-I	INTRODUCTION TO ARCHITECTURAL PROFESSION CODE OF CONDUCT AND ETHICS	11
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- Housing and its importance in architecture, its relationship with neighborhood and city planning.
- Housing demand and supply.
- National Housing Policy.
- Housing agencies and their role in housing development
- Impact of life style. Rural Housing.
- Public and private sector housing.

UNIT-II	SOCIO-ECONOMICASPECTS	9
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- Economics of housing.
- Social economic factors influencing housing affordability.
- Formal and informal sector.
- Equity in housing development.
- Sites and services.
- Slum housing, upgradation and redevelopment.
- Low Cost Housing.
- Health principles in housing.
- Legislation for housing development.
- Cost-effective materials and technologies for housing. Case studies in India and developing countries.

UNIT-III	HOUSINGSTANDARDS	9
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- UDPI guide lines, standard and regulations.
- DCR.
- Performance standards for housing.

UNIT-IV SITE PLANNING AND HOUSING DESIGN**9****Site Planning for housing.**

- Selection of site for housing, consideration of physical characteristics of site, location factors, orientation, climate, topography, landscaping. Integration of services and parking.

Housing design relating to Indian situations.

- Traditional housing, row housing, cluster housing, apartments, high-rise housing. Case studies in India of the various types.

UNIT-V CURRENT ASPECTS AND ISSUES IN HOUSING**7**

- Green building and sustainable practices.
- Disaster resistance and mitigation.
- Prefabrication Community participation.

TOTAL PERIODS 45**TEXT BOOK**

1. Christopher Alexander, 'A Pattern Language', Oxford University press, New York 1977.
2. Leuris S, 'Front to back: A Design Agenda for Urban Housing', Architectural Press, 2006.
3. S.K.Sharma, 'Mane A New Initiative in Public Housing', Housing & Urban Development Corporation, 1991.

REFERENCES

1. Richard Kintermann and Robert Small, 'Site Planning for Cluster Housing', Van Nostrand Reinhold Company, London/New York, 1977.
2. Joseph de Chiara et al, 'Time Saver Standards for Housing and Residential Development', McGraw Hill Co, New York, 1995.
3. Forbes Davidson and Geoff Payne, 'Urban Projects Manual', Liverpool University Press, Liverpool 1983.
4. HUDCO Publications, 'Housing for Low Income, Sector Model'.
5. 'Sustainable Building Design Manual: Vol 1 and 2', The Energy Research Institute, 2004.
6. A.K.Lal, 'Handbook of Low Cost Housing', New Age International Private Limited, 1995.

Cos/POs MAPPING'

COs	Program Outcomes (POs)							
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
1	1	2	-	-	-	-	-	-
2	1	2	-	-	-	-	-	-
3	1	2	-	-	-	-	-	-
4	1	2	-	-	-	-	-	-
5	1	2	-	-	-	-	-	-

Correlation Level: 1 - Low, 2 - Medium, 3 - High

THEORY

U20TH0941

ARCHITECTURAL DESIGN STUDIO- VII

L	T	P/S	C
0	0	16	8

OBJECTIVES

- To enable an understanding of urbanism as a continuous experience involving the interrelated disciplines of architecture, urban design and town planning.
- To understand architecture as influenced by and influencing the dynamics of cities.
- To facilitate the taking of architectural design decisions in the context of the urban environment.

COURSE OUTCOMES

After Completion of the Course, the Students will be able to

CO1 - Ability to observe and analyses the urban environment. **(K3)**

CO2 - Ability to include the transportation nodes, heritage areas, adaptive reuse, suburban sprawl, place making. **(K3,K4)**

CO3 - Understanding of this aspect of architecture will be achieved by architectural projects involving interdependencies between architecture and the city. **(K3,K4)**

CO4 - Ability to perceive and design buildings as contributing to/ transforming the urban fabric. **(K3,K4)**

CO5 - Ability to bring inclusivity into the architectural design process. **(K3,K4)**

CONTENT

- Urbanism is a dynamic phenomenon involving many aspects - urban growth, landuse distribution and change, urban form, demographics including gender and class, cultural aspects such as place and heritage physical infrastructure such as roads and transportation nodes, public spaces etc.,
- Architecture is an integral and large part of urbanism, shaping and being shaped by it. It can serve to include/ gather society and enrich the urban environment in a seamless manner. Understanding of this aspect of architecture will be achieved by architectural projects involving interdependencies between architecture and the city.
- Some of the issues and areas that could be addressed are- transportation nodes, heritage areas, adaptive reuse, suburban sprawl, place making, identity, collective memory, mixed use programming, large scale urban interventions, revitalization and renewal of urban fragments, urban waterfront development, urban nodes, multiuse urban complexes.
- The tools and techniques can include contemporary ways/ tools of perceiving, gathering and analyzing data, inclusive, collaborative and participatory approaches, etc.,
- It is preferable to have one major project with small exercises under it if required.

TOTALPERIODS 240

TEXT BOOK

1. Jonathan Barnett, 'An Introduction to Urban Design', Harper and Row;1982
2. Cavallo, R. et al, 'New Urban Configurations', IOS Press,2014.
3. Henriette Steiner & Maximilian Sternberg, 'Phenomenologies of the City: Studies in the History and Philosophy of Architecture', Routledge2015.
4. Jan Gehl, 'Life between Buildings- Using Public Space', ArkitektensForleg1987.
5. 'Time Savers Standard for Urban Design', Donald Watson, McGraw Hill,2005.
6. Malcolm Moore & Jon Rowland Eds, 'Urban Design Futures', Routledge,2006.

REFERENCES

1. Michelle Provoost et al., 'Dutchtown', NAI Publishers, Rotterdam,1999.
2. Lawrence Halprin, 'Cities', Reinhold Publishing Corporation, New York,1964.
3. Gosling and Maitland, 'Urban Design', St. Martin's Press,1984.
4. Kevin Lynch, 'Site Planning', MIT Press, Cambridge1967.
5. Jeremy Till et al, 'Spatial Agency: Other Ways of Doing Architecture', Routledge,2011.

Cos/POs MAPPING'

COs	Program Outcomes (POs)							
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
1	1	2	-	3	-	-	-	-
2	1	2	-	3	-	-	-	-
3	1	2	-	3	-	-	-	-
4	1	2	-	3	-	-	-	-
5	1	2	-	3	-	-	-	-

Correlation Level: 1 - Low, 2 - Medium, 3 - High

SEMESTER X

THEORY	DISASTER MANAGEMENT	L	T	P/S	C
U20TH1042	ARCHITECTURE	3	0	0	3

OBJECTIVES

- To provide students an exposure to disasters, their significance and types.
- To ensure that students begin to understand the relationship between vulnerability, disasters, disaster prevention and risk reduction.
- To gain a preliminary understanding of approaches of Disaster Risk Reduction(DRR).
- To enhance awareness of institutional processes in the country and to develop rudimentary ability to respond to their surroundings with potential disaster response in areas where they live, with due sensitivity.

COURSE OUTCOMES

After Completion of the Course, the Students will be able to

CO1 - The students will be able to differentiate the types of disasters, causes and their impact on environment and society. (K1-K2)

CO2 - Assess vulnerability and various methods of risk reduction measures as well as mitigation. (K1,K2)

CO3 - Understanding of inter-relationship between disasters and development. (K1,K2)

CO4 - Understanding of disaster risk –management in India. (K1)

CO5 - Draw the hazard and vulnerability profile of India, Scenarios in the Indian context, Disaster damage assessment and management. (K2,K3)

UNIT - I	INTRODUCTION TO DISASTERS	9
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- Definition: Disaster, Hazard, Vulnerability, Resilience, Risks.
- Disasters: Types of disasters – Earthquake, Landslide, Flood, Drought, Fire etc–
- Classification, Causes, Impacts including social, economic, political, environmental, health, psychosocial, etc.
- Differential impacts- in terms of caste, class, gender, age, location, disability
- Global trends in disasters: urban disasters, pandemics, complex emergencies, Climate change- Dos and Don'ts during various types of Disasters.

UNIT - II APPROACHES TO DISASTER RISK REDUCTION (DRR) 9

- Disaster cycle - Phases, Culture of safety, prevention, mitigation and preparedness community based DRR, Structural- non structural measures.
- Roles and responsibilities of- community, Panchayati Raj Institutions/Urban Local Bodies (PRIs/ULBs), States, Centre, and other stakeholders- Institutional Processes and Framework at State and Central Level-
- State Disaster Management Authority(SDMA).
- Early Warning System – Advisories from Appropriate Agencies.

UNIT III INTER-RELATIONSHIP BETWEEN DISASTERS AND DEVELOPMENT 9

- Factors affecting Vulnerabilities, differential impacts, impact of Development projects such as dams, embankments, changes in Land-use etc.
- Climate Change Adaptation.
- IPCC Scenario and Scenarios in the context of India.
- Relevance of indigenous knowledge, appropriate technology and local resources.

UNIT IV DISASTER RISK MANAGEMENT IN INDIA 9

- **Hazard and Vulnerability profile of India, Components of Disaster Relief: Water, Food,**

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Sanitation, Shelter, Health, Waste Management, Institutional arrangements (Mitigation, Response and Preparedness, Disaster Management Act and Policy - Other related policies, plans, programmers and legislation.

- Role of GIS and Information Technology Components in Preparedness, Risk Assessment, Response and Recovery Phases of Disaster – Disaster Damage Assessment.

UNIT V DISASTER MANAGEMENT: APPLICATIONS AND CASE STUDIES AND FIELD WORK

9

- Landslide Hazard Zonation: Case Studies, Earthquake Vulnerability Assessment of Buildings and Infrastructure: Case Studies, Drought Assessment: Case Studies, Coastal Flooding: Storm Surge Assessment, Floods: Fluvial and Pluvial Flooding: Case Studies; Forest Fire: Case Studies, Man Made disasters: Case Studies, Space Based Inputs for Disaster Mitigation and Management and field works related to disaster management.

TOTAL PERIODS 45

TEXT BOOK

1. Singhal J.P. "Disaster Management", Laxmi Publications, 2010. ISBN-10: 9380386427 ISBN- 13:978-9380386423
2. Tushar Bhattacharya, "Disaster Science and Management", McGraw Hill India Education Pvt. Ltd., 2012. ISBN-10: 1259007367, ISBN-13:978-1259007361]
3. Gupta Anil K, Sreeja S. Nair. Environmental Knowledge for Disaster Risk Management, NIDM, New Delhi, 2011
4. Kapur Anu Vulnerable India: A Geographical Study of Disasters, IAS and Sage Publishers, New Delhi, 2010.

