B.S.ABDUR RAHMAN
U N I V E R S I T Y
B.S.ABDUR RAHMAN INSTITUTE OF SCIENCE & TECHNOLOGY
(Estd.u/s 3 of the UGC Act, 1956)
(FORMERLY B.S.ABDUR RAHMAN CRESCENT ENGINEERING COLLEGE)
Seethakathi Estate, G.S.T. Road, Vandalur, Chennai - 600 048.

REGULATIONS (2009), CURRICULUM AND SYLLABUS
FOR
M.Tech. CONSTRUCTION ENGINEERING AND PROJECT MANAGEMENT

(updated upto June 2011)

REGULATIONS -2009 FOR M.TECH / MCA / M. Sc DEGREE PROGRAMMES

(with modifications incorporated in June 2011)

1.0 PRELIMINARY DEFINITIONS AND NOMENCLATURE

In these Regulations, unless the context otherwise requires

i) **"Programme"** means Post Graduate Degree Programme (M.Tech./ MCA / M.Sc.)

ii) **"Course"** means a theory or practical subject that is normally studied in a semester, like Applied Mathematics, Structural Dynamics, Computer Aided Design, etc.

iii) **"University"** means B.S.Abdur Rahman University, Chennai, 600048.

iv) **"Institution"** unless otherwise specifically mentioned as an autonomous or off campus institution means B.S.Abdur Rahman University.

v) **"Academic Council"** means the Academic Council of the University.

vi) **'Dean (Academic Courses)'** means Dean (Academic Courses) of B.S.Abdur Rahman University.

vii) **'Dean (Students)'** means Dean(Students) of B.S.Abdur Rahman University.

viii) **"Controller of Examinations"** means the Controller of Examinations of B.S.Abdur Rahman University who is responsible for conduct of examinations and declaration of results.

2.0 PROGRAMMES OFFERED, MODE OF STUDY AND ADMISSION REQUIREMENTS

2.1 P.G. Programmes Offered

The various P.G. Programmes and their modes of study are as follows:

Degree	Mode of study
M.Tech.	Full Time
M.Tech.	Part Time – Day / Evening
M.C.A.	Full Time
M. Sc.	Full Time

M.TECH. CONSTRUCTION ENGG & PROJECT MANAGEMENT

Sl. No.	Name of the Department	P.G. Programmes offered	Qualifications for admission
01.	Civil Engineering	M.Tech. (Structural Engineering)	B.E / B.Tech. (Civil Engineering) / (Structural Engineering)
		M.Tech. (Construction Engineering and Project Management)	B.E. / B.Tech. (Civil Engineering) / (Structural Engineering)
02.	Mechanical Engineering	M.Tech. (CAD - CAM)	B.E. / B.Tech. (Mechanical / Auto / Manufacturing / Production / Industrial Engineering)
		M.Tech. (Manufacturing Engineering)	B.E. / B. Tech. (Mechanical / Auto / Manufacturing / Production / Industrial Engineering)
03.	Polymer Technology	M.Tech. (Polymer Technology)	B. E. / B. Tech. degree Mech./ Production / Polymer Science or Engg or Tech/Rubber Tech/ M.Sc(Polymer Sc./Chemistry Appl. Chemistry)
04.	Electrical and Electronics Engineering	M.Tech. (Power Systems Engg)	B.E / B.Tech. in (EEE/ICE/EIE)
		M.Tech. (Power Electronics & Drives)	B.E / B.Tech. in (EEE/ICE/EIE)
05.	Electronics and Communication Engineering	M.Tech. (Communication Systems)	B.E./ B.Tech. in ECE / Electronics / EIE
		M.Tech. (VLSI and Embedded Systems)	B.E./ B.Tech. in ECE / Electronics / EIE
06.	ECE Department jointly with Physics Department	M.Tech. (Optoelectronics and Laser Technology)	B.E./B.Tech. (ECE/EEE/Electronics/ EIE/ICE) M.Sc (Physics/Materials Science/ Electronics/ Photonics)
07.	Electronics and Instrumentation Engineering	M.Tech. (Electronics and Instrumentation Engineering)	B.E./B.Tech. (EIE/ICE/Electronics/ ECE/EEE)
08.	Computer Science and Engineering	M.Tech. (Computer Science and Engineering)	B.E. /B.Tech. (CSE/IT/ECE/EEE/EIE/ ICE/Electronics / MCA)
		M.Tech. (Software Engineering)	B.E. / B.Tech. (CSE / IT) MCA
09	Information Technology	M.Tech. (Information Technology)	B.E /B.Tech. (IT/CSE/ECE/EEE/EIE/ ICE/Electronics) MCA
10	Computer Applications	M.C.A.	Any degree. Must have studied Mathematics / Statistics /Computer oriented subject.
		M.Tech. (Systems Engineering and Operations Research)	Any degree. Must have studied Mathematics / Statistics /Computer oriented subject.
11	Mathematics	M.Sc. (Actuarial Science)	B.Sc. (Mathematics) of B.Sc. (Applied Science)
12	Chemistry	M.Sc.(Chemistry)	B.Sc (Chemistry) of B.Sc. (Applied Science)

