SRM UNIVERSITY
(Under section 3 of UGC Act 1956)

M.ARCH REGULATIONS, CURRICULUM AND SYLLABUS – 2016

(FULL TIME)

(For students admitted from the academic year 2016-17 onwards)

SCHOOL OF ARCHITECTURE AND INTERIOR DESIGN
FACULTY OF ENGINEERING AND TECHNOLOGY
SRM UNIVERSITY
SRM Nagar, Kattankulathur – 603 203
Tamil Nadu, India

INDEX TO REGULATIONS

MASTER OF ARCHITECTURE – (FULL TIME) Regulation 2016

PRELIMINARY DEFINITIONS AND NOMENCLATURE

In these regulations, unless in context otherwise required.

1. "Programme" means M.Arch Degree Programme.
2. "Course" means a theory or practical subject that is normally studied in a Semester.
3. "Faculty" means a Faculty of the University, like Faculty of Civil Engineering, Faculty of Technology, etc.
4. "Faculty Adviser" means a teaching member of the Department who advises a set of students on academic and other matters.
5. University means SRM UNIVERSITY

R.1.0 Admission

R.1.1 The number of seats in M.ARCH (FT) programme for which admission is to be made in the Faculty of Engineering and Technology will be decided by the Board of Management of SRM University & Council of Architecture.

R.1.2 Eligibility Minimum academic qualifications required for Master's Degree programme is 50% marks in aggregate in a Bachelor of Architecture degree course or equivalent of any University or authority recognized by the council of Architecture as equivalent thereto.

R.1.3 The eligibility criteria as well as the criteria to be satisfied to apply for direct admission in any year will be decided by the Admission Committee and forwarded to the applicants along with the relevant application forms.

R.1.4 The Admission Committee will prepare a merit list. According to the merit list the Committee will offer admissions through counseling taking into account the available seats.

R.1.5 **(i)** The minimum percentage of marks / CGPA will beas prescribed by the University in para R.1.2. The criteria will be set out in an information brochure and forwarded to the applicants along with the relevant application forms. The qualifying degree should be from a university recognized by this university**.**

(ii) Candidates should submit at the time of admission the necessary certificates of the qualifying degree examinations.

(iii) At the time of admission, a candidate should have appeared / passed in the final examination of the qualifying examinations

R.1.6 Notwithstanding the above, the actual admissions will be based on the rules and regulations of the competent authorities. Candidates have to fulfill the medical standards required for admission as set out by the Admission Committee.

R.1.7 The selected candidate will be admitted to the M.ARCH (FT) programme after he / she fulfills all the admission requirements as indicated in the letter of admission after payment of the prescribed fees.

R.1.8 In the matter of admission to the M.ARCH (FT) programme the decision of the Admission Committee is final.

R.1.9 If, at any time after admission, it is found that a candidate has not fulfilled all the requirements stipulated in the offer of admission, the Director of Faculty of Engineering and Technology/ Dean of School of Architecture And Interior Design may revoke the admission of the candidate and report the matter to the Vice Chancellor.

R.2.0 Structure of the M.ARCH (FT) Programme

R.2.1 M.ARCH (FT) programme will have a curriculum and course contents (Syllabi) for the courses approved by the Academic Council.

R.2.2 The curriculum of M.Arch programme is designed, such that the minimum prescribed credits required for the award of the degree is **72 credits**.

R.2.3 The electives from the curriculum are to be chosen by the students and will be offered, subject to minimum registration.

R.2.4 The medium of instruction, examination will be in English.

R.3.0 Faculty Adviser

R.3.1 To help the students in planning their courses of study and for getting general advice on the academic programme, a certain number of students will be assigned to a Faculty adviser.

R.4.0 Class Committee

R.4.1 Every class (comprising of sections) of the M.ARCH (FT) will have a Class Committee consisting of faculty and students. The class committees for the School/Department programmes of each semester will be constituted by the Head of the concerned School/ Department.

R.4.2 The constitution of the Class Committee for the School/ Department programmes of each semester will include the following members:

a. All the course instructors of that programme

b. Two students of the class to be chosen by the students of the class.

c. A senior faculty member, preferably a professor, of the concerned School/Department, preferably not associated with teaching of the class, to be nominated by the concerned Head of the School/Department, to act as the chairperson of the Class Committee

R.5.0 Registration and Enrollment

R.5.1 The process of signing up for courses is called registration. Students are enrolled after they pay the prescribed fees. For a student to attend classes he has to complete both registration and enrollment. All students shall formally register for the courses every semester to undergo course work.

R.5.2 Registration of any course will be controlled by the concerned Head of the department. Except for the first semester, the registration for a semester will be done during a specified week before the end-semester examination of the previous semester. For the first semester registration shall be completed within a week after the commencement of classes. Late registration will be permitted with a fine, decided time to time, up to two weeks from the last date specified for registration.

R.5.3 The registration sheet contains the course number, course name, number of credits and category for each course taken in that semester. The student will make the choice of course (in case of elective courses) in consultation with his/her Faculty Adviser.

R.6.0 Registration / Enrollment Requirement

R.6.1 If a student finds his/her load heavy in any semester, or for any other valid reason, he/she may drop the course(s) within two weeks of the commencement of the semester with the written approval of his / her Faculty Adviser and Head of the School/Department.

R.7.0 Compensatory Courses

R.7.1 Compensatory courses are meant for students who, due to some unavoidable reasons, have not earned 75% attendance during the normal course of study and are detained from appearing in the end semester examination. These courses offer an opportunity for the students to have necessary teaching input which they may have missed out.

R.7.2 Compensatory courses may be announced by a School/Department, by the Deans/HODs, with the approval of the Director (Engg & Tech). The course will be conducted during the regular academic session either during the weekends or in the evenings after the regular classes as

decided by the Director (Engg & Tech) and the number of hours that will be conducted will be 75% of the hours specified in the curriculum for a course. Maximum two courses will be permitted to a student during the semester and the student has to have at least 75% attendance in these courses.

The evaluation process for compensatory courses consists of only end semester examinations and no internal assessment process.

Student shall have to score the passing minimum in the end semester examination only and full weightage will be given to marks scored thereof.

Courses will be offered by the departments only to students detained for lack of attendance in those courses (Grade I, R.11.0). No student should register for more than two compensatory courses offered during a semester and totally not more than 6 courses in the normal duration of study.

R.7.3 Compensatory courses will be announced after the publication of results of end semester examinations of odd/even semester and the conduct of these courses will not go beyond the last working day of the semester. A student will have to register within the time stipulated in the announcement, by paying the prescribed fees.

R.7.4 No student who has got 'I' grade in a particular course can appear for end semester examinations for that course without undergoing the compensatory classes for that course.

R.7.5 Withdrawal from Compensatory courses is not permitted.

R.7.6 Student who has obtained F grade in a course shall not register for compensatory courses.

R.8.0 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 M.ARCH (FT) programme in four semesters. However a student may complete the programme at a slower pace by taking more time but in any case not more than 6 semesters under regular programme excluding semesters withdrawn on medical grounds etc. as per R.9.1.

Programme	Min. No. of Semesters	Max. No. of Semesters
M.Arch.(FULL TIME)	4	8

R.9.0 Temporary withdrawal from the programme

R.9.1 A student may be permitted by the Director (Engg&Tech) to withdraw from the programme for a semester or longer for reasons of ill health or other valid reasons. Normally a student will be permitted to discontinue from the programme only for a maximum continuous period of two semesters.

R.10.0 Discipline:

R.10.1 Every student is required to maintain discipline and decorous behavior both inside and outside the University campus and not to indulge in any activity that will tend to bring down the prestige of the University.

R.10.2 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 Director (Engg&Tech), and he will refer it to the Discipline and Welfare Committee of the University, constituted by the Vice Chancellor.

The Committee will enquire into the charges and recommend suitable action if the charges are substantiated. The Director (Engg&Tech) will take appropriate action on the recommendation of the Discipline and Welfare Committee.

R.10.3 Director (Engg&Tech) may suspend a student pending inquiry depending upon the prima facie evidence.

R.10.4 Appeal: The student may appeal to the Vice Chancellor whose decision will be final and binding.

R.11.0 Attendance

R.11.1 Attendance is the physical presence of the student in the class. It is a well-observed fact that the students who score good grades are those who attend the classes regularly. Therefore, the students must strive to attend all the classes without fail.