REFERENCES

1. Govt. of India: Disaster Management Act, Government of India, New Delhi, 2005
2. Government of India, National Disaster Management Policy, 2009.

Cos/POs MAPPING'

COs	Program Outcomes (POs)							
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
1	1	-	-	2	-	-	-	-
2	1	-	-	2	-	-	-	-
3	1	-	-	2	-	-	-	-
4	1	-	-	2	-	-	-	-
5	1	-	-	2	-	-	-	-

Correlation Level: 1 - Low, 2 - Medium, 3 - High

THEORY**ARCHITECTURAL THESIS****L T P/S C****U20ST1043**

0 0 36 18

OBJECTIVES

- To ensure consolidation and application of the knowledge gained in preceding years of the Programme in the context of a design project of the student's choice.
- To enable addressing of specific projects through key, identified issues inherent in the project
- To enable development of thought processes in specific areas/aspects into project.
- To facilitate development of ability to complete and handle projects independently as a precursor to professional life.

COURSE OUTCOMES**CO1** - Skill, knowledge and expertise in the domain of architectural design. **(K2,K3)****CO2** - Ability to study/research/design can include any of the broad areas. **(K3)****CO3** - Ability to present the thought process an ideas using the software's tools. **(K3,K4)****CO4** - Ability to design a complex project like social housing, urban oriented design.**CO5** - Ability to handle a major architectural project independently through all stages. **(K4,K5)****CONTENT**

- Students should 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.
 - 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.
- 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 summarizing the entire thesis work and soft copy of all the work.

TOTAL PERIODS 540**TEXT BOOK**

1. Linda Grant and David Wang, 'Architectural Research Methods', John Wiley & Sons, 2002.
2. Joseph De Chiara, Michael J Crosbie, 'Time Saver Standards for Building Types', McGraw Hill Professional, 2001

REFERENCES

Stephen A. Klimment, Editor 'Building Type Basics' Series, Wiley.

1. Igor Marjanović, Katerina Rüedi Ray, Lesley Naa Norle Lokko, 'The Portfolio - An Architecture Student's Handbook', Routledge, 2003.

Cos/POs MAPPING'

COs	Program Outcomes (POs)							
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
1	1	2	-	3	-	-	1	-
2	1	2	-	3	-	-	1	-
3	1	2	-	3	-	-	1	-
4	1	2	-	3	-	-	1	-
5	1	2	-	3	-	-	1	-

Correlation Level: 1 - Low, 2 - Medium, 3 - High

PROFESSIONAL ELECTIVE – I

THEORY

THEORY OF DESIGN

L T P/S C

U20EL0603

3 0 0 3

OBJECTIVES

- To give understanding of design as a broader field and the changing role of designer in society.
- To give exposure to methodologies, theories and models of the design process.
- To give deeper understanding of the process of creativity as well as to introduce techniques which will enable creative thinking.
- To help understand creativity with respect to the discipline of architecture.
- To introduce participatory approach to design.

COURSE OUTCOME

After Completion of the Course, the Students will be able to

CO1- Ability to think about architecture as one of the many fields under the broader ambit of design as a fundamental human activity **(K1, K2)**.

CO2- Self-awareness with respect to the creative process **(K1, K2)**.

CO3- Ability to engage different processes to give creative output **(K1, K2)**.

CO4- An understanding of architectural concepts - programmatic, analogic, metaphor, essence, etc **(K1, K2)**.

CO5- An Detailed Understanding of Process in Designing **(K1, K2, K3)**.

UNIT - I

INTRODUCTION TO DESIGN

7

- Definition and understanding of design.
- History of design process from earliest times through Renaissance, Beaux Arts, Bauhaus.
- Different classifications of design according to scale, process, mode of production, etc., - self-conscious/ unselfconscious, design through drawing/ design through craft, pragmatic/ iconic/ analogic/ canonic or syntactic, handmade/ machine made, product design to city design, functional/ aesthetic, nature vernacular/technological.

UNIT - II

DESIGN METHODOLOGY MOVEMENT

10

- Context for the rise of the design methodology movement from the 1950s with the critique of modernism.
- Theories of the first generation and the second-generation design methodologists.
- Design as wicked problem.
- Escalation and regression in Design.
- Summary by Johnson of various models of the design process - parametric or analysis/ synthesis/ evaluation, conjecture-refutation, paradigmatic, hermeneutical.

UNIT III

CREATIVE THINKING

10

- Understanding the term creativity.
- Theories on thinking - left brain/ right brain, convergent/ divergent thinking, lateral/vertical thinking.
- Broadbent's idea of the design spectrum - from the logical to chance.
- Blocks in creative thinking.
- Techniques to generate creativity as put forth by Broadbent, Bono.

UNIT IV

ARCHITECTURAL CREATIVITY

8

- Types of architectural concepts - programmatic, analogic, metaphor, essence, etc.,
- Channels to creativity in architecture as put forth by Antoniades.
- Personal philosophies and strategies of individual designers.

UNIT V

PROCESS AND DESIGN

10

- People and design process- concept of pattern language by Christopher Alexander, participatory approach to design, design as process involving time and people.
- Introduction to contemporary processes in design including diagramming, mapping, parametric exploration, etc.,

TOTAL PERIODS 45

TEXT BOOK

1. Geoffrey Broadbent, 'Design in Architecture - Architecture and the Human Sciences', John Wiley & Sons, New York, 1981.
2. Bryan Lawson, 'How Designers Think', Architectural Press, 2005.
3. Anthony Antoniades, 'Poetics of Architecture- Theory of Design', VNR, 1992.
4. Edward De Bono, 'Lateral Thinking- Textbook of Creativity', Penguin Books, 1990.
5. Christopher Alexander, 'A Pattern Language', Oxford University Press, 1977.
6. James C. Snyder, Anthony J. Catanese, Timothy L. McGinty, 'Introduction to Architecture', McGraw Hill, 1979.
8. Mark Garcia, 'The Diagrams of Architecture', Wiley, 2010.
9. C. Thomas Mitchell, 'Redefining Designing: From Form to Experience', Van Nostrand Reinhold, 1992.

REFERENCES

1. Victor Papanek, 'Design for the Real world, Human Ecology and Social Change', Chicago Review Press, 2005.
2. Paul Alan Johnson, 'Theory of Architecture- Concepts, Themes, Practices', VNR, 1994.
3. Christopher Jones, 'Design Methods', John Wiley and Sons, 1980.
4. Tom Heath, 'Method in Architecture', John Wiley & Sons, New York, 1984.
5. Nigel Cross, 'Developments in Design Methodology', John Wiley & Sons, 1984.
6. James L. Adams, 'Conceptual Blockbusting', Basic Books, 2001.
7. Jeremy Till et al, 'Spatial Agency: Other Ways of Doing Architecture', Routledge, 2011.

Cos/POs MAPPING

COs	Program Outcomes (POs)							
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
1	1	2	-	1	-	-	-	-
2	1	2	-	1	-	-	-	-
3	1	2	-	1	-	-	-	-
4	1	2	-	1	-	-	-	-
5	1	2	-	1	-	-	-	-

Correlation Level: 1 - Low, 2 - Medium, 3 - High

OBJECTIVES

- To introduce the study of vernacular architecture as a process and not a product.
- To provide an overview of the different approaches and concepts to the study of vernacular architecture.
- To study the various vernacular architecture forms in the different regions of the country.
- To look at the impact of colonial rule on the vernacular architecture of India.

COURSE OUTCOME

After Completion of the Course, the Students will be able to

CO1 - An understanding of Indian vernacular architecture as a process and to also provide an overview of various approaches and concepts towards its study **(K1, K2)**.

CO2 - Knowledge of vernacular architectural forms in different regions **(K1, K2)**.

CO3 - An understanding of the impact of colonial rule on vernacular architecture in India **(K1, K2)**.

CO4 - An understanding of vernacular architecture of south India **(K1, K2)**.

CO5 - An understanding of western influences on vernacular architecture of India **(K1, K2)**.

UNIT - I INTRODUCTION 7

- Definition and classification of vernacular architecture. Vernacular architecture as a process.
- Methodology for survey and study of vernacular architecture.
- Overview of cultural and contextual responsiveness of vernacular architecture.

UNIT - II APPROACHES AND CONCEPTS 9

- Overview of different approaches and concepts to the study of vernacular architecture.
- Aesthetic, architectural and anthropological studies in detail.

UNIT III VERNACULAR ARCHITECTURE OF THE WESTERN AND NORTHERN 11

- Forms, spatial planning, cultural aspects, symbolism, colour, art, materials of construction and construction technique of the vernacular architecture of the deserts of Kutch and Rajasthan (including havelis of Rajasthan), rural and urban Gujarat (including wooden mansions/ havelis in general and that of the Bohra Muslims) and geographical regions of Kashmir (including houseboats).

UNIT IV VERNACULAR ARCHITECTURE OF SOUTH INDIA 8

- 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 Kerala (including houses of the Nair & Namboothri community, Koothambalam and Padmanabhapuram palace) and Tamil Nadu (including houses and palaces of the Chettinad region, agharams)

UNIT V WESTERN INFLUENCES ON VERNACULAR ARCHITECTURE OF INDIA 10

- Colonial influences on the traditional Goan house.
- Evolution of the bungalow from the traditional bangla, Victorian villas. Planning principles and materials and methods of construction of the bungalow.
- Settlement pattern and house typologies of Pondicherry and Cochin.

TEXT BOOK

1. Paul Oliver, 'Encyclopedia of Vernacular Architecture of the World', Cambridge University Press, 1997.
2. Amos Rapoport, 'House, Form & Culture', Prentice Hall Inc. 1969.
- R W Brunskill, 'Illustrated Handbook on Vernacular Architecture', Faber & Faber, 1970.

REFERENCES

1. V.S. Pramar, 'Haveli – Wooden Houses and Mansions of Gujarat', Mapin, 1989.
2. Kulbushanshan Jain and Minakshi Jain, 'Mud Architecture of the Indian Desert', Aadi Centre, Ahmadabad, 1992.
3. G.H.R. Tillotson, 'The Tradition of Indian Architecture: Continuity, Controversy, Change since 1850', Oxford University Press, Delhi, 1989.
4. Carmen Kagal, 'Vistara- The Architecture of India', The Festival of India, 1986.
5. S. Muthiah et al, 'The Chettiar Heritage', Chettiar Heritage 2000.
6. Weber.W & Yannas.S, 'Lessons from Vernacular Architecture', Routledge, 2014.
7. Bernard Rudofsky, 'Architecture without Architects', MoMA, 1964.