2.2 MODES OF STUDY

2.2.1 Full-time

Candidates admitted under "Full-Time" shall be available in the institution during the complete working hours for curricular, co-curricular and extra-curricular activities assigned to them.

2.2.2 A full time student, who has completed all non-project courses desiring to do the Project work in part-time mode for valid reasons, shall apply to the Head of the Institution through the Head of the Department, if the student satisfies the clause 2.3.5 of this Regulations. Permission may be granted based on merits of the case. Such conversion is not permitted in the middle of a semester.

2.2.3 Part time - Day time

In this mode of study, the candidates are required to attend classes for the courses registered along with full time students.

2.2.4 Part time - Evening

In this mode of study, the candidates are required to attend only evening classes.

2.2.5 A part time student is not permitted to convert to the full time mode of study.

2.3. ADMISSION REQUIREMENTS

2.3.1 Candidates for admission to the first semester of the Master's Degree Programme shall be required to have passed an appropriate degree examination of this University as specified in Table 1 or any other examination of any University or authority accepted by the University as equivalent thereto.

2.3.2 Notwithstanding the qualifying examination the candidate might have passed, he/she shall have a minimum level of proficiency in the appropriate programme/courses as prescribed by the institution from time to time.

2.3.3 Eligibility conditions for admission such as class obtained, number of attempts in qualifying examination and physical fitness will be as prescribed by the Institution from time to time.

2.3.4 All part-time candidates should satisfy other conditions regarding experience, sponsorship etc., which may be prescribed by the institution from time to time.

2.3.5 A candidate eligible for admission to M.Tech. Part Time - Day Time programmeshall have his/her permanent place of work within a distance of 65km from the campus of the institution.

2.3.6 A candidate eligible for admission to M.B.A. Part Time - Evening programme shall have a working experience of 2 years at least at supervisory level. He/ she shall have his/her place of work within a distance of 65 km from the campus of the institution.

3.0 DURATION AND STRUCTURE OF THE P.G. PROGRAMME

3.1. The minimum and maximum period for completion of the P.G. Programmes are given below:

Programme	Min. No. of Semesters	Max. No. of Semesters
M.Tech. (Full Time)	4	8
M.Tech.(Part Time)	6	12
M.C.A. (Full Time)	6	12
M.Sc. (Full Time)	4	8

3.2 The P.G. programmes will consist of the following components as prescribed in the respective curriculum

i. Core courses

ii. Elective courses

iii. Project work / thesis / dissertation

iv. Laboratory Courses

v. Case studies

vi. Seminars

vii. Practical training

3.3 The curriculum and syllabi of all the P.G. programmes shall be approved by the Academic Council.

3.4 The number of credits to be earned for the successful completion of the programme shall be specified in the curriculum of the respective specialization of the P.G. programme.

3.5 Each academic semester shall normally comprise of 75 to 80 working days spread over sixteen weeks. End-semester examinations will follow immediately after these working days.