R.11.2 Every teaching staff member handling a class will take attendance till 3 calendar days before the last instruction day in the semester. The percentage of attendance, calculated up to this point, will be indicated by a letter code as follows:

Attendance-Rounded	Code
95% and above	H
85 to 94%	9
75 to 84%	8
Below 75%	L

R.11.3 A student must maintain an attendance record of at least 75% in individual courses. Without the minimum attendance of 75%, in any course, students become ineligible to write the end semester examination in that course. His / Her registration for that course will be treated as cancelled, and he/she shall be awarded 'I' grade (I stands for registration cancelled for want of minimum attendance) in that course. This grade shall appear in the grade card until the course is successfully completed.

The student should register for and repeat the course when it is offered next.

R.11.4 The minimum attendance requirement of 75% allows a student the facility to use the balance 25% to account for illnesses, permitted assignments such as job interviews, inter university sports meets, inter-collegiate/inter-university competitions, accidents, unforeseen emergencies etc. An attendance of 75% in a course (except in cases governed by R.11.6) is considered to be the minimum required for a student to get just enough input on the course syllabus through class room contact hours to make him / her eligible to appear in the end semester examination for that course.

R.11.5 The teacher shall announce the particulars of all students who have attendance less than 75% in that course in the class. Copies of the same should also be sent to the Director Engg&Tech), and Heads of Schools/ Departments concerned. The students who have less than 75% attendance will not be permitted to sit for the end semester examination.

R.11.6 Condonation of Attendance: In rare and genuine cases, a committee will examine the case and recommend suitably to the Director who may give condonation of attendance in deserving cases but in any case not more than 10%.

R.12.0 Assessment Procedure and System of Tests

R.12.1 The complete academic performance of a student is evaluated internally by the concerned course instructors / departments except the project work which will have an evaluation component by external examiners.

R.12.2 The student's performance in each course, in general, is evaluated based on in-semester assessment (internal marks) and end semester examinations.

R.12.3 The assessment method is further detailed below:

Theory Courses:

a) Cycle test 1 — 10 Marks
b) Cycle test 2/Seminar — 10 Marks
c) Model Examination — 10Marks
d) End semester Examination — 70 Marks
e) Duration of the examination: — 3 Hours

R.12.4 Design Studio Courses:

Assessment tool	Weight age	Split up of marks		
Project				
Total in-semester assessment	**50 marks**	Concept	Design Development	Presentation
		15	20	15
End semester viva/voce	**50 marks**	Concept	Design Development	Presentation
		15	20	15

R.12.5 Computer lab:

Assessment tool	Weight age	Remarks		
Continuous assessment of plates	50 marks	No. of plates done during the session will be evaluated.		
Total in-semester assessment	**50 marks**			
End semester Viva/Voce	**50%**	Practical Examination evaluated by the External Examiner. Duration of the examination 3 hours		
		Drafting	Rendering & Material application	Viva
		15	25	10

R.12.6 Dissertation:

Assessment tool	Weightage	Remarks		
Review 1	10 marks			
Review 2	10 marks			
Review 3	10 marks			
Review 4	10 marks			
Internal Review	10 marks			
Total in-semester assessment	**50 marks**			
End semester viva/voce	**50 marks**	**Split up of marks**		
		Concept	Design Development	Presentation
		15	20	15

Total in semester assessment 30 marks
End semester examination: 70 marks (Duration of Examination 3 hours)

R.13.0 DISSERTATION:

R.13.1 A candidate is permitted to enroll for the thesis project (Dissertation) if he/she has earned a minimum of 42 credits up to the end of third semester for full time. If the candidate has not earned the requisite minimum credits he/she has to complete the arrears and then enroll for the thesis project in the subsequent year

R.13.2 Dissertation shall be carried out under the supervision of a Faculty Member in the concerned Department.

R.13.3 Dissertation shall be pursued for a minimum of 16 weeks during the final semester.

R.13.4 Dissertation report/Drawings prepared according to approved guidelines and duly signed by the Supervisor(s) and the Head of the Department/Director of the School shall be submitted to the Dean of the Faculty.

R.13.5 If a candidate fails to submit the dissertation on or before the specified deadline, he/she is deemed to have failed in the Dissertation and shall re-enroll the same in a subsequent semester.

R.13.6 Student who has acquired the minimum number of total credits prescribed in the Curriculum for the award of the M.Arch will not be permitted to register for more courses to improve his/her cumulative grade point average.

R.13.7 The medium of instruction, examination, seminar and project/thesis/dissertation reports will be English.

R.14.0 End Semester Examination

R.14.1 There will be one end semester examination for courses categorized under R.12.3. to R. 12.6.

R.14.2 The examinations at the end of a particular semester will be conducted for the courses of all odd and even semesters.

R.14.3 A student should have appeared for the end- semester examination of the prescribed courses falling under R. 12.3. to R. 12.6 and appeared for the final viva voce examination for the project work (R.12.6) to become eligible for the award of the grade in the respective courses.

R.15.0 Reappearance in end Semester Examination

R.15.1. Students who have secured 'F'or 'Ab' or 'I' grade in a particular course can reappear when the end semester examination for that course is again conducted provided they satisfy other eligibility conditions such as lack of attendance overcome by attending Compensatory courses (R.7.0) and minimum credit / appearance in end semester examinations requirements (R. 6.0), Temporary withdrawal from the programme (R.9.0) and Discipline (R.10.0).

R.15.2. Students who have secured F, Ab or I grade in a courses with practical component shall appear in the end semester examinations of both the theory and practical components.

R.16.0 Course Wise Grading of Students

R.16.1 Letter Grades and Grade Points (GP)

Based on the semester performance, each student is awarded a final letter grade at the end of the semester in each Course. The letter grades and the corresponding grade points are as follows:

Letter Grade	Grade Points	Remarks
O (Outstanding)	10	-----
A+ (Excellent)	9	-----
A (Very Good)	8	-----
B+ (Good)	7	-----
B (Above average)	6	-----
C (Average)	5	-----
P (Pass)	4	-----

Letter Grade	Grade Points	Remarks
F (Fail)	0	<50 Failure due to insufficient marks in the course
Ab (Absent)	0	Failure due to non-appearance in the examination
I (Incomplete)	0	Failure due to insufficient attendance in the course.

R.16.2 A student is considered to have completed a Course successfully or achieved a pass grade and earned the credits if he secures a letter grade other than F or Ab or I in that Course. A letter grade F or Ab or I in any Course implies a failure in that Course.

R.16.3 A Course successfully completed cannot be repeated.

R.16.4 If a student gets a fail grade (F/Ab/I) in a course with both theory and practical components, then he/she has to reappear in the end semester examinations of both.

R.16.5 If a student obtains "F"/"Ab" grade in a course in the first three attempts, from fourth attempt onwards, full weightage (100%) shall be assigned to marks scored in the end semester examinations and the internal assessment marks they have scored during the regular course of study will be ignored. The first attempt is that which corresponds to the first registration for the course. If a student gets I or Ab grade in an attempt that is also treated as an attempt.

R. I7.0 Method of Awarding Letter Grades.

R.17.1 The internal marks awarded to the students are first normalized and combined with the normalized marks of end semester examination. Subsequently letter grades are awarded for the normalized marks as indicated below:

Letter Grade	Grade Points	Normalized Mark range
O (Outstanding)	10	95-100
A+ (Excellent)	9	90-94
A (Very Good)	8	85-89
B+ (Good)	7	75-84
B (Above average)	6	65-74
C (Average)	5	55-64
P (Pass)	4	50-54
F (Fail)	0	<50 Failure due to insufficient marks in the course

Letter Grade	Grade Points	Normalized Mark range
Ab (Absent)	0	Failure due to non-appearance in the examination
I (Incomplete)	0	Failure due to insufficient attendance in the course.

The detailed methodology of normalization of internal marks as well as marks in the end-semester examinations shall be formulated by the Controller of Examinations. Grades "I" and "Ab" will be as per R. 15.1

R.17.2 To pass in a course with earnable credits a student has to score a minimum of 50% of the total normalized marks secured in both the internal and end semester examination.

R.18.0 Declaration of Results

R.18.1 Controller of Examinations assign letter grade and announces the results based on the absolute marks obtained in each courses.