Cos/POs MAPPING'

COs	Program Outcomes (POs)							
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
1	1	2	-	1	-	-	-	-
2	1	2	-	1	-	-	-	-
3	1	2	-	1	-	-	-	-
4	1	2	-	1	-	-	-	-
5	1	2	-	1	-	-	-	-

Correlation Level: 1 - Low, 2 - Medium, 3 - High

THEORY
U20EL0502

ART APPRECIATION

L	T	P/S	C
3	0	0	3

OBJECTIVES

- To introduce art as a fundamental human activity, its characteristics and ways in which it can be understood.
- To introduce the vocabulary of art and to enable the appreciation of art.
- To understand different productions of art as manifestations within particular contexts.

COURSE OUTCOME

After Completion of the Course, the Students will be able to

CO1 - An understanding and appreciation of art as basic and varied human creation related to cognition and experience **(K1, K2)**.

CO2 - Awareness of important art productions in the West and India **(K1, K2)**.

CO3 - Sensitivity towards collective and individual cultural productions as unique expressions of historical and geographic context **(K1, K2)**.

CO4 - An understanding of context for the major changes in art from late 19th century and the birth of modern art **(K1,K2)**.

CO5 - An understanding of Modern Art **(K1,K2)**.

UNIT - I INTRODUCTION TO ART

7

- Definition of art, need for art, role of art. Art, reality, perception, representation.
- Categories of art in terms of media and technique. How to appreciate art in terms of form, content and context.

UNIT - II

VOCABULARY OF ART

8

- Introduction to the vocabulary of art constituted by elements (line, shape, form, space, color, light, value, texture) and principles (unity, variety, harmony, rhythm, balance, proportion, emphasis, contrast, movement).
- Appreciation of art with respect to all the above through examples.

UNIT III

BEGINNINGS OF WESTERN ART TO MODERN ART

10

- Outline of art in the West from the beginnings to the birth of modern art.
- Important works from the following art traditions will be understood and appreciated in terms of their form, content and context: Prehistoric Art, Egyptian and Mesopotamian art, Greek and Roman art, Medieval art, Renaissance and Baroque art, Neoclassicism, Romanticism, Realism.

UNIT IV

MODERN ART AND AFTER

11

- Outline of the context for the major changes in art from late 19th century and the birth of modern art.
- Important works from the following movements will be understood and appreciated in terms of their form, content and context: Impressionism, Post Impressionism, Fauvism, Expressionism, Modern art, Abstract/ Non-Objective art, Cubism, Dadaism, Surrealism, Futurism, Constructivism, Suprematism, DeStijl,
- Abstract Expressionism, Pop art, Op art. Outline of new forms and media in art from mid 20th century.

UNIT V**INDIAN ART****9**

- Outline of art in India over history. Important works from the following art traditions and movements will be understood and appreciated in terms of their form, content and context:
- Indus Valley art, Hindu, Buddhist and Jain art, Mughal and Rajput miniature art, art during the colonial period, modern Indian art, contemporary directions

TOTAL PERIODS 45**TEXT BOOK**

1. Fred, S. Kleiner, 'Gardener's Art through Ages', Wadsworth Publishing, 2012.
2. Bernard S. Myers, 'Understanding the Arts', Holt Rinehart and Winston Inc, 1964.
3. H.H. Arnason, 'History of Modern Art', Thames and Hudson, 1977.
4. Partha Mitter, 'Indian Art', Oxford University Press, 2001.
5. Edith Tomory, 'A History of Fine Arts in India and the West', Orient Blackswan, 1989.

REFERENCES

1. Peter and Linda Murray, 'The Penguin Dictionary of Art and Artists', Penguin, 1989.
2. E.H. Gombrich, 'The Story of Art', Phaidon, 2002.
3. E.H. Gombrich, 'Art and Illusion', Phaidon, 2002.
4. 'Indian Art since the early 1940s- A Search for Identity', Artists Handicrafts Association of Chola Mandal Artists Village, Madras, 1974.
5. A.K. Coomaraswamy, Fundamentals of Indian Art, Historical Research Documentation Programme, Jaipur, 1985.

Cos/POs MAPPING'

COs	Program Outcomes (POs)							
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
1	1	2	-	-	-	-	-	-
2	1	2	-	-	-	-	-	-
3	1	2	-	-	-	-	-	-
4	1	2	-	-	-	-	-	-
5	1	2	-	-	-	-	-	-

Correlation Level: 1 - Low, 2 - Medium, 3 - High

PROFESSIONAL ELECTIVE – II

THEORY	INTERIOR DESIGN	L	T	P/S	C
U20EL0603		3	0	0	3

OBJECTIVES

- To provide familiarity with the characteristics of interior spaces and furniture across history.
- To introduce the profession of interior design and bring out its role.
- To inform about the various components of interior space and give an understanding of the design aspects involved in each.

OUTCOMES

CO1- An understanding of interior design as an integral part of architecture and as an Interdisciplinary and allied field related to architecture **(K1,K2)**.

CO2- An overall exposure to the ways in which interior spaces can be enriched through the design of specific interior components **(K1,K2)**.

CO3- An understanding of interior treatment and finishes in the experience of interior spaces **(K1,K2)**.

CO4- An understating of interior elements and spaces **(K1,K2)**.

CO5- Ability to design interior spaces **(K1,K6)**.

UNIT - I INTERIOR SPACES AND FURNITURE ACROSS HISTORY 11

- Outline of the characteristics of representative/ exemplary interior spaces, interior decoration and furniture in the Western world from the beginnings to twentieth century.
- Outline of characteristics of representative/ exemplary interior spaces, interior decoration and furniture in India across the ages, including living folk traditions.

UNIT - II INTRODUCTION TO INTERIOR DESIGN 7

- Definition and process of interior design. Introduction to the design of interior spaces as related to typology, function and themes.
- Vocabulary of design in terms of elements (point, line, shape, form, space, color, light, pattern, texture) and principles (balance, proportion, scale, rhythm, hierarchy unity, contrast, harmony, emphasis, movement) with specific reference to examples from interior design.

UNIT - III COMPONENTS OF INTERIOR SPACE-I 9

- Role of interior treatment and finishes in the experience of interior spaces.
- Outline of the design of components such as floors, ceilings, walls, partitions, window treatments and accessories based on parameters such as context, function, ambience, materials, properties, methods of construction, color, texture.
- Study of representative examples.

UNIT - IV COMPONENTS OF INTERIOR SPACE-II 9

- Role of lighting in the experience of interior spaces. Outline of different types of interior lighting systems and fixtures based on their effects and suitability in different contexts. Study of representative examples.
- Role of landscaping in the experience of interior space. Outline of interior landscaping elements such as rocks, plants, water, flowers, fountains, paving artifacts.
- Their physical properties and effects on spaces. Study of representative examples

- Introduction to furniture design as related to parameters such as human comfort and function (including anthropometrics and ergonomics), built in or freestanding, materials and methods of construction, cultural particularities, changing trends and lifestyles, innovations and design ideas. Study of representative examples.

TOTAL PERIODS 45

TEXT BOOK

1. Francis D.K.Ching, 'Interior Design Illustrated', John Wiley & Sons, 2012.
2. Joseph DeChiara, Julius Panero, Martin Zelnik, 'Time Saver's Standards for Interior Design', McGraw-Hill Professional, 2001.
3. John F. Pile, 'Interior Design', Pearson Prentice Hall, 2007.
4. Jan Pieper, George Michell, 'The Impulse to Adorn- Studies in Traditional Indian Architecture', Marg Publications, 1982.
5. Aronson J, 'The Encyclopaedia of Furniture', Potter Style, 1965.
6. Pat Kirkham, Susan Weber, Editors, 'History of Design: Decorative Arts and Material Culture, 1400-2000', Yale University Press, 2013.
7. John F. Pile, Judith Gura, 'A History of Interior Design', Wiley, 2013.

REFERENCES

1. Helen Marie Evans, 'An Invitation to Design', Macmillan Pub Co, 1982.
2. Julius Penero and Martin Zelnik, 'Human Dimensions and Interior Space', Whitney Library of Design, 1979.
3. Kathryn B. Hiesinger and George H. Marcus, 'Landmarks of Twentieth Century Design', Abbey Ville Press, 1995.
4. Susanne Slesin and Stafford Cliff, 'Indian Style', Thames and Hudson, 1990.
5. Rosemary Kilmer, W. Otie Kilmer, 'Construction Drawings and Details for Interiors: Basic Skills', John Wiley & Sons, 2009.

Cos/POs MAPPING'

COs	Program Outcomes (POs)							
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
1	1	2	-	-	-	-	-	-
2	1	2	-	-	-	-	-	-
3	1	2	-	-	-	-	-	-
4	1	2	-	-	-	-	-	-
5	1	2	-	-	-	-	-	-

Correlation Level: 1 - Low, 2 - Medium, 3 - High

- To outline the evolution of structural systems through history.
- To introduce concepts of structural design through works of architects/engineers.
- To create understanding about the relationship between architectural expression/form and structure.

COURSE OUTCOME

CO1-Familiarity with concepts of structural design and its influence on the functional and aesthetic domains of architectural design relating to historic and contemporary periods. **(K1,K2).**

CO2-Understanding of architectural expression and its relation to form, structure and changing technology **(K1,K2).**

CO3- Understanding on Contemporary examples with respect to parametric/ digital processes and innovative new materials **(K1,K2).**

CO4-Understanding of contemporary structural Expression through case studies. **(K1,K2).**

CO5-Understanding of a study of architectural form and structural expression. **(K1,K2).**

UNIT - I STRUCTURAL DESIGN IN THE PRE-INDUSTRIAL ERA 8

- Development of monolithic and rock cut structures.
- Trabeated construction, arcuate construction, vaults and flying buttresses.
- Tents and masted structures.

UNIT - II STRUCTURAL DESIGN IN THE POST-INDUSTRIAL PERIOD 8

- Post Industrial modular construction of large span and suspension structures in steel and concrete - projects of Pier Luigi Nervi, Maillart, Candella, Buckminster Fuller and Eero Saarinen. Structure in Deconstructivism – Structure and aesthetics.
- Parametric/ digital processes and structure.

UNIT III CONTEMPORARY STRUCTURAL EXPRESSION THROUGH CASE STUDIES 10

- The select case studies would include KCR Terminal at Hung Hom, Hong Kong, B3 Offices in Stockley Park, Sainsbury Centre for Visual Art, Renault Centre and Swindon UK by Norman Foster and Standsted Airport Terminal, London, UK by Fosters/Arup British Pavilion EXPO1992, Seville, Spain and Waterloo International Terminal by Nicholas Grimshaw.

UNIT IV CONTEMPORARY STRUCTURAL EXPRESSION THROUGH CASE 10

- The select case studies would include Inmos Microchip Factory, Centre Commercial St. Herbtain, PA Technology, Princeton and Fleetguard, Quimper UK by Richard Rogers Athens Olympic Stadium and Village, Bridges and Public Bus Stop in St. Gallen , Railway Station, Lyon, France and Stadelhofen Railway station, Zurich Schweiz by Santiago Calatrava Kansai International Airport, UNESCO Workshop, the Jean-Marie Tjibaou Cultural Center, Menil Museum, Thomson Optronics Factory, IBM Traveling Exhibition Pavilion, Columbus International Exposition, Genoa Italy and Lowara Officers, Montecchio Maggiore Italia by Renzo Piano Building Workshop.
- Contemporary examples with respect to parametric/ digital processes and innovative new materials

- Seminar to present a study of architectural form and structural expression through select cases which will aid understanding of structural philosophy and analysis, building envelope and services and construction sequence

TOTAL PERIODS**45****TEXT BOOK**

Shigeru Ban, McQuaid, Matilda, 'Engineering and Architecture: Building the Japan Pavilion', Phaidon Press Ltd, UK, 2008.

'Cox Architects' (The Millennium Series), Images Publishing Group, 2001. James B Harris, Kevin Li, 'Mastered Structures in Architecture', Routledge, 2012

REFERENCES

Patrizio Bertelli et al, 'Herzog & De Meuron: Prada Aoyama Tokyo', Fondazione Prada, 2004 Christopher Beorkrem, 'Material Strategies in Digital Fabrication', Routledge, 2012

Angus J. Macdonald, Structure and Architecture, Architectural Press, 2001.

Cos/POs MAPPING'

COs	Program Outcomes (POs)							
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
1	1	1	-	1	-	-	-	-
2	1	1	-	-	-	-	-	-
3	1	1	-	-	-	-	-	-
4	1	1	-	1	-	-	-	-
5	1	1	-	1	-	-	-	-

Correlation Level: 1 - Low, 2 - Medium, 3 - High

OBJECTIVES

- To introduce the origins, determinants and elements of human settlements.
- To give an overview of the evolution of human settlements across history.
- To introduce planned cities as expressions of specific intent.
- To give exposure to changes in human settlements today.

COURSE OUTCOME

CO1 - Awareness of the nature and characteristics of human settlements **(K1,K2)**.

CO2 - An understanding of the evolution of human settlements and their shaping forces **(K1,K2)**.

CO3 - Familiarity with current aspects of settlements **(K1,K2)**.

CO4 – An understanding of modern and post modernism cities **(K1,K2)**.

CO5 - An understanding human settlements in a changing world **(K1,K2)**.

UNIT - I ORIGIN OF HUMAN SETTLEMENTS AND EARLY SETTLEMENTS 9

- Origins of civilizations.
- Elements and determinants of human settlements.
- Human settlements in the pre-historic period. Ancient river valley civilizations of Indus valley, Mesopotamia, Egypt and China with emphasis on the layout and patterns of the settlements and the influence of resources on them.

UNIT - II PRE-INDUSTRIAL CITIES 9

- Greek and Roman civilizations and their settlements-role of defense, politics, trade and other factors in the development of settlement planning. Medieval and Renaissance cities in Europe.
- City plans of Vienna, Amsterdam, Paris.
- Cities as expression of political power- Washington DC, Pretoria. Industrial revolution and its influence on cities.

UNIT III CITIES IN INDIA 9

- Ancient town planning principles of India.
- Medieval Indian cities and factors that led to their development. Islamic and Mughal cities.
- Colonial urbanism including presidency towns, hill towns and cantonments.
- New Delhi as imperial power.

UNIT IV MODERN AND POSTMODERN CITIES 9

- Contributions of Ebenezer Howard, Lewis Mumford, Patrick Geddes, C.A. Doxiadis. Visionary/ Utopian city concepts by Le Corbusier, Frank Lloyd Wright.
- Modern town planning principles and examples including Manhattan and New Town movement in Britain. Planning of the capital cities of Brasilia and Chandigarh.
- Postmodern Utopian vision of Archigram, Metabolism and Paolo Soleri.

UNIT V HUMAN SETTLEMENTS IN A CHANGING WORLD 9

- Changing nature of human settlements today through case studies.
- Topics to include impact of global economy, trade, information and communication technology, sustainability.

TOTAL PERIODS 45

TEXT BOOK

1. Mumford L, 'The City in History', Harcourt Brace International, 1968.
2. Morris AEJ, 'History of Urban Form before the Industrial Revolution', Routledge, 1994.
3. Spiro Kostof, 'The City Shaped: Urban Patterns and Meaning through History', Thames and Hudson, 1999.
4. Dutt B.B, 'Town Planning in Ancient India', Thacker Spink & Co., Calcutta, 1995.
5. 'Cities in a Globalizing World: Global Report on Human Settlements', United Nations Center for Human Settlements. London: Sterling, VA: Earthscan Publications, 2001.

REFERENCES

1. Spiro Kostof, 'The City Assembled: Elements of Urban form through History', Thames, and Hudson, 2005.
2. Simon Eisner, Arthur Gallion, Stanley Eisner, 'Urban Pattern', John Wiley & Son, 1999.
3. Comhaire J, 'How Cities Grew', Florham Park Press, 1971.
4. Kosambi D.D, 'The Culture and Civilisation of Ancient India in Historical Outline', Vikas, 1997.

Cos/POs MAPPING

COs	Program Outcomes (POs)							
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
1	1	-	-	2	-	-	-	-
2	1	-	-	2	-	-	-	-
3	1	-	-	2	-	-	-	-
4	1	-	-	2	-	-	-	-
5	1	-	-	2	-	-	-	-

Correlation Level: 1 - Low, 2 - Medium, 3 - High

PROFESSIONAL ELECTIVE – III

THEORY	CONTEMPORARY BUILDING MATERIALS	L	T	P/S	C
U20EL0606		3	0	0	3

OBJECTIVES

- To introduce current materials and products in architecture that are eco-friendly, composite, durable, advanced, smart.
- To inform about innovations in materials and practices in building industry.
- To focus on materials and systems, their properties and connections, intrinsic relationship with structural systems and environmental performance.

COURSE OUTCOME

After Completion of the Course, the Students will be able to

CO1 - To give Exposure to the need and use of various contemporary materials in creating innovation **(K1, K2)**

CO2 - To understand the characteristics and performance of the newer materials in terms of detailing and application to the context. **(K1, K2)**

CO3 - To understand the types, terminology and classification of composite materials based on particle, reinforced, fiber reinforced, structural and composite benefit in building construction. **(K1, K2)**

CO4 - To understand definition, manufacture, properties, performance and applications of Nano Materials. **(K1, K2)**

CO5 - To have knowledge about digital and tensile materials. **(K1, K2)**

UNIT-I INTRODUCTION

7

- Introduction and need for ultra-performance materials in building design as a substitute to conventional materials.
- Newer application for special performance, thermal/ sound/ moisture protection, fitting, equipment and furnishing.
- Properties of contemporary materials – multidimensional, repurposed, recombinant, intelligent, interfacial, transformant, etc.

UNIT - II ADVANCED CONCRETE AND COMPOSITE REINFORCEMENT

10

- Types of advanced concrete and its applications.
- Workability and mechanical properties, durability and reliability of advanced concrete materials. Manufacturing and application in buildings.
- Bendable concrete, light transmitting concrete, translucent concrete, pervious concrete, eco-cement, etc.,
- Introduction to manufacture, types, properties and performance of new reinforcement materials in concrete - Aramid fibers, bio-steel, carbon (Graphite) Fibers and fiber glass etc.

UNIT III COMPOSITE MATERIALS

10

- Types, terminology and classification of composite materials based on particle reinforced fiber reinforced, structural and composite benefit in building construction.
- Composite materials manufacturing process.
- Use of composite materials namely Polymer Matrix Composites (PMCs) and Fiber- Reinforced Polymers (FRPs) along with cement, steel, aluminum, wood, glass, etc., for thermal insulation, fire protection, coating, painting and structural monitoring etc.

UNIT IV NANO-MATERIALS AND NANO-COMPOSITES**9**

- Definition, manufacture and types of nanomaterials. Properties, performance of nanomaterials in building construction, types and application of nano-materials like carbon, nano tubes etc.,
- Nano composite used with cement, steel, aluminium, wood, glass for thermal insulation, fire protection, coating and painting and structural monitoring etc..Nano technologies in building and construction.
- Contemporary examples with respect to parametric/ digital processes and innovative new materials.

UNIT V DIGITAL AND TENSILE MATERIALS**9**

- Types of materials and its constitution, manufacturing and construction technology requirement for 3D printed buildings structure and Extraterrestrial printed structures.
- Tensile fabric structure by digital printing. Translucent fabric, thin-film photovoltaics, texlon foil, PVC (poly vinyl chloride) coated polyester cloth and PTFE (poly tetra fluoroethylene)(teflon)
- coated glass cloth.

TOTALPERIODS 45**TEXT BOOK**

1. Christiane Sauer, 'Made of...New Materials Sourcebook for Architecture and Design', Prestel Pub,2010.
2. Mel Schwart, 'Encyclopaedia of Smart Materials -Vol 1,2', Wiley-Interscience, 2001.
3. SenemÖzgönülŞensan, 'Smart Materials and Sustainability: Application of Smart Materials in Sustainable Architecture', LAP Lambert Academic Publishing,2010.
4. Axel Ritter, 'Smart Materials in Architecture, Interior Architecture and Design',Birkhäuser Architecture,2002.