R.18.2 The "I" grade once awarded stays in the record of the student and is deleted when he/she completes the course successfully later. The grade acquired by the student will be indicated in the grade card of the appropriate semester with an indication of the month and the year of passing of that course.

R.18.3 "F" grade obtained by a student will be deleted in the grade card once that course is successfully completed. The pass grade acquired by the student will be indicated in the grade card of the appropriate semester with an indication of the month and the year of passing.

The CGPA will be accordingly revised.

R.19. 0 Re-View of answer scripts

R.19.1 In case any student feels aggrieved on the final outcome of the assessment in any course, the student shall apply to the Controller of Examinations, along with the prescribed fee, for the review of end semester examination answer script, within the stipulated time after the announcement of the results of the examinations. The COE shall facilitate the review of the answer script jointly to be carried out by the student and the faculty detailed for this purpose. If any discrepancy is noticed during review the same shall be rectified and the originally awarded grade accordingly amended.

R.20.0 Course Repetition

R.20.1 A student securing 'F 'or 'Ab' or 'I' grade in a core course has to compulsorily get a pass grade for the award of degree.

A student securing 'F' or 'Ab' or 'I' grade in an elective course has the following options:

(i) He/she may reappear and pass the course in case of F or Ab grade or register for compensatory course and pass in case of I grade.

(or)

(ii) He/she may opt for another elective in place of the elective in which he/she did not get a pass grade and achieve a pass in it.

An elective course with grades O to P cannot be withdrawn.

R.20.2 A course successfully completed cannot be repeated.

R.21.0 Grade Card

R.21.1 The grade card issued by the Controller of Examinations at the end of the semester to each student will contain the following:

a) The credits for each course registered for that semester.
b) The letter grade obtained in each course.
c) The attendance code in each course.
d) The total number of credits earned by the student up to the end of that semester in each of the course categories.
e) The Cumulative Grade Point Average (CGPA) of all the courses taken from the first semester.

R.21.2 (i) The SGPA will be calculated according to the formula

$$\text{SGPA} = \frac{\sum_1^n C_i \times (GP)_i}{\sum_1^n C_i}$$

Where C_i = credit for the i^{th} course, $(GP)_i$ = the grade point obtained for the i^{th} course (refer R.16.1) , n = total number of courses and the sum is over all the courses taken in that semester, including those in which the student has secured F, Ab and Igrades.

(ii) For the cumulative grade point average (CGPA) following formula is used:

$$\text{CGPA} = \frac{\sum_1^r S_i \times (SGPA)_i}{\sum_1^r S_i}$$

Where S_i = Sum of credits in i^{th} semester, $(SGPA)_i$ = Semester Grade Point Average earned in i^{th} semester and r = number of semesters and the sum is over all the semesters under consideration.

(iii). The SGPA and CGPA shall be rounded off to 2 decimal points and reported in the transcripts.

R.21.3 Class/Distinction will be awarded to the students after they successfully complete the M.ARCH (FT) programme as per the norms stipulated in the following table:

Regular students

Category	CGPA (From I-IV semesters)	Class / Distinction
Students who successfully complete the M.ARCH(FT)programme within the time duration of 4 semesters (R.8.0)	≥ 4 & < 5.5	Pass
	≥ 5.5 & < 6	Second Class
	≥ 6 & < 8.5	First Class
	≥ 8.5 (without F, Ab or I or temporary withdrawal-R.7.0 in any Semester)	First Class with Distinction
	≥ 8.5 (with F, Ab or I in any Semester but obtained pass grade (O to P) subsequently)	First Class
	≥ 4 & < 5.5	Pass
	≥ 5.5 & < 6	Second Class
	≥ 6	First Class
Students who cannot complete the M.ARCH (FT) program in 4 semesters but complete it successfully within the time duration of 5 semesters. (R.8.0)	≥ 4 & < 5.5	Pass
	≥ 5.5 & < 6	Second Class
	≥ 6	First Class
Students who cannot complete the M.ARCH(FT)program in 5 semesters but complete it successfully within the time duration of 8 Semesters(R.8.0)	≥ 4 & < 10	Pass

R.22.0 Eligibility for Award of the M.ARCH (FT). Degree

R.22.1 A student shall be declared to be eligible for the award of the M.ARCH (FT) degree if he/she has

a) Registered and successfully completed all the courses and projects as per the curriculum.

b) Successfully acquired the minimum required credits as specified in the curriculum corresponding to the branch of his/her study within the stipulated time duration.
c) No disciplinary action pending against him/her

R.23.0 Change of Regulations

R.23.1 The academic council of SRM University may from time to time revise, amend or change the regulations, scheme for examinations and syllabi if found necessary.

M.ARCH (ARCHITECTURAL DESIGN) – CURRICULUM

FIRST SEMESTER

CODE	SUBJECT TITLE	L	T	P	C
16AR6001	Contemporary processes in Architecture	3	-	-	3
16AR6003	GIS and Remote Sensing	2	1	-	2
16AR6005	Advanced structural systems	2	1	-	2
16AR6007	Urban design	3	-	-	3
	STUDIO COURSES				
16AR6009	Advanced Computer Studio -I	-	-	8	4
16AR6011	Design studio - I - Urban Infrastructure projects	-	-	12	6
	Total	10	2	20	20

SECOND SEMESTER

CODE	SUBJECT TITLE	L	T	P	C
16AR6002	High Rise buildings	3	-	-	3
	Elective -I	2	1	-	2
16AR6004	Architectural Conservation	3	-	-	3
16AR6006	Intelligent Building systems	2	1	-	2
	STUDIO COURSES				
16AR6008	Advanced Computer Studio -II	-	-	8	4
16AR6010	Design studio – II - Intelligent Building systems / High rise buildings	-	-	12	6
	Total	10	2	20	20

THIRD SEMESTER

CODE	SUBJECT TITLE	L	T	P	C
16AR7001	Environmental Strategies	3	-	-	3
	Elective - II	2	1	-	2
16AR7003	Real Estate Management	3	-	-	3
16AR7005	Sustainable development and technologies	2	1	-	2
	STUDIO COURSES				
16AR7007	GIS Studio	-	-	8	4
16AR7009	Design studio – III - Environmental planning and Design	-	-	12	6
	Total	10	2	20	20

FOURTH SEMESTER

CODE	SUBJECT TITLE	L	T	P	C
16AR7010	Dissertation	-	-	12	12
	Total	-	-	12	12

LIST OF ELECTIVES

CODE	SUBJECT TITLE	L	T	P	C
	Elective - I				
16AR6012	New age materials and construction	2	1	-	2
16AR6014	Computer Aided Structural Design	2	1	-	2
16AR6016	Landscape Construction	2	1	-	2
	Elective - II				
16AR7011	Vernacular building traditions	2	1	-	2
16AR7013	Bio-architecture	2	1	-	2
16AR7015	Financial Management	2	1	-	2

TOTAL NUMBER OF CREDITS 72

SCHEME OF EXAMINATION

Course	Duration In Hours	Internal Marks	External Marks	Total
Theory Courses	3 hrs.	30	70	100
Studio courses	Not Applicable	50	50	100

I SEMESTER

16AR6001	CONTEMPORARY PROCESSES IN ARCHITECTURE	L	T	P	C
		3	0	0	3

PURPOSE

Architects & Scholars are finding many new methods at arriving at design solutions. An exposure to the latest processes in design methodology & pioneering works of contemporary architects.

OBJECTIVE

Knowledge of the theoretical pursuits in contemporary design methodologies & a study of the resulting new movement that is prevalent across the world.

UNIT I - FRACTALS IN ARCHITECTURE **9**

The fractional landform – spiral geometry plus concentric curve plus grid – complex land forms – Fluid fractals – Fractals in nature – Fractals in cities – Postmodern science of cities.

UNIT II - DIAGRAMS & DIAGRAMMATICS **8**

Texture fields - Field constructions – Logistics of contexts – Think surfaces – moirés & mats – Digital fields – Patterns of congruity – Fields of affinity – Dynamic policies & programs.

UNIT III - NONLINEARITY **8**

Non Linear Dynamic Systems – Properties – chaos – Biological development – Punctuated equilibria – Self organization – The Gia hypothesis – Generic properties – Catastrophe theory & Phyllotaxies etc.

UNIT IV - NEW PROCESSES **10**

The flow of traffic as a generator of forms – Continuous structure deformed by circumstances – Advanced form of movement – Multi source synthesis – Architects in Cyber space – Hyper aesthetics – The cinematic section organic forms – The rotating disc etc.