REFERENCES

1. Michelle Addington, & Daniel L Schodek, 'Smart Materials and New Technologies: for the Architecture and Design Professions, Architectural Press,2005.
2. Michael. F. Ashby, Paulo Ferreira, Daniel L. Schodek, 'Nanomaterials, Nanotechnologies and Design: An Introduction for Engineers and Architects', Butterworth- Heinemann,2009.
3. Blaine Brownell, 'Transmaterial 2', Princeton Architectural Press,2008.
4. John Fernandez, 'Material Architecture: Emergent Materials for Innovative Buildings and Ecological Construction', Taylor & Francis, 2006.

Cos/POs MAPPING'

COs	Program Outcomes (POs)							
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
1	1	2	-	1	-	-	1	-
2	1	2	-	1	-	-	1	-
3	1	2	-	1	-	-	1	-
4	1	2	-	1	-	-	1	-
5	1	2	-	1	-	-	1	-

Correlation Level: 1 - Low, 2 - Medium, 3 - High

OBJECTIVES

- To introduce latest advances in the field of glass in architecture.
- To enable right selection and usage of right glass for appropriate purposes.
- To give understanding of use of glass in contemporary architecture as well as its role in green design and improving building performance.

COURSE OUTCOME

After Completion of the Course, the Students will be able to

CO1 - To understand of glass and its potential in contemporary usage **(K1,K2)**.

CO2 - To create awareness in need for green buildings and energy efficient buildings. **(K1,K2)**.

CO3 - To create importance of case study of green buildings designed predominantly with energy efficient materials. **(K1,K2)**.

CO4 - To Understand tools currently in practice with respect to the use of glass in buildings. **(K1,K2)**.

CO5 - To Understand software currently in practice with respect to the use of glass in buildings. **(K1,K2)**.

UNIT-I GLASS AS BUILDING MATERIAL

10

- Applications of glass in buildings (façade/ interior applications). Understanding the production & properties of glass.
- Value additions including coating technology (importance & necessity) and processing (tempering, heat strengthening, DGU, laminated, ceramic fritting). Types of Glass- mirror, lacquered, fire resistant. Modern glass with different applications.
- Glass for hospitals, green homes, airports, offices, other buildings.
- Glass and human safety compliances. Role of glass in fire safety considerations - Class E, EI & EW.
- Role of glass in acoustics. International standards & codal provisions.

UNIT - II GLASS AND GREEN ARCHITECTURE

10

- Building Physics.
- Theory of electromagnetic radiation.
- Understanding of internal and external reflections. Day-lighting in Buildings - introduction and basic concepts (VLT). Solar Control and thermal insulation (SF, UV, SHGC).
- Need for green Buildings. Energy efficient buildings. Achieving energy efficiency using glass. Factors of energy efficient material selection.
- Performance parameters.
- Energy codes and Green ratings - ECBC, IGBC, GRIHA.
- Approaches of energy efficiency - prescriptive method, trade off method. Accommodating passive architecture.

UNIT III CASE STUDY

10

- Case study of green building designed predominantly with energy efficient materials.
- Calculations involving basic factors in glass design.
- Optimization of Glass for waste reduction and standardisation of Design. Construction site/ green building visit report.

UNIT IV DESIGN WORKSHOPS I

15

- Analyzing and creating building using interactive modelling. Analyzing of sun path, solar exposure building orientation, daylight, acoustics, site shadow analysis.

- Analysis of thickness for safety, consideration of aesthetics, economy, optimization and wastage, air- conditioning load calculations and payback analysis.

TOTAL PERIODS 60

TEXT BOOK

1. Christian Schittich, 'Glass Construction Manual', Birkhauser Basel, 2007.
2. 'Architectural Glass Guide', Federation of Safety Glass, 2013.

REFERENCES

1. 'LEED 2011 For India - Green Building Rating System', Indian Green Building Council, 2011
2. 'Energy Conservation Building Code. User Guide', Bureau of Energy Efficiency, 2009.
3. 'IS 875 (Part -3) Reaffirmed 1997. Code of Practice for Design loads', Bureau of Indian Standards, 1998.
4. 'IS 7883. Code of Practice for the Use of Glass in Buildings', Bureau of Indian Standards, 2013.
5. Training Manuals & E- Learning, Glass Academy

Cos/POs MAPPING'

COs	Program Outcomes (POs)							
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
1	1	2	-	1	-	-	-	-
2	1	2	-	1	-	-	-	-
3	1	2	-	1	-	-	-	-
4	1	2	-	1	-	-	-	-
5	1	2	-	1	-	-	-	-

Correlation Level: 1 - Low, 2 - Medium, 3 - High

OBJECTIVES

- To introduce the design potential of steel as a material in building construction and its inherent structural benefits.
- To inform about the various components of steel as structural and aesthetic design through case studies.
- To provide familiarity with the best practices of steel as a construction material.

COURSE OUTCOME

After Completion of the Course, the Students will be able to

CO1 - To Understand of steel as a structural material in design and construction practice. **(K1,K2).**

CO2 -To Understand of steel as a functional material in design and construction practice. **(K1,K2).**

CO3 -To Understand of steel as an aesthetic material in design and construction practice. **(K1,K2).**

CO4 -To Understand of steel as sustainable material in design and construction practice. **(K1,K2).**

CO5 - To study on transformation of architectural design into fabricated materials. **(K1,K2).**

UNIT-I INTRODUCTION TO STEEL AS BUILDING MATERIAL

8

- Materiality of steel, structural properties of steel, advantages of steel in construction.
- History of metal in construction—Iron to Steel. Steel and tension. Industrialization and mass fabrication of steel.
- Casting of steel in historic and contemporary examples.
- Invention of hollow structural sections. Hot rolled steel shapes, various hollow structural sections.

UNIT - II STEEL IN HIGH TECH MOVEMENT, CONTEMPORARY ARCHITECTURE

10

- Introduction to High Tech movement.
- Understanding of various typologies of high-tech movement – Extruded, Grid/Bay, Diagrids, arched/ curved structures tensile.
- Advantages of diagrids over standard frames.
- Curved steel – creating curves in steel buildings, limitations in curving steel.
- Evolution of AESS (architecturally exposed structural steel) through High Tech movement.

UNIT III STRUCTURAL EXPRESSION OF STEEL

10

- Introduction to AESS (architecturally exposed structural steel), standard structural steel versus AESS. Factors that define AESS.
- Characteristics and categories of AESS.
- Connection types for AESS – bolted, welded and cast connections. Member types for AESS – Tubular and standard sections.
- Various steel frame design, basic connection strategies, basic understanding of steel floor systems, truss systems and braced systems.

UNIT IV SUSTAINABILITY, STEEL AND OTHER MATERIALS

9

- Introduction to steel as a sustainable material.
- Recycled, reuse and adaptive reuse of steel. Steel and glazing systems, support systems for glazing.
- Technical aspects of combining steel with glass. Various steel and glass envelope

- systems - curtain wall system, wind braced support systems, cable net walls, spider steel connections with structural glass, simple and complex cable systems.
- Handling curves and lattice shell construction. Advanced framing system – Steel and Timber. Low carbon design strategies.

UNIT V FABRICATIONS, ERECTION AND IMPLICATIONSONDESIGN

8

- Study on transformation of architectural design into fabricated elements.
- Study of process profile through case studies. Role of physical and digital models in fabrication. Steel in temporary/ exhibit buildings.
- Need for corrosion and fire protection. Various finishes and coating systems of steel.
- Detailed study on corrosion protection and fire protection systems.
- Transportation, site issues and erection onsite.
- Erection of beams and columns.
- Effects of climate and weather on erections. Other issues relating to practical implication of design onsite.

TOTALPERIODS

45

TEXT BOOK

1. TerrimeyerBuake, 'Architectural Design in Steel', SPON,2004.
2. Peter Silver et al, 'Structural Engineering for Architects', Laurence King,2013.

REFERENCES

1. Victoria Ballard Bell & Patrick J Rand; 'Materials for Architectural Design', Lawrence King,2006.
2. Ettinger J. Van et all(Editors), 'Modern Steel Construction in Europe',Elsevier,1963.
3. Leonardo Benevolo, 'History of Modern Architecture Vol 1 &2', Reprint, MIT Press, 1977.
4. 'Handbook of Steel Construction', Canadian Institute of Steel Construction,2010.
5. John Leckie, 'Steel and Other Materials', Canadian Institute of Steel Construction, 2007.
6. INSDAG Publications and Brochures.

Cos/POs MAPPING'

COs	Program Outcomes (POs)							
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
1	1	2	-	1	-	-	-	-
2	1	2	-	1	-	-	-	-
3	1	2	-	1	-	-	-	-
4	1	2	-	1	-	-	-	-
5	1	2	-	1	-	-	-	-

Correlation Level: 1 - Low, 2 - Medium, 3 - High

PROFESSIONAL ELECTIVE – IV

THEORY	CONTEMPORARY PROCESS IN ARCHITECTURAL DESIGN	L	T	P/S	C
U20EL0709		3	0	0	3

OBJECTIVES

- To introduce theories of media and its influence on the perception of space.
- To enable study of the various aspects of digital architecture and its exploration through emerging phenomena that relies on abstraction of ideas.
- To give understanding of the works of contemporary architects who have illustrated the influence of the digital media in architecture.

COURSE OUTCOME

After Completion of the Course, the Students will be able to

CO1-An understanding the works of Architect in contemporary process**(K1)**.

CO2 - An Ability to implement in digital architecture**(K1)**.

CO3 - Creating the diagram and schematic plans in design **(K1)(K2)**.

CO4 – An understanding different style in architecture **(K2)**

CO5 – An Understanding of contemporary materials and implementing in design**(K2)**

UNIT-I INTRODUCTION 7

- Investigation of contemporary theories of media and their influence on the perception of space and architecture.
- Technology and art.
- Technology and architecture.
- Digital technology and architecture.

UNIT - II ASPECT OF DIGITAL ARCHITECTURE 8

- Aspects of digital architecture. Design and computation.
- Difference between digital process and non- digital process.
- Architecture and cyberspace. Qualities of the new space.
- Issues of aesthetics and authorship of design. Increased Automatism and its influence.

UNIT III CONTEMPORARY PROCESS 10

- Emerging phenomena such as increasing formal and functional abstractions.
- Diagrams, diagrammatic reasoning, diagrams and design process.
- Animation and design. Digital hybrid.

UNIT IV GEOMETRIES AND SURFACES 9

- Fractal geometry.
- Shape grammar.
- Hypersurface.
- Liquid Architecture.
- Responsive architecture

UNIT V CONTEMPORARY PROCESS AND ARCHITECTURAL WORKS 11

- Ideas and works of architects related to contemporary processes. The architects to include Greg Lynn, Reiser + Umemotto, Lars Spuybroek/ NOX Architects, UN studio, Diller Scofidio Dominique Perrault, Decoi, Marcos Novak, Foreign Office Architects, Asymptote, Herzog and de Meuron, Neil Denari, Serie Architects, BIG Architects.

- Study to be undertaken in the form of assignments/discussions/seminars/presentations

TOTAL PERIODS 45

TEXT BOOK

1. Walter Benjamin, 'The Work of Art in the Age of Mechanical Reproduction', in Illuminations, Schocken Books, New York, 1969
2. Ignaci de Sola Morales, 'Differences: Topographies of Contemporary Architecture', MIT Press, 1997.
3. William J Mitchell, 'The Logic of Architecture: Design, Computation and Cognition', MIT Press, 1995.
4. Ali Rahim, 'Contemporary Process in Architecture', John Wiley & Sons, 2000.
5. Ali Rahim (Ed), 'Contemporary Techniques in Architecture', Halsted Press, 2002.
6. Peter Eisenmann; Diagram Diaries, Universe, 1999.
7. Grey Lynn, 'The Folded, The Pliant and The Supple, Animate form', Princeton Arch. Press, 1999.

REFERENCES

1. Gillian Hunt, 'Architecture in the Cyberspace II', John Wiley & Sons, 2001.
2. L. Convey et al, 'Virtual Architecture', Batsford, 1995.
3. Rob Shields (ed.), 'Cultures of the internet: Virtual Spaces, Real Histories, Living bodies', Sage, London, 1996.
4. John Beckman, 'The Virtual Dimension, Architecture, Representation and Crash Culture', Princeton Architecture Press, 1998.
5. William J Mitchell, City of Bits: Space, Place and the Infobahn', MIT Press, Cambridge, 1995.
6. Marcos Novak, 'Invisible Architecture: An Installation for the Greek Pavilion', Venice Biennale, 2000.

Cos/POs MAPPING'

COs	Program Outcomes (POs)							
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
1	1	2	-	1	-	-	-	-
2	1	2	-	1	-	-	-	-
3	1	2	-	1	-	-	-	-
4	1	2	-	1	-	-	-	-
5	1	2	-	1	-	-	-	-

Correlation Level: 1 - Low, 2 - Medium, 3 - High

THEORY		L	T	P/S	C
U20EL0710	ENERGY EFFICIENT ARCHITECTURE	3	0	0	3

OBJECTIVES

- To inform about the need to use alternative sources of energy in view of the depleting resources and climate change.
- To provide familiarity with simple and passive design considerations.
- To inform about the importance of day lighting and natural ventilation in building design.
- To create awareness of future trends in the design of sustainable built environment.

COURSE OUTCOME

After Completion of the Course, the Students will be able to

CO1- Knowledge of alternative sources of energy and passive design considerations. **(K1).**

CO2- An understanding of day lighting and natural ventilation in design **(K1).**

CO3- Familiarity with future trends in creating sustainable built environment **(K2).**

CO4- An understanding of Day lighting and Ventilation **(K2).**

CO5- An understanding of new trends in technology **(K2).**

UNIT-I PASSIVE DESIGN

10

- Significance of energy efficiency in the contemporary context.
- Simple passive design considerations involving site conditions, building orientation, plan form and building envelope.
- Heat transfer and thermal performance of walls and roofs.

UNIT - II PASSIVE HEATING

10

- Direct gain.
- Thermal storage of wall and roof.
- Roof radiation trap.
- Solarium.
- Isolated gain.

UNIT III PASSIVE COOLING

8

- Evaporative cooling.
- Nocturnal radiation cooling.
- Passive desiccant cooling.
- Induced ventilation.
- Earth sheltering.
- Wind tower.
- Earth air tunnels.

UNIT IV DAY LIGHTING AND NATURAL VENTILATION

7

- Daylight factor.
- Daylight analysis.
- Daylight and shading devices.
- Types of ventilation.
- Ventilation and building design

UNIT V CONTEMPORARY AND FUTURE TRENDS

10

- Areas for innovation in improving energy efficiency such as photo voltaic cells, battery technology, thermal energy storage, recycled and reusable building materials, nanotechnology, smart

materials, energy conservation building code

TOTALPERIODS 45

TEXT BOOK

1. 'Manual on Solar Passive Architecture', IIT Mumbai and Mines New Delhi,1999.
2. Arvind Krishnan et al, 'Climate Responsive Architecture a Design Handbook for Energy Efficient Buildings', Tata McGraw Hill Publishing Company Limited, New Delhi,2001.
3. MajumdarM, 'Energy-efficient Building in India', TERI Press,2000.
4. Givoni .B, 'Passive and Low Energy Cooling of Buildings', Van Nostrand Reinhold, New York,1994.

REFERENCES

1. Fuller Moore, 'Environmental Control Systems', McGraw Hill Inc, New Delhi,1993.
2. Sophia and Stefan Behling, 'SolpowerThe Evolution of Solar Architecture', Prestel, New York,1996.
3. Patrick Waterfield, 'The Energy Efficient Home: A Complete Guide', CrowoodpressLtd,2011.
4. Dean Hawkes, 'Energy Efficient Buildings: Architecture, Engineering andEnvironment', W.W. Norton & Company, 2002.
5. David Johnson and Scott Gibson, 'Green from the Ground Up: Sustainable, Healthy and Energy Efficient Home Construction', Taunton Press,2008.

Cos/POs MAPPING'

COs	Program Outcomes (POs)							
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
1	1	2	-	2	-	-	-	-
2	1	2	-	2	-	-	-	-
3	1	2	-	2	-	-	-	-
4	1	2	-	2	-	-	-	-
5	1	2	-	2	-	-	-	-

Correlation Level: 1 - Low, 2 - Medium, 3 - High

THEORY**ARCHITECTURAL CONSERVATION**

U20EL0711

L	T	P/S	C
3	0	0	3

OBJECTIVES

- To introduce the various issues and practices of conservation in architecture.
- To provide familiarity with the status of conservation in India and the various agencies involved in the field of conservation worldwide and their policies.
- To outline the status of conservation practice in the country and the various guidelines for the preservation, conservation and restoration of buildings.
- To inform about the character and issues in Indian heritage towns through case studies.

COURSE OUTCOME

After Completion of the Course, the Students will be able to

CO1- An understanding of the importance of heritage, issues and practices of conservation Through case studies **(K1)**.

CO2 - Familiarity with historic materials and their properties, different technologies for investigating masonry, foundation and also traditional and modern repair methods **(K1)**.

CO3- An understanding on analysis of traditional and modern methods. **(K1)(K2)**.

CO4- An Understanding and data collection of Heritage building **(K2)**.

CO5- An ability to analyze and documenting the historical building **(K2)**.

UNIT-I INTRODUCTION TO CONSERVATION**12**

- Understanding heritage.
- Defining conservation, preservation and adaptive reuse.
- Heritage conservation- need, debate and purpose.
- History of conservation movement.
- International agencies like ICCROM, ICOMOS, UNESCO and their role in conservation. Charters.
- Principles and ethics of conservation.

UNIT - II CONSERVATION IN INDIA**7**

- Museum conservation.
- Monument conservation and the role of ASI, SDA, INTACH.
- Central and state government policies and legislations.
- Inventories and projects.
- Selected case studies of sites such as Hampi, Golconda, Mahabalipuram.

UNIT III CONSERVATION METHODS AND MATERIALS**10**

- Investigation techniques and tools.
- Behavior of historic materials and structures.
- Problems with masonry, foundation.
- Repair methods, traditional and modern methods.
- Seismic retrofit, services additions and disabled access to historic buildings. Moisture and pollution problems.

UNIT IV CONSERVATION PRACTICE**7**

- Listing of monuments.
- Documentation of historic structures.
- Assessing architectural character.
- Historic structure report.
- Guidelines for preservation, rehabilitation and adaptive re-use of historic structures.
- Case studies of palaces in Rajasthan, dwellings in Chettinad and Swamimalai.
- Heritage site management.

UNIT V URBAN CONSERVATION AND CONSERVATION PLANNING**9**

- Understanding the character and issues of historic towns.
- Selected case studies. Historic districts and heritage precincts.
- Conservation as a planning tool.
- Financial incentives and planning tools such as TDR.
- Urban conservation and heritage tourism.
- Case studies of sites like Cochin, Pondicherry French town. Conservation project management.

TOTAL PERIODS 45**TEXT BOOK**

1. Bernard Fielden, 'Conservation of Historic Buildings', Architectural Press, 2003.
2. Bernard Fielden, 'Guidelines for Conservation - A Technical Manual', INTACH, 1989.
3. MS Mathews, 'Conservation Engineering', Universitat Karlsruhe, 1998.
4. J. Kirk Irwin, 'Historic Preservation Handbook', McGraw Hill, 2003.
5. Donald Appleyard, 'The Conservation of European Cities', M.I.T. Press, Massachusetts, 1979.
6. Publications of INTACH

REFERENCES

1. James M. Fitch, Historic Preservation: Curatorial Management of the Built World by University Press of Virginia; Reprint Edition, 1990.
2. Robert E. Stipe, 'A Richer Heritage: Historic Preservation in the Twenty-First Century', University of North Carolina Press, 2003.
3. B.P. Singh, 'India's Culture- The State, The Arts and Beyond', Oxford University Press, 2000
4. John H. Stubbs and Emily G Makas; Architectural Conservation in Europe and the Americas, John Wiley & Sons, 2011.
5. A.G. K. Menon (Ed), 'Conservation of Immovable Sites', INTACH Publication, N. Delhi.

Cos/POs MAPPING'

COs	Program Outcomes (POs)							
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
1	1	2	-	1	-	-	-	-
2	1	2	-	1	-	-	-	-
3	1	2	-	1	-	-	-	-
4	1	2	-	1	-	-	-	-
5	1	2	-	1	-	-	-	-

Correlation Level: 1 - Low, 2 - Medium, 3 - High

PROFESSIONAL ELECTIVE – V

THEORY		L	T	P/S	C
U20EL0712	ADVANCED STRUCTURES	3	0	0	3

OBJECTIVES

- To give an understanding of the loss of pre- stress and design requirements for determinate beams.
- To provide familiarity with the concept of industrial structures and high rise structures.
- To enable the study of concepts of tensile structures, domes, shells and folded plates

COURSE OUTCOME

After Completion of the Course, the Students will be able to

CO1 – Understand the concepts and applications of pre-stressed concrete. **(K1, K2)**

CO2 - Understanding the concepts and application of industrial structures. **(K1, K2)**

CO3- Understanding the concepts and systems used in skyscraper. **(K1, K2)**

CO4 - Familiarity with the theory and applications of tensile structures. **(K2, K3)**

CO5 - An understanding of shells, Domes and folded plates. **(K1, K2)**

UNIT-I PRESTRESSED CONCRETE 10

- Losses of Prestress.
- Design requirements.
- Design of determinate beams

UNIT - II INDUSTRIAL STRUCTURES 8

- Classification, planning and layout requirements, functional requirements.
- Types of industrial structures- power plants, bunkers and silos, cooling towers, containment structures, chimneys. Merits.