UNIT V - CONTEMPORARY ARCHITETCURE **10**

Study of the works of Frank Gehry , Peter Eisenmann ,Greg Lynn ,Enrique Miralles, Daniel Liebskind ,Roger Penrose ,Heinz Gallinski , Zaha Hadid, Santigo Calatrava etc – Modern trends in urban design & town planning – Helsinki , Finland –Landsberger alle ,Berlin –Master plan of Bucharest ,Romania- High speed railway complex at Busan South Korea.

TOTAL - 45

REFERENCES

1. New Science – New Architecture – AD Vol 67 , no 9/10 Sep – Oct 1997
2. Architecture after Geometry –AD Vol 67 , no 5/7 may / June 1997
3. Architects in Cyber space – AD Vol no11/12 Nov/ Dec 1995.

16AR6003	GIS AND REMOTE SENSING	L	T	P	C
		2	1	0	2

UNIT I - INTRODUCTION **5**

Definition, map and map analysis, automated cartography, history and development of GIS, Hardware requirement, system concepts, co-ordinate systems, standard GIS packages

UNIT II - DATA ENTRY, STORAGE AND MAINTENANCE **10**

Types of data, spatial and non spatial data, data structures, points, lines, polygon, vectora nd raster, files and file organisation, database, data entry, digitiser, scanner, Dbase, files and data formats, data compression

UNIT III - DATA ANALYSIS AND MODELLING **10**

Spatial analysis, data retrieval, query, simple analysis, recode, overlay, vector data analysis, raster data analysis, modelling in GIS, digital elevation model, DTM, cost and path analysis. Artificial Intelligence – Expert system

UNIT IV - DATA OUTPUT AND ERROR ANALYSIS **10**

Types of output data, display on screen, printer, plotter, other output devices, sources of errors, types of errors, elimination, accuracies.

UNIT V - GIS APPLICATIONS **10**

Resource management, agriculture, soil, water, resources management, cadastral records and LIS, integration of Remote Sensing in GIS, knowledge based techniques

TOTAL - 45

REFERENCES

1. Burrough, P.A., Principles of GIS for land resource assessment, Ozford Publication, 1980
2. Jeffrey Star and John Estes, Geographical Information System – An Introduction, Prentice Hall inc., Engelwood cliffs, New Jersy, 1990
3. Lillesand T.M. and Kiefer, R.W, Remote Sensing and Image interpretation, John Weily and Sons, New York, 1989
4. Marble, D.F.Calkins, H.W. and Peuquest, Basic readings in Geographic information system, Spad system Ltd., New York, 1984

16AR6005	ADVANCED STRUCTURAL SYSTEMS	L	T	P	C
		2	1	0	2

PURPOSE

Recent advances in materials & construction technology have led to the development of space structures as efficient solutions to large span roofing. Space structures offer the architects exceptional freedom in design and as there are many types such as braced domes, single, double and multi-layered grids, braced folded structure, cable roofs and stressed skin systems. Also they can be built of steel, aluminium, wood or concrete. It is the aim of this course to expose scholars to the tremendous range of solutions & possibilities offered by space structures, and tensile structures.

OBJECTIVES

- To create awareness among the students about the range of solutions possible for long span roofing
- To foster understanding of the basic principles of space frames, tensile structures, folded plates and trusses and girders for long spans.

UNIT I - SPACE FRAMES **9**

Definitions, Types – single & multilayered grids – two way & three way space grids, connectors – types of nodes, ball joint system, socket joint systems, plate joint systems, slot joint systems, shell joint systems, DDC system, space deck system SERC jointing system, MERO joints etc.

Braced domes – basic geometries, types of braced domes, scwedler domes, stiff jointed framed domes, plate type domes, network domes, Zimmermann domes, lamella domes, geodesic domes & grid domes – single layer & double layered domes, practical examples

UNIT II - BRACED FOLDED STRUCTURES **9**

Steel frame folded plate roofs, types of folded systems, type of bracing systems, types of braced barrel vaults, practical examples

UNIT III - TENSILE STRUCTURES **9**

Suspended cable structures – types of cable network systems, shapes of cable suspended systems, examples of tensile membrane structures – types of pneumatic structures – structural materials & coatings - tent structure – principles – example – tensegritic structures – tensegritic nets – morphology characteristics – tension strut dome – truss structures stabilised by cable tension, suspend-dome structure, flying mast fabric roof system

UNIT IV - STRESSED SKIN SYSTEMS **9**

Principles, necessary conditions – stressed skin grids – types of pyramids, advantages – stressed skin domes & folded plates – structures – various types

UNIT V - SPACE STRUCTURES WITH CHANGING GEOMETRIES **9**

Deployable structures – foldable / extensible structures – examples, adaptive trusses – pentadome system –principles –examples
Retractable roofs – examples in Canada, Japan etc.

TOTAL - 45

REFERENCES

1. N. Subramanian – Principles of Space Structures 2nd ed. Wheeler publishing New Delhi 1999
2. Malcolm Millais – Building structures – E & FN spon, London, 1977
3. Henry J. Cowan – structural systems – van no stand Reinhold company, New York, 1981

16AR6007	URBAN DESIGN	L	T	P	C
		3	0	0	3

PURPOSE

The overall goal of the course is to help students further their understanding of the complex forces which shape urban forms and spaces. This requires study of the theory and practice of urban design and development throughout the world, including case studies of various urban design solutions.

OBJECTIVE

Students will have an understanding of urban design concepts and understand the methodology for arriving at urban design solutions and formulating policies.

UNIT I - THEORIES OF URBAN DESIGN **6**

Introduction and Scope of urban design; Cities in history ; City forms and forces that shape them; Theories and concepts of urban design - Natural models, Utopian models, Models from arts and science

UNIT II - CASE STUDIES IN URBAN DESIGN **9**

International case studies in Urban design - Urban design solutions; Economic, Engineering, Social, Professional and Formal solutions.
Some case studies will be presented by students in a seminar.

UNIT III - CITY PLANNING AND URBAN DESIGN **10**

Aims and objectives of planning; The Legal and Administrative Basis for Planning; The Comprehensive plan; Land utilization; Presentation and Implementation techniques in urban design; Zoning -- As a Mechanism for Design Control

UNIT IV - URBAN DESIGN AND HIGH RISE DEVELOPMENT **8**

The concept and context of high-rise in urban design; urban growth and change towards high-rise in developing countries; Urban skyline and roofscape

UNIT V - URBAN DESIGN PROJECT **12**

Prepare an independent and original study of a specific area – Present the data collected and give suggestions for urban design control in that area.

TOTAL - 45

REFERENCES

1. Concepts of Urban design ,David Gosling, Academy editions
2. City shaped, Spiro Kostof, Bulfinch Press
3. Architecture of town and cities, Paul D. Speriregon, The MIT press
4. An introduction to Urban design, Johnathan Barnet, Harper& Row Publishers

16AR6009	ADVANCED COMPUTER STUDIO - I	L	T	P	C
		0	0	8	4

PURPOSE

This course gives a holistic approach to three dimensional visualisation in building design by integrating the concepts of two dimensional & three dimensional parameters with the application of parametric data manipulation.

OBJECTIVES

- To enable the students use computer aided design in parametric data manipulation efficiently.
- To encourage the students in building up a working environment in two dimension and three dimension simultaneously.

CONTENTS

1. Introduction to parametric application – concept of working in 2D and 3D simultaneously. Drawing management features, sheet set mechanism, call out tools, archiving and sheet index creation.
2. Design objects- working with conceptual models, object viewers, tools for design objects, documenting design data, materials and display system.

3. Detailing components, tools for detail drafting utilities, integrating details with user interface, tool palettes, properties palettes and annotation tools.
4. Rendering and visualisation module –photo realistic presentation techniques.
5. Project works and exercises incorporating all the above features.

TOTAL - 120

REFERENCES

1. Architectural Desktop Reference Manual ,Auto Desk Inc
2. Architectural Desktop user

16AR6011	DESIGN STUDIO - I URBAN INFRASTRUCTURE PROJECTS	L	T	P	C
		0	0	12	6

PURPOSE

This is a design studio course with its main focus as the Planning of Transportation facilities such as Airport terminals and MRTS nodes. Apart from educating students about the planning standards, International Aviation regulations, MRTS norms and Environmental Planning legislations, the course encourages students to use the computer as a design tool.