UNIT III HIGH-RISE BUILDINGS 7

- Introduction.
- Load action in high rise buildings
- Various structural systems. Waffle slab.
- Approximate analysis of frames for gravity and horizontal loadings

UNIT IV TENSILE STRUCTURES 10

- Concept, development, laws of formation, merits and demerits of pneumatic structures.
- Basic principles, forms, merits and demerits of cable structures.

UNIT V SHELLS, DOMES AND FOLDED PLATES 10

- Shells of translation.
- Shells of revolution.
- Classification of shells and different forms.
- Domes.
- Types of folded plates.
- Spaceframes.

TEXT BOOK

1. B.C.Punmia, 'Reinforced Concrete Structures, Vol.1&2', Laxmi Publications, New Delhi, 1994.
2. N. Subramanian, 'Principles of Space Structures', Wheeler, 1998.
3. Thandavamoorthy T.S, 'Advanced Structures of Architecture', Eswar Press, 2008.
4. Council on Tall Buildings and Urban Habitat, 'Structural System for Tall Buildings', McGraw Hill, 1995.
5. Milo.S.Ketchum and Mark.A. Ketchum, 'Types and Forms of Shell Structures', 1997.

REFERENCES

1. P. Dayaratnam, P.Sarah, 'Prestressed Concrete Structures', Medtech, 2017.
2. Wolfgang Schueller, 'High Rise Building Structures', John Wiley & Sons, 1976.
3. Frei Otto, 'Tensile Structures Volume 1 & 2' The MIT Press, 1973.
4. Bryan Stafford Smith, Alex Coull, 'Tall Building Structures - Analysis & Design', John Wiley, 1991.
5. Thomas Herzog, 'Pneumatic Structures', Crosby Lockwood Staples, London, 1977.
6. Bandyopadhyay J.N, 'Thin Shell Structures: Classical and Modern Analysis', New Age International, 2007.
7. Ramaswamy G.S, 'Design and Construction of Concrete Shell Roofs', CBS, 2005.

Cos/POs MAPPING'

COs	Program Outcomes (POs)							
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
1	1	2	-	2	-	-	1	-
2	1	2	-	2	-	-	1	-
3	1	2	-	2	-	-	1	-
4	1	2	-	2	-	-	1	-
5	1	2	-	2	-	-	1	-

Correlation Level: 1 - Low, 2 - Medium, 3 - High

THEORY	SUSTAINBLE ARCHITECTURE AND PLANNING	L	T	P/S	C
U20EL0713		3	0	0	3

OBJECTIVES

- To give an understanding of the concept of sustainability and sustainable development.
- To inform about issues like climate change, ecological foot print, etc.
- To provide familiarity with low impact construction practices, life cycle costs and alternative energy resources.
- To give exposure to the different rating systems for building practices with case studies.
- To enable understanding of the concept of sustainable communities and associated socio-economic dimensions through case studies

COURSE OUTCOME

After Completion of the Course, the Students will be able to

CO1 - An understanding of the concepts of ecosystem, carrying capacity, ecological footprint, sustainability and sustainable development. **(K1)**

CO2 - Awareness of emerging vulnerabilities of global warming and climate change and an understanding of the contribution of building industry towards the same. **(K1,K2)**

CO3 - Familiarity with approaches to achieving sustainable buildings and communities. **(K1,K2)**

CO4 - Knowledge of incentives and evaluation systems for green buildings. **(K2)**

CO5 - Awareness of sustainable cities. **(K1,K2)**

UNIT-I INTRODUCTION TO SUSTAINABILITY

7

- Concept of sustainability.
- Carrying capacity, sustainable development.
- Bruntland report.
- Ethics and visions of sustainability.
- Circles of sustainability.
- Sustainable economy and use.
- eco systems, food chain and natural cycles or cradle to cradle concept.

UNIT - II CLIMATE CHANGE AND SUSTAINABILITY

10

- Overview of climate change and its impact on a global and regional scale.
- Principles of energy systems.
- Energy crisis and global environment.
- Study on vernacular techniques and technological advancements in climate control in different climatic zones

UNIT III SITE AND SUSTAINABILITY

8

- Sustainable site selection and development.
- Introduction to Green building concepts.
- TERI, LEED, GIRHA and BREEAM. Ecology and sustainability.
- Different sources of energy, recyclable products and embodied energy.

UNIT IV SUSTAINABLE MATERIALS

10

- Selection of materials Eco building materials and construction.
- Low impact construction – bio mimicry, zero energy buildings, nanotechnology and smart materials.

UNIT V SUSTAINABLE CITIES

10

- Dimensions of sustainable community- social, cultural and economic factors.
- Urban ecology, urban heat island effects, smog etc.
- Case studies of eco city or communities.

TOTAL PERIODS 45

TEXT BOOK

1. Dominique Gauzin-Muller, 'Sustainable Architecture and Urbanism: Concepts, Technologies and Examples', Birkhauser, 2002.
2. Catherine Slessor, 'Eco-Tech: Sustainable Architecture and High Technology', Thames and Hudson 1997.
3. Ken Yeang, 'Ecodesign- A Manual for Ecological Design', Wiley Academy, 2006.

REFERENCES

1. Arian Mostaedi, 'Sustainable Architecture: Low Tech Houses', Carles Broto, 2002.
2. Sandra F. Mendler & William Odell, 'HOK Guidebook to Sustainable Design', John Wiley and Sons, 2000.
3. Richard Hyder, 'Environmental Brief: Pathways for Green Design', Taylor and Francis, 2007.
4. Brenda Vale and Robert Vale, 'Green Architecture: Design for a Sustainable Future', Thames and Hudson, 1996.

Cos/POs MAPPING'

COs	Program Outcomes (POs)							
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
1	1	2	-	-	-	-	-	-
2	1	2	-	-	-	-	-	-
3	1	2	-	-	-	-	-	-
4	1	2	-	-	-	-	-	-
5	1	2	-	-	-	-	-	-

Correlation Level: 1 - Low, 2 - Medium, 3 - High

THEORY**DISSERTATION****L T P/S C****U20EL0714****0 0 3****OBJECTIVES**

- To inculcate the spirit of research in architecture.
- To enable the acquisition of in-depth knowledge in a specific aspect/ issue in the discipline of architecture as well as develop perspectives on the same through reading, study, analysis and thought.
- To facilitate the development of a coherent line of thinking and express it through clear writing.
- To serve as prelude to Thesis.

COURSE OUTCOME

After Completion of the Course, the Students will be able to

CO1 - A dissertation report which is based on accepted norms of technical writing. **(K1,K2)**

CO2 - Ability to research deeply into a subject and develop a coherent line of thought based on point of view, observation, analysis and study. **(K3,K4)**

CO3 - Ability to look at architecture, history and design through ideas, texts and intent behind works. **(K2,K3)**

CO4 - Ability to involve research based on primary sources and secondary sources. **(K4,K5)**

CO5 - Ability to look at architecture from an informed, analyzed and well thought out critical perspective which would help strengthen the thesis process. **(K3,K4)**

CONTENT

- Design studio emphasizes on explaining and understanding architecture primarily through the mode of making. However, architecture as a field itself is driven by explicitly stated or implicitly understood ideas/ points of view of particular society and individuals. Dissertation offers an opportunity to look at architecture, history and design through ideas, texts and intent behind works.
- It involves process of observation, reflection and abstraction. Students are encouraged to choose any topic of their interest.
- Topics may range from analyzing the works of an architect, history, typological changes, writing, design process and many more. They could involve research based on primary sources in terms of doing actual field studies and/or secondary sources through reading.
- The dissertation proposal in about 1500 words stating the topic, issues to be explored and the scope must be submitted for approval. Work on the approved topic should start from the beginning of the semester and would be periodically reviewed. At the end of the semester, a well written report of a minimum 10,000 words should be submitted in the prescribed format, if any, provided by the University.
- The suggested structure for the report can be - outline/ background of the area of study, statement of objectives or research questions within the area of study, outline of methodology/ way to achieve the objectives or answer the questions of research, core section with necessary content such as documentation, analysis, arguments, etc., final conclusion. The report will be presented in the viva- voce exam and defended.

TOTAL PERIODS**90**

TEXT BOOK

1. Iain Borden and KaaterinaRuedi; 'The Dissertation: An Architecture Student's Handbook', Architectural Press,2000.
2. Linda Grant and David Wang, 'Architectural Research Methods', John Wiley Sons,2001

REFERENCES

1. Wayne C Booth, Joseph M Williams, Gregory G. Colomb, 'The Craft of Research', 2nd Edition, University of Chicago Press,2008.
2. Ranjith Kumar, 'Research Methodology- A Step by Step Guide for Beginners', Sage Publications,2005.
3. John W Creswell, 'Research Design: Qualitative, Quantitative and Mixed Methods Approaches', Sage Publications, 2002.

Cos/POs MAPPING'

COs	Program Outcomes (POs)							
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
1	1	2	-	1	-	-	3	-
2	1	2	-	1	-	-	3	-
3	1	2	-	1	-	-	3	-
4	1	2	-	1	-	-	3	-
5	1	2	-	1	-	-	3	-

Correlation Level: 1 - Low, 2 - Medium, 3 - High

PROFESSIONAL ELECTIVE – VI

THEORY	ARCHITECTURAL PHOTOGRAPHY AND JOURNALISM	L	T	P/S	C
U20EL0915		3	0	0	3

OBJECTIVES

- To introduce general skills necessary for the practice of professional journalism.
- To introduce the fundamentals of writing, explain different strategies and their criticism.
- To give particular exposure to architectural journalism.
- To introduce photojournalism, bring out importance/ contributions of photography in the architectural profession and to help develop proficiency in modern photography techniques.