DESIGN PROJECT - I

PLANNING AND DESIGN OF AIRPORTS **90**

Students would be required to prepare a Master plan after careful site selection regarding capacity, air traffic control and climatic aspects. They would be encouraged to design the Terminals and other service facilities after acquiring sufficient knowledge about design standards, runways, taxiways and aircraft characteristics related to airport design.

DESIGN PROJECT - II

PLANNING AND DESIGN OF AN MRTS NODE **90**

A brief study of the existing MRTS in Chennai would lead to fostering awareness about the conventional standards in the design of a MRTS Station that could incorporate the best in Public Architecture. The use of Architectural CAD Software in presentation will be encouraged.

TOTAL - 180

REFERENCES

1. Robert Horonjeff - Planning and Design of Airports - Mcgraw hill, USA 1975
2. Henry sanoff - Planning and Design of Airports - VNR California 1976

SECOND SEMESTER

16AR6002	HIGH RISE BUILDINGS	L	T	P	C
		3	0	0	3

PURPOSE

The council for tall buildings defines High rise buildings as a building whose height creates different conditions in the design construction and use than those that exist in common building of a certain region and period. As more and more buildings in India are tending towards high rise it becomes imperative for aspiring architects to acquire knowledge and expertise in this field.

OBJECTIVES

- To expose the students to the various types of structural systems that are employed for tall buildings,
- Knowledge of the various building service systems that are required by tall buildings.

UNIT I - INTRODUCTION TO TALL BUILDINGS **5**

Classification of tall building structural system - Types - Shear frames, Interacting systems, Partial tubular systems, Tubular systems.

UNIT II - TALL BUILDING FLOOR SYSTEMS **10**

Composite steel floor systems, prestressed and post tensioned concrete floor systems - Examples.

UNIT III - LATERAL LOAD RESISTING SYSTEMS **10**

Braced frames and moment resisting frame systems – Examples, Shear wall systems – Examples, Core and outrigger systems - Benefits and drawbacks – Examples, Tubular systems - Advantages and Disadvantages – Examples, Hybrid systems - Examples

UNIT IV - SERVICES FOR TALL BUILDINGS **10**

Express elevators - Sky lobbies - Local elevators, Service floors etc., - Water supply systems - Skip stage pumping - Energy conservation methods - Location and sizing of water tanks. Electrical and Communication systems etc.,

UNIT V - FIRE PROTECTION OF TALL BUILDINGS **10**

Wet risers, Sumps, Smoke detectors, Alarms, Sprinkler systems, Fire escape stairs, Fire resistant doors, Fire resistant rating of materials and Firefighting equipments etc.,

TOTAL - 45

REFERENCES

1. Bennetts, Ian etal - Tall building Structural Systems
2. Proceedings of the Council for Tall buildings - Vol 1 to 10

16AR6004	ARCHITETCURAL CONSERVATION	L	T	P	C
		3	0	0	3

PURPOSE

The overall goal of the course is to help students further their understanding of the concepts in historic preservation & conservation of urban forms & spaces. This requires study of the theory & practice of conservation & the various techniques of conserving individual materials & the documentation of the same.

OBJECTIVES

Students will have an understanding of conservation concepts & understand the methodology for arriving at such solutions and formulating policies aimed at preservation & conservation. A brief study of various developments related to conservation and heritage across the world, including case studies of various conservation solutions.

UNIT I - ETHICS & PHILOSOPHY OF CONSERVATION 5

Defining heritage – Cultural value and Cultural capital –Terminologies, attitudes and approaches to conservation.

UNIT II - LISTING OF BUILDINGS & HERITAGE PRECINCTS 10

.Various criteria for listing buildings & documentation techniques. Statues of listed buildings – spot listing & delisting, Inter disciplinary approaches to building recording. Conservation & management – adoptive re use, character & issues of heritage towns- delineating zones, planning for heritage precincts and areas.

UNIT III - CONSERVATION TECHNIQUES 10

Documenting material, use and structural issues of historic buildings, focus on restoring and conserving brick structures, technology, use and repair of iron and steel members, understanding wooden and timber structures / methods of conserving timber structures, traditional plaster work skills, introduction to the significance and use of lime, working with lime- repairing and replacing plaster, conserving stone structures, issues concerning terracotta and mud structures.

UNIT IV - LEGISLATION, POLICY AND ORGANISATIONS 10

Explore legislation for the heritage from an international perspective, reviewing various charters of ICOMOS, ICCROM, UNESCO, World heritage sites- review legislative measures adopted in India – Ancient sites and monument protection act. Bombay and Hyderabad heritage regulations- proposed Tamilnadu heritage act. Role of various agencies in the promotion of conservation such as ASI / INTACH/ Heritage societies / Urban arts commission

UNIT V - ECONOMICS OF HERITAGE **10**

An introduction to the economic aspects of conservation , cultural value and economic , incentives for conservation like transferable development rights and the institution of National Cultural fund, overview of incentive schemes adopted in other countries.

TOTAL - 45

REFERENCES

1. Charles Mynors (1995) Listed Buildings and Conservation Areas FT Law & Tax, London
2. R.D.Pickard (1996) Conservation in the built environment , Longman, Harlow James Stevens Curl, Encyclopaedia of architectural terms, Donhead Publishing , 1993 Stewart
3. Stewart Brand, how buildings learn: What happens after they are built, London, Viking, 1994.

16AR6006	INTELLIGENT BUILDING SYSTEMS	L	T	P	C
		2	1	0	2

PURPOSE

This course enlightens the students about the components of intelligent buildings – automatic environment control systems, automatic emergency systems, automatic security systems and flexible furniture systems

OBJECTIVES

- Knowledge about intelligent building management and energy efficient systems
- Application of these technologies to current building practices

UNIT I - INTRODUCTION TO INTELLIGENT BUILDING **5**

The emergence of the intelligent office building in USA, Japan and Europe, Alternative intelligent building scenario

UNIT II - DESIGN OF INTELLIGENT BUILDINGS **10**

Choosing and installing a building management system, Integration of fire and security system in intelligent building, Sensing and control system

UNIT III - MANAGEMENT OF INTELLIGENT BUILDINGS **10**

Building energy management – trends and advances in energy management systems, Building management systems for retrofit, Shared tenant services

UNIT IV - NETWORKING **10**

Cable management - Fibre optic network design for intelligent buildings - Generic requirements for intra-building optical fibres - Beyond the intelligent building – EDI (electronic data interchange) and telecommuting

UNIT V - THE FUTURE **10**

Intelligent design teams - Expert systems and intelligent building - The future of communities, buildings and building systems

TOTAL - 45

REFERENCES

1. Ed. By Stephen Mc clelland, Intelligent buildings, IFS publication, 1988
2. Proceedings of the conference held in LondonApril 1987, High Tech Buildings, online publications1987
3. Bernaden. A & R.E.Neuba, Intelligent building source book, Fairmount press inc. 1988
4. Riewoldt otto, Intelligent spaces-Architecture for the information age
5. Andrew Harrison et al., Intelligent building in south east asia, IB Asia lts. 1998

16AR6008	ADVANCED COMPUTER STUDIO – II	L	T	P	C
		0	0	8	4

PURPOSE

This course gives an integrated approach in building design and management by integrating the concepts of CAD in creating 2D and 3D presentations with the process of estimation, information management and documentation practices.

CONTENTS

- Introduction to parametric software; Concept of integrated project management with reference to the software

- Design (2D/3D) and graphic module; Graphic component editing; Rendering and visualization module
- Parametric modelling techniques; Interoperability of software; Concepts of bi-directional associativity;
- Project documentation; Building information management; Automated estimation and scheduling
- Change management and information reuse; Data sharing
- Exercises integrating all the above features

TOTAL - 120

REFERENCES

1. Revit Reference manual, Autodesk Inc.
2. Revit user Guide, Autodesk Inc.

16AR6010	DESIGN STUDIO – II - INTELLIGENT BUILDING SYSTEMS / HIGH RISE BUILDINGS	L	T	P	C
		0	0	12	4

PURPOSE

Students will be thorough in their understanding of the programme requirements and design of tall buildings.

OBJECTIVES

- Students will use Internet and library resources provided to develop a thorough understanding of the facilities and standards required in the design problem.
- Students will understand the problems associated with services and structural problems associated with high rise, tall structures.

DESIGN PROJECT – I

PLANNING & DESIGN OF HIGH RISE BUILDINGS **90**

Students would be required to prepare detailed plans and sections of any suitable tall building after careful site selection and with regard to the function, imageability, climatic & cultural aspects. They would be encouraged to study and apply suitable structural and service systems after acquiring knowledge about design standards & case studies of contemporary high rise buildings. Special features of skyscrapers such as service floors, sky lobbies, express elevators, skip stage pumping system, firefighting arrangements etc., will be given importance.

DESIGN PROJECT – II

MULTIUSE STRUCTURES **90**

Multiuse structures which incorporate commercial spaces in the lower floors, office spaces in the upper floors and residential apartments at the top floors have become the emerging typology in many cities worldwide. Students will be encouraged to investigate this type of buildings and explore design solutions that would lead to a smooth integration of various functions, while keeping in mind the cultural and local factors. Integration of intelligent building management systems that lead to energy efficiency, intelligent security and enhanced firefighting services would be mandatory. Students will be encouraged to design building form and fabric in response to the cultural values and lifestyle that is in vogue in Indian cities.

TOTAL - 180

REFERENCES

1. John Zukowsky - Skyscrapers, New millennium - Prestel, London.
2. Harriet Scoenholz Bee-Tall Buildings, The museum of modern art- The museum of modern art ,New York – 2003
3. Johasin Eiselle & Ellen Klofr –High rise manual – Typology design construction & Technology - Birkhanser, Basel - Switzerland – 2003
4. Mathew Wells - Skyscrapers, Structure & Design - Lawrence King publishing London 2005.
5. Judith Dupre -Skyscrapers, History of the world's most famous skyscrapers – Blackdog & Leventhal publishers, New York 1996.
6. Hamzah T.R & Ken Yeang- Ecology of the sky – Images publishing, Victoria 2001.
7. Riewoldt (Otto) –Intelligent spaces –Architecture for the information age- Lawrence King , London -1997

III SEMESTER

16AR7001	ENVIRONMENTAL STRATEGIES	L	T	P	C
		3	0	0	3

PURPOSE

The aim of this course is to foster awareness about environmental issues and to explore environmental strategies that ensure environmental protection. Also the development of knowledge about EIA of large scale urban projects & their legal aspects is intended.

OBJECTIVES

- To train scholars in the methodology of preparing EIA for facilities planned at a city level (Airport, transportations notes etc)
- To expose students to the legal & economical aspects of environmental management.

UNIT I - APPROACHES AND STRATEGIES

Global and National environmental issues, Sustainable resource management and strategies for sustainable development – Environmental strategies for developing environmental awareness and protection.

UNIT II - LEGAL ASPECTS

National and International standards for environmental quality, MINAS, BIS – Rationale for environmental legislation – Overview of international protocols, Indian environmental legislation and regulatory system – regulatory non-compliance liabilities – environmental audit.

UNIT III - ENVIRONMENTAL ECONOMICS

Environmental marketing , environmental labeling and certifications, ISO14,000 – Environmental management systems – Trade and the environment – International trade agreement – cost of cleaner environment – fiscal incentives and disincentives – market based instruments – environmental damage costing.

UNIT IV - ENVIRONMENTAL IMPACT ASSESSMENT

EIA of projects – regional and strategic assessments – elements of EIA – prediction and assessment of impacts on the physical – chemical, biological and socio economical environmental – EIA methodologies, cost-benefit analysis, comparison of alternatives, public participation, mitigation plans, monitoring plans, environmental management plan – expert system in EIA - use of regional AQM – carrying capacity studies – life cycle analysis – post project audit procedures.

UNIT V - CASE STUDIES

Case studies on EIA of development projects and on environmental auditing.

TOTAL - 45

REFERENCES

1. Larry W. Canter – Environmental impact assessment – McGraw-Hill publishers 1996.
2. EIA Manual – Download from the website of ministry of environment & forests (MOEF) – Government of India.

16AR7003	REAL ESTATE MANAGEMENT	L	T	P	C
		3	0	0	3

PURPOSE

- To enable the students understand the concept of Real Estate management
- To give an overview of the Real Estate Market to the students
- Providing exposure, at an advanced level, to the wide range of issues that reflect the principal areas of specialization in the real estate profession;
- Stimulating an awareness of the issues involved in international real estate;
- Developing analytical and methodological skills that are critical for management, decision-making and problem-solving roles.

OBJECTIVES

By the end of the course, students will be thoroughly exposed to the aspects of Real Estate Management. .Students shall be capable of managing retail real estate and corporate real estate effectively.

UNIT – I REAL ESTATE DEVELOPMENT

Fundamental concepts and techniques, recognizing institutional and entrepreneurial elements, issues encountered in various phases of development like site evaluation and land procurement, development team assembly, market study and development scheme, construction and project management, project marketing and hand-over of completed projects.

UNIT – II DEVELOPMENT & PROJECT FINANCING

Project Feasibility, Development Financing, Asset Disposal and Redevelopment Options, Analyses of Development Sites and Case Studies, integrated case study on a specific development project, which requires reviewing, analysing and resolving the problems or strategic issues.

UNIT III - URBAN POLICY & REAL ESTATE MARKETS

Impact of Government Regulations and Public Policies on Real Estate Markets, include urban land rent and location theories, land use structures, community and neighbourhood dynamics, degeneration and renewal in urban dynamics, private-public participation, government policies on public and private housing, and urban fiscal policy including property taxation, local government finance.

UNIT IV - CORPORATE REAL ESTATE ASSET MANAGEMENT

Strategic plans to align real estate needs with corporate business plans; Performance measurement techniques to identify asset acquisition or disposal; methods for enhancing value through alternative uses, efficient space utilization or improving user satisfaction.

UNIT V - COMMERCIAL REAL ESTATE APPRAISAL

Determination of the capitalization rates across different types of properties; Appraisal of freehold and leasehold interests; Critical analysis of the valuation approaches adopted for securitized real estate; Asset pricing models; investment flexibility and future redevelopment opportunities.

TOTAL - 45

REFERENCES

1. Barron's real estate hand book V Edition, Hauppauge, NY, Barron , 2001
2. Project planning scheduling & control in construction an encyclopedia of terms & applications , New York, Wiley, 1995

16AR7005	SUSTAINABLE DEVELOPMENT AND TECHNOLOGIES	L	T	P	C
		2	1	0	2

UNIT I – INTRODUCTION **6**

Sustainable development - need, issues and goals.

UNIT II - ANALYSIS OF THE URBAN ENVIRONMENT **9**

Quantifying the urban environment - application of remote sensing; urban heat islands; prediction and evaluation of the urban environment; ecological footprint of cities.

UNIT III - ENERGY AND THE BUILT ENVIRONMENT **9**

Energy and sustainability issues in the building environment; basics of energy-definitions and terminology, energy flows and balance; techniques of Life Cycle Assessment –applied to building materials.

UNIT IV - SUSTAINABLE TECHNIQUES **9**

Sustainable techniques to maintain and / or improve air quality, water quality and biodiversity; transport systems; urban forestry, park system and greenways.

UNIT V - CASE STUDIES **12**

Case studies on sustainable development - study of urban form, city quarter, urban street block and green buildings.

TOTAL - 45

REFERENCES

1. Anna Ray - Jones, Sustainable Architecture In Japan wiley- academy, 2000.
2. Cliff Moughtin, Urban Design: Green Dimensions Reed Educational and Professional Publishing Ltd. 1996
3. Sandra Mendler, William Odell, The Guide Book Of Sustainable Design, John Wiley & Sons, 2000.
4. Lawson.B , Bulding Materials, Energy And The Environment; Towards Ecologically Sustainable Development Raia, Act, 1996

16AR7007	GIS STUDIO	L	T	P	C
		0	0	8	4

UNIT I - INTRODUCTION **30**

Classification of spatial and non-spatial data – application of spatial data in urban and regional planning – objectives and functions of GIS models in Urban and Regional planning

UNIT II - SPATIAL DATA INPUT **30**

Defining the objectives of a GIS planning problems – Identification of required spatial data layers – coding schemes – digitisation of spatial data – editing spatial data usable for the given planning problem

UNIT III - ATTRIBUTE DATA INPUT **30**

Role of attribute data in defining geographic features – adding attribute data file – topology generation – joining attribute data to its geographic features

UNIT IV - SPATIAL ANALYSIS USING GIS **30**

Performing overlay functions – manipulating attribute data – GIS modelling – map and report generation – case problems on regional analysis, impact assessment study, project formulation and land suitability analysis

TOTAL - 120

REFERENCES

1. Brail K.R. (1990) Integrating GIS into Urban and Regional planning. Alternative approaches for developing countries. Regional development Dialogue, Vol.11, No.3, UNCRD, Japan 1990
2. Cartwright T.J. (1991) Information Systems for Urban and Management in Developing countries. The concept and reality, computers, environment and urban systems Vol.15, 1991
3. Klosterman RE. (1990) Microcomputer packages for planning Analysis, American planning Association Journal, Autrenn, 1990
4. ERSI (1992) Understanding GIS. The ARCI INFO methods, ERSI, USA
5. Tomlin C.D. (1990) Geographic Information systems and cartographic Modelling, Prentice Hall, Englewood cliffs, U.S.A.