COURSE OUTCOME

After Completion of the Course, the Students will be able to

CO1 - An ability to critically think and analyze about the effects of architecture on society as well as the tools to enable recording of the same **(K1,K2)**.

CO2 - An understanding of Equipment's like Camera and lenses **(K1,K2)**.

CO3 - An understanding of Journalism skills: research, reporting, writing, editing, criticism **(K1,K2)**

CO4 - An Discussions on topics needed in an architectural journal and current issues **(K1,K2)**

CO5 - An Exercise on integrating photography in architectural journalism **(K1,K2,K3)**

UNIT-I INTRODUCTION TOARCHITECTURALPHOTOGRAPHY

9

- General introduction to the art of photography; concept of color; concepts of lighting, distance, visual angle, frames media.
 - Technical definitions, types of lighting fixtures, types of flashes, controlling lighting levels with flash photography.
 - Color rendering in photographic medium, color rendering in photographs under different lighting condition, lighting colors and its effect on a photograph, color filters in a camera.
- Exercise in lighting photography with artificial light and black and white photos

UNIT - II PHOTOGRAPHIC TECHNIQUESANDCOMPOSITION

9

- 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

UNIT III JOURNALISM

9

- Introduction to journalism, key concepts and objectives of Journalism.
 - Specialized journalism: with emphasis on architectural journalism.
- Journalism skills: research, reporting, writing, editing criticism.

UNIT IV DISCUSSIONS ANDISSUES

9

- Regional, national and international discussion forums.
- Changes in contemporary and historical design practices.
- Discussions on topics needed in an architectural journal and current issues.
- Types of journals.
- Works of key architectural journalists.
- Public discourse on the internet.

- Mass media and public opinion.
- Critique on selected pieces of journalism.

UNIT V FIELDPROGRAM

9

- Exercise on integrating photography in architectural journalism.

TOTALPERIODS

45

TEXT BOOK

1. Julian Calder and John Garrett, The 35mm Photographer's Handbook, Pan Books, London 1999
2. Julie Adair King, Digital Photography for Dummies, COMDEX, New Delhi 1998
3. Professional photography –photographing buildings, David Wilson, Rotovision
4. Point view- The art of architectural photography, E. Manny A Ballan, VNR
5. Huckerby, Martin., The Net for Journalists: A Practical Guide to the Internet for Journalists in Developing Countries. UNESCO/Thomson Foundation/ Common wealth Broadcasting Association, 2005.
6. Ward, S. J. A. "Philosophical Foundations of Global Journalism Ethics." Journal of Mass Media Ethics., Vol. 20, No. 1, 3-21, 2005

REFERENCES

1. Martin Huckerby, 'The Net for Journalists: A Practical Guide to the Internet for Journalists in Developing Countries'. UNESCO/Thomson Foundation/ Common wealth Broadcasting Association, 2005.
2. S. J. A. Ward, 'Philosophical Foundations of Global Journalism Ethics', Journal of Mass Media Ethics, Vol. 20, No. 1, 3-21, 2005.
3. M. Heinrich, 'Basics Architectural Photography', Birkhauser Verlag AG, 2008.
4. Gerry Kopelow, 'Architectural Photography: The Professional Way', Princeton Architectural Press, 2007.

Cos/POs MAPPING'

COs	Program Outcomes (POs)							
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
1	1	2	-	-	-	-	-	-
2	1	2	-	-	-	-	-	-
3	1	2	-	-	-	-	-	-
4	1	2	-	-	-	-	-	-
5	1	2	-	-	-	-	-	-

Correlation Level: 1 - Low, 2 - Medium, 3 - High

THEORY	CONSTRUCTION AND PROJECT MANAGEMENT	L	T	P/S	C
U20EL0916		3	0	0	3

OBJECTIVES

- To introduce different management techniques suitable for planning and construction projects.
- To enable understanding of management systems for accomplishing the task efficiently in terms of quality, time and cost.

COURSE OUTCOME

After Completion of the Course, the Students will be able to

- CO1-** Ability to understand a project from concept to commissioning, feasibility study & facility programme, design, construction to commissioning **(K2)**
- CO2-** Ability to apply project management techniques in achieving objectives of a project like client needs, quality, time & cost. **(K2,K3)**
- CO3-** An understanding of principles of management, construction scheduling, scope definition and team roles. **(K2)**
- CO4-** An Understanding of Computerized Project Management in Field of Practicing. **(K1,K2)**
- CO5-** An Understanding of Real estate & regulatory strategies. **(K1,K2)**

UNIT-I INTRODUCTION TO PROJECT MANAGEMENT

7

- 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 chart, merits and demerits. CPM networks, merits and demerits. PERT network.
- Introduction to the theory of probability and statistics.

UNIT - II PROJECT PROGRAMMING AND CRITICAL PATH METHOD

11

- Project network, Event activity, Dummy, Network rules, Graphical guidelines for Network.
- Numbering the events Cycles.
- Development of network-planning for network construction.
- Models of network construction.
- Steps in development of network.
- Work break down structure Hierarchies.
- 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.

UNIT III RESOURCE PLANNING

7

- 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.

UNIT IV COMPUTERIZED PROJECT MANAGEMENT

11

- Creating a new project, building task.
- Creating resources and assessing costs, refining project.
- Project tracking, recording actual.
- Reporting on progress.
- Analyzing financial progress.

- Introduction to BIM..

UNIT V CONCEPT TO COMMISSIONING

9

- Project feasibility study.
- Real estate & regulatory strategies.
- Facility programming and planning.
- Design management.
- EPC. testing & commissioning.

TOTAL PERIODS 45

TEXT BOOK

1. Dr. B.C. Punmia and K.K. Khandelwal, 'Project Planning and Control with PERT and CPM', Laxmi Publications, 2018.
2. Elaine Marmel, 'Microsoft Project 2010 Bible', Wiley, 2010.
3. Sam Kubba, 'Green Construction Project Management and Cost Oversight', Elsevier, 2010

REFERENCES

1. Jerome D. Wiest and Ferdinand K. Levy, 'A Management Guide to PERT/CPM', Prentice Hall of India, 1982.
2. Bert Bielefeld, 'Basics Project Management Architecture', Birkhauser, 2013.

Cos/POs MAPPING'

COs	Program Outcomes (POs)							
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
1	1	2	-	1	-	-	-	-
2	1	2	-	1	-	-	-	-
3	1	2	-	1	-	-	-	-
4	1	2	-	1	-	-	-	-
5	1	2	-	1	-	-	-	-

Correlation Level: 1 - Low, 2 - Medium, 3 - High

THEORY	EARTHQUAKE RESISTANT ARCHITECTURE	L	T	P/S	C
U20EL0917		3	0	0	3

OBJECTIVES

- To enable an understanding of the fundamentals of earthquake and the basic terminologies.
- To give basic knowledge of earthquake resistant design concepts.
- To provide familiarity with design codes and building configuration
- To enable understanding of the different types of construction details to be adopted in a seismic prone area.
- To give knowledge for applying earthquake resistant principles in an architectural design project.

COURSE OUTCOME

After Completion of the Course, the Students will be able to

CO1- Ability to understand the formation and causes of earthquakes **(K1,K2)**.

CO2- An understanding of the factors to be considered in the design of buildings and services to resist earthquakes **(K2)**

CO3- Seismic design and detailing of masonry structures, wood structures, earthen structures. Seismic design and detailing of RC and steel buildings **(K1,K2, K3)**

CO4- An Understanding of Seismic design and detailing of Construction techniques **(K1,K2)**.

CO5- An Understanding of design for earthquake resistance involving institutional masonry building with horizontal spread and height restriction **(K1,K2)**

UNIT - I FUNDAMENTALS OF EARTHQUAKES 7

- Earth's structure, seismic waves, plate tectonics theory, origin of continents, seismic zones in India.
- Predictability, intensity and measurement of earthquake.
- Basic terms- fault line, focus, epicenter, focal depth etc.

UNIT - II SITE PLANNING, PERFORMANCE OF GROUND AND BUILDINGS 10

- Historical experience, site selection and development.
- Earthquake effects on ground, soil rupture, liquefaction, land slides.
- Behavior of different types of building structures, equipment's, lifelines, collapse patterns.
- Behavior of non-structural elements like services, fixtures in earthquake-prone zones

UNIT III SEISMIC DESIGN CODES AND BUILDING CONFIGURATION 10

- Seismic design code provisions.
- Introduction to Indian codes.
- Building configuration - scale of building, size, horizontal and vertical plane, building proportions, symmetry of building - torsion, re-entrant corners, irregularities in buildings like short storeys, short columns, etc.

UNIT IV DIFFERENT TYPES OF CONSTRUCTION DETAILS 11

- Seismic design and detailing of masonry structures, wood structures, earthen structures. Seismic design and detailing of RC and steel buildings.
- Design of non-structural elements - architectural elements, water supply, drainage, electrical and mechanical components.

UNIT V URBAN PLANNING AND ARCHITECTURAL DESIGN 7

- Vulnerability of existing buildings, facilities planning, fires after earthquake, socio-economic impact after earthquakes.
- Conceptual design for earthquake resistance involving institutional masonry building with horizontal spread and height restriction, multistoried RC framed apartment/commercial building.

TEXT BOOK

1. 'Guidelines for earthquake resistant non-engineered construction', National Information centre of earthquake engineering (NICEE, IIT Kanpur, India), 2004.
2. C.V.R Murthy, Andrew Charlson, 'Earthquake Design Concepts', NICEE, IIT Kanpur, 2006.
3. Agarwal.P, 'Earthquake Resistant Design', Prentice Hall of India, 2006.

REFERENCES

1. Ian Davis, 'Safe Shelter within Unsafe Cities: Disaster Vulnerability and Rapid Urbanization', Open House International, UK, 1987
2. 'Socio-economic developmental record'- Vol.12, No.1, 2005.
3. Mary C. Comerio, Luigia Binda, 'Learning from Practice- A Review of Architectural Design and Construction Experience after Recent Earthquakes', Joint USA-Italy workshop, Oct.18-23, 1992, Orvieto, Italy.

Cos/POs MAPPING'

COs	Program Outcomes (POs)							
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
1	1	2	-	1	-	-	-	-
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3	1	2	-	1	-	-	-	-
4	1	2	-	1	-	-	-	-
5	1	2	-	1	-	-	-	-

Correlation Level: 1 - Low, 2 - Medium, 3 - High