16AR7009	DESIGN STUDIO III ENVIRONMENTAL PLANNING AND DESIGN	L	T	P	C
		0	0	12	6

PURPOSE

Students will be exposed to the principles of environmental planning and understanding of ecological, social and economic factors while planning for sustainable development of hilly areas and coastal buildings.

OBJECTIVE

- Students will use Internet and library resources provided to develop a thorough understanding of the facilities and standards required in the design problem.
- Students will understand the problems associated with the environment.

DESIGN PROJECT

PLANNING AND DESIGN FOR TOURISM IN HILL / COASTAL AREAS

Hill and coastal areas are environmentally fragile due to their location, topography and natural vegetation. They are especially vulnerable in our country where the population density is very high and the environmental bye laws are not stringent. Environmental analysis of such areas and their development for tourism requires an inter disciplinary approach involving remote sensing, Geographical information systems, environmental modeling techniques, ecological sustainability and socio economic factors.

Scholars will be encouraged to conduct case studies of such environmentally susceptible hill / coastal areas and analyze the same using Satellite imagery, GIS software, environmental modeling techniques and field surveys. Moreover

analysis of these areas for tourism development and land suitability will be carried out in order to develop a broad framework for planning and development. Students would be encouraged to investigate the special building rules and byelaws prevalent for hill / coastal areas from an ecological perspective.

Both hill & coastal areas are rich in resources such as scenic areas, views and vistas .Hence while planning for the optimized development of these areas scholars have to consider the visual impact assessment as an integral part of environmental impact assessment, so as to conserve hill sites and coast. It can be inferred that this exercise would advocate a balanced approach between conservation, sustainability & development.

TOTAL - 180

REFERENCES

1. Robert Kay & Jacqueline Alder -Coastal planning & Management – E& F spon New York -1999
2. James Steel – Ecological Architecture –A critical history, Thames and Hudson, London 2005.
3. Anna Ray Jones -Sustainable architecture in Japan –Green buildings of Nikken Sekkei - John wiley & sons , W.Sussex 2000
4. Saudra Mendler & William Odell –A guide book to Sustainable design , John wiley & sons USA ,2000.3
5. George F.Thompson & Frederick R.Steiner -Ecological design &Planning, John wiley & sons, Canada 1997.

FOURTH SEMESTER

CODE	SUBJECT TITLE	L	T	P	C
16AR7010	Dissertation	-	-	12	12
	Total	-	-	12	12

ELECTIVE -I

16AR6012	NEW AGE MATERIALS AND CONSTRUCTION	L	T	P	C
		2	1	0	2

PURPOSE

To expose the students to the new construction materials used in the construction industry and the state of art and technology in building construction.

OBJECTIVES

The student will learn the detailing and construction of buildings using modern building materials like stainless steel, plastics, glass reinforced concrete etc., involving new techniques in construction.

UNIT I - MATERIALS AND CONSTRUCTION DETAILS FOR CURTAIN WALLS 9

Glass curtain walls, steel cladding, aluminum cladding, and other metallic / non-metallic cladding details for multi-storied buildings. Ribbed metal cladding systems. Sloping and curved glass walls, Steel plate shear walls. Metallic cladding – for roof.

UNIT II - MATERIALS AND CONSTRUCTION DETAILS OF TENSILE STRUCTURES 9

Achievement of shape - curvature, pre-stressing and supports; Materials – fabric and high strength cables; Multiplicity of tents and achieving complexity of form; fabrication and erection details.

Pneumatic structures – materials; construction details and erection procedure.

UNIT III - MATERIALS AND CONSTRUCTION DETAILS FOR SPACE FRAMES AND SPACE TRUSSES 9

Long-span trussed arched roof; steel space frames using box sections, angles, channels and tubes; Geodesic domes. Materials, support systems, construction and erection details.

UNIT IV - PREFABRICATION 9

Application in housing, steel structural systems for high-rise buildings, long span structures, space trusses and RCC vierendeel trusses. Dismantlable structures, movable staircases.

UNIT V - PLASTIC 9

Plastic as a structural material – load bearing plastic spandrel panels, fiberglass plastic application in construction.

TOTAL - 45

REFERENCES

1. Details in Architecture – creative detailing by some of the world's leading architects, The Images Publishing Group Pty Ltd., Australia, 1999.
2. Engineering & Architecture, Architectural Design Profile 70, Academy Group Ltd., London, 1987.
3. Robert E. Fischer, Engineering for Architecture, Mcgraw-Hill book company, New York, 1980.
4. Fred Nashed. AIA, Time-saver details for Exterior Wall design, McGraw Hill, USA, 1996.
5. Belen Garcia, Earthquake Architecture, Paco Asensio.

16AR6014	COMPUTER AIDED STRUCTURAL DESIGN	L	T	P	C
		2	1	0	2

PURPOSE

By the end of the course, the students shall be capable of discriminating the various structural softwares and selecting the appropriate one for the given structure. They shall also be confident enough to analyse simple problems independently.

OBJECTIVES

To expose the students to computer analysis of structures and enable the students to use structural analysis for simple 2D and 3D structures.

UNIT I - COMPUETR AIDED DESIGN **5**

Introduction to computer aided structural analysis methods – stiffness method – concept of forming stiffness martin for element and transforming into global stiffness matrix (only brief outline) – use of computers to facilitate the same.

UNIT II - STRUCTURAL ANALYSIS **10**

Introduction to structural analysis softwares – GTD STRUDL , STAAD PRO, SAP 2000, ANSYS –their relative merits and demerits – applications.

UNIT III - SOFTWARE FOR DESIGN **10**

Familiarisation with usage of structural engineering software – input commands co – ordinate systems geometry creation – member connectivity – member properties – materials constant – loading – load combinations –analysis commands – design.

UNIT IV - ANALYSIS OF STRUCTURES I **10**

Analysis and design of 2D single storey rigid frames – Taking out design forces – design (Gravity and wind loads only)

UNIT V - ANALYSIS OF STRUCTURES II **10**

Analysis and design of 3D –single storey and multi storied buildings – taking out design (Gravity and wind loads only)

TOTAL - 45

REFERENCES

1. Finite element methods by C.S.Krishnamoorty
2. Moshe F.Rubinstein, Matrix computer analysis of structures, Prentice –Hall Inc, Englewood cliffs New Jersey.
3. STAAD Manual for STAAD PRO 2000, R&D Engineers.
4. Manual for GT.STRUDL.

16AR6016	LANDSCAPE CONSTRUCTION	L	T	P	C
		2	1	0	2

PURPOSE

This course enlightens the students about the components of landscape features and the construction of the same.

OBJECTIVES

Knowledge of the various features of innovative and modern landscape design application of innovative detailing and appropriate technologies to further better landscape planning.

UNIT I - DESIGN OF LANDFORMS **9**

Contours – representation of land forms design, interpolation of contours slope analysis, uses and function, grading – symbols and abbreviations, basic grading exercises, grading & aligning of roads and paths. Earth works- principles of earthwork, cut and fill calculations- precautions to be taken in earth fill methods in relation to precipitation and soil conditions.

UNIT II - WATER AS RESOURCE **9**

Use of water in an appropriate context of time, political / religious power, way of thinking, technical advancements and influences from other regions. Qualities of water and scopes of display, drainage- surface drainage, calculation of surface run off, design of surface and storm water drainage. Design of water such as swimming pools, cascades fountains etc., and their technical requirements, considerations for design and detail. Water bodies, natural ponds.

UNIT III - HARD LANDSCAPES **9**

Design of detail of hard landscape , roads, paving, barriers, edge conditions functions, types criteria for selection, design aspects, detail design. Low energy design and construction- application of low energy architecture in landscape design, special emphasis on solar energy and lighting.

UNIT IV - OUTDOOR LIGHTING **9**

Design of technical terms, types of electrical lighting, types of fixtures, auxiliary fixtures principles of design for outdoor lighting, design and type of effects with electrical lighting, safety precautions with electrical lighting, electrical accessories and their installation.

UNIT V - STREET FURNITURE **9**

Criteria for the selection of materials and specifications for street furniture in various environments. Design of sign ages and simple outdoor structures like pavilions, gazebos etc., Use of waste materials in landscape architecture, recycling and re use of materials and their impact on landscape design.

TOTAL - 45

REFERENCES

1. Dietrich ,Kerrs , Landscape construction 1994
2. Charles.W.Harris an Nicholas .T.Dines , Times saver standards fir Landscape architecture, Mc Graw hill 1985.

ELECTIVE –II

16AR7011	VERNACULAR BUILDING TRADITIONS	L	T	P	C
		2	1	0	2

PURPOSE

This course enlightens the students about the components of vernacular buildings – building material and construction used in vernacular architecture.

OBJECTIVES

Knowledge about vernacular building technologies and their use in contemporary buildings , use of natural materials and energy efficient systems ,application of these technologies to current building practices.

UNIT I – INTRODUCTION **9**

Traditional principles of planning, primitive forms, symbolism, color, folk art etc., in the architecture of rural and tribal India; deserts of Rajasthan, Kutch and subterranean architecture of Gujarat.

UNIT II - VERNACULAR BUILDING TRADITIONS–NORTH INDIA **9**

Wooden houses, Mansions (Havelis) Gujarat and Rajasthan – Shekawati Havelis, Havelis at Jaisalmer, House boats (Dhungas), Kashmir – materials of construction and constructional details – settlement planning

UNIT III - VERNACULAR BUILDING TRADITIONS – SOUTH INDIA **9**

Wooden houses, palaces and theatres & family homes (Tharavads) in Kerala, constructional details such as joinery and elements of climate control. Chettinad houses and palaces in Tamilnadu – Lime plaster work, Heritage tiles, Wooden pillars – constructional details –Principles of planning, proportion and religious practices and social customs in relation to settlement planning.

UNIT IV - COLONIAL INFLUENCES **9**

Colonial influences on the Traditional Architecture of Christian houses, Colonial architecture of Goa – concept of a Bungalow, evolution of the verandh and other colonial elements of design & style. Architecture of Bengal and Victorian villas. Chisholm and Henry Irwin and the evolution of Indo Sarcenic architecture European construction techniques in such buildings and the influence of the vernacular traditions.

UNIT V - SECULAR ARCHITECTURE **9**

Medieval period – citadels, palaces, towers, gateways, public buildings etc in the towns of Jodhpur, Jaisalmer, Jaipur, Udaipur & Gwalior. Planning principles elements of style, climate control and constructional details of the same.

TOTAL - 45

REFERENCES

1. Carmen Kagal, VISTARA- The Architecture of India, Pub –The Festival of India, 1986.
2. V.S.Pramar Haveli – wooden houses and Mansions of Gujarat, Mapin publishing pvt ltd, Ahmedabad, 1989
3. Kulbushan Jain and Minakshi Jain –Mud Architecture of the Indian Desert Aadi centre, Ahmedabad, 1992.
4. G.H.R.Tillotsun – The Tradition of Indian Architecture continuity, controversy and change since 1850, Oxford university press, Delhi 1989.
5. Suzaneeslein and Stafford Clief, Indian style, Clarkson N.Potter inc, New York, 1999.

16AR7013	BIO ARCHITECTURE	L	T	P	C
		2	1	0	2

PURPOSE

This course enlightens the students about the evolution of Green buildings- Building material choices, concepts and construction techniques, rating systems and evaluation techniques used in Green Architecture.

OBJECTIVES

- Knowledge of the environment and the ecosystems and about the use of energy efficient technologies in contemporary buildings, use of natural materials and water conservation techniques.
- Rating of current buildings.

UNIT I - SUSTAINABILITY & GREEN BUILDING **9**

Brief understanding of food & energy cycles, Principals of sustainability in Natural Ecosystems. Elements of green development- Introduction root of green architecture – green building design- benefits- rating system- LEEDS

UNIT II - SITE SELECTION & DEVELOPMENT **9**

Sustainable design, environmental impacts of building and construction .Natural strategies to protect natural resources. Land use patterns and sustainable concepts in development of appropriate sites.

Site development, site selection – re – use of existing buildings / sites.

UNIT III - WATER EFFICIENCY **9**

Strategies to reduce water consumption in buildings- low flow plumbing fixtures of water efficient appliances rain water harvesting reuse of grey water for non

potable uses wetlands for natural waste water treatment, use of wetlands for natural storm water and vegetated roof tops. Concept of energy efficiency and system performance, optimising building envelope configuration/ design for energy efficiency and passive solar strategies, current concepts in energy efficient design with regard to thermal comfort and lighting. Exploring (natural) renewable power source such as photo voltaics, solar hot water fuel cells etc.

UNIT IV - BIO DEGRADABLE MATERIALS AND RECYCLING **9**

Concept of embodied energy, performance and life cycles of building materials selection of sustainable materials that reduce pollution during manufacture, installation and maintenance. Innovative use of recycled materials, recycling waste segregation, collection and disposal use of appropriate native plant material in landscape architecture.

UNIT V - CASE STUDIES **9**

Residences, instuitional building and offices- apartments high – rise buildings and skyscrapers.

Few examples- works of Ken Yeang, CII Centre at Hyderabad, TERI Building at Bangalore and relevant examples from India and the rest of the world.

TOTAL - 30

REFERENCES

1. Anna ray – Jones, Sustainable architecture in Japan- The Green buildings of Nikken Sekkei, Wiley – academy 2000.
2. Architecture and the environment – Bio climatic building design – David Lloyd (Laurence king Publishers, London, 1998.
3. Sustainable architecture low tech houses- Charles Broto & Arian Mostedi Pub: Joseph Ma Minguet 2002.
4. Energy efficient buildings in India – Milli Majumdar. TERI publication and Ministry of non-conventional energy sources, 2001
5. Ecology of the sky – Ivor Richards, The images publishing groups , 2001

16AR7015	FINANCIAL MANAGEMENT	L	T	P	C
		2	1	0	2

PURPOSE

The course aims to deliver the basic concepts of Finance Management in an Architectural perspective.

OBJECTIVES

- To study the investment decisions
- To estimate the cash inflow and outflow
- To study elements of profit formulation and appraising.

UNIT I - INTRODUCTION **9**

The Need, Scope of Financial Management, Types of Financing, Short term and Long term, Internal generation of funds, Role of an Architect in taking finance decisions.

UNIT II - CAPITAL BUDGETING **9**

Time value of money, cost of capital, cash flows, Capital Budgeting, Evaluations, Selection and Execution of Capital Budgeting, Limitations of Capital Budgeting

UNIT III - CASH FLOW ANALYSIS **9**

Investment Analysis, Planning, Organisation and Control of Capital Expenditure Traditional (Payback ARR) Discounted cash flow (NPV, PI, IRR etc.)

UNIT IV - PROJECT FINANCING **9**

Project Financing, Financial Institutions in the field of Housing, Infra-structure development, Participation of Private Sectors in project financing

UNIT V - MANAGEMENT IN PROJECTS **9**

Real estate management, Asset liability management, Role of Asset vs. Property management, Reduction of cost in the construction, Profit scheduling implementation control techniques, Financial reporting, solving management issues (case)

TOTAL - 45

REFERENCES

1. Prasanna Chandra – Financial Management, Tata McGraw Hill, New Delhi, 2004
2. Im Pandey, Vikas Publishing Co, New Delhi, 2004
3. S.N. Maheswari, Financial Management, Sultan & Sons, Delhi, 2004
4. P.V.Kilkarni, Financial Management, Himalaya Publishing Co. Mumbai, 2004
5. James C. Van Horne, Financial Management, Tata McGraw Hill, New Delhi, 1997