3.6 The curriculum of P.G. programmes shall be so designed that the minimum prescribed credits required for the award of the degree shall lie within the limits specified below:

Programme	Minimum prescribed credit range
M.Tech.	70 to 80
M.C.A	130 to 140
M.Sc	74 to 80

3.7 Credits will be assigned to the courses for all P.G. programmes as given below:

* One credit for one lecture period per week
* One credit for one tutorial period per week
* One credit each for seminar/practical session of two or three periods per week
* One credit for four weeks of practical training

3.8 The number of credits registered by a candidate in non-project semester and project semester should be within the range specified below:

P.G. Programme	**Non-project Semester**	**Project semester**
M.Tech. (Full Time)	15 to 23	12 to 20
M.Tech. (Part Time)	6 to 12	12 to 16
M.C.A. (Full Time)	12 to 25	12 to 20
M.Sc. (Full Time)	15 to 25	12 to 20

3.9 The electives from the curriculum are to be chosen with the approval of the Head of the Department.

3.10 A candidate may be permitted by the Head of the Department to choose electives offered from other P.G. Programmes either within a Department or from other Departments up to a maximum of three courses during the period of his/her study, provided the Heads of the Departments offering such courses also agree.

3.11 To help the students to take up special research areas in their project work and to enable the department to introduce courses in latest/emerging areas in the curriculum, "Special Electives" may be offered. A candidate may be permitted to register for a "Special Elective" up to a maximum of three credits

during the period of his/her study, provided the syllabus of this course is recommended by the Head of the Department and approved by the Dean (AC) before the commencement of the semester, in which the special elective course is offered. Subsequently, such course shall be ratified by the Board of Studies and Academic Council.

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

3.13 Practical training or industrial attachment, if specified in the curriculum shall be of not less than four weeks duration and shall be organized by the Head of the Department.

3.14 PROJECT WORK/THESIS/DISSERTATION

3.14.1 Project work / Thesis / Dissertation shall be carried out under the supervision of a qualified teacher in the concerned Department.

3.14.2 A candidate may however, in certain cases, be permitted to work on the project in an Industrial/Research Organization, on the recommendation of Head of the Department, with the approval of the Head of the Institution. In such cases, the project work shall be jointly supervised by a supervisor of the Department and an Engineer / Scientist from the organization and the student shall be instructed to meet the supervisor periodically and to attend the review committee meetings for evaluating the progress.

3.14.3 Project work / Thesis / Dissertation (Phase - II in the case of M.Tech.) shall be pursued for a minimum of 16 weeks during the final semester, following the preliminary work carried out in Phase-1 during the previous semester.

3.14.4 The Project Report/Thesis / Dissertation report / Drawings prepared according to approved guidelines and duly signed by the supervisor(s) and the Head of the Department shall be submitted to the Head of the Institution.

3.14.5 The deadline for submission of final Project Report / Thesis / Dissertation is within 30 calendar days from the last working day of the semester in which Project / Thesis / Dissertation is done.

3.14.6 If a candidate fails to submit the Project Report / Thesis / Dissertation on or before the specified deadline he / she is deemed to have not completed the Project Work / Thesis / dissertation and shall re-register the same in a subsequent semester.

3.14.7 A student who has acquired the minimum number of total credits prescribed in the Curriculum for the award of the Masters Degree will not be permitted to enroll for more courses to improve his/her cumulative grade point average (CGPA).

4.0 FACULTY ADVISER

To help the students in planning their courses of study and for getting general advice on academic programme, the concerned department will assign a certain number of students to a faculty member who will be called the Faculty Adviser.

5.0 CLASS COMMITTEE

5.1 Every class of the P.G. Programme will have a Class Committee, constituted by the Head of the Department as follows:

i. Teachers of all courses of the programme

ii. One senior faculty preferably not offering courses for the class, as chairperson.

iii. One or two students of the class, nominated by the Head of the Department.

iv. Faculty Advisers of the class - Ex-Officio Members

v. Professor in-charge of the P.G. Programme - Ex-Officio Member.

5.2 The Class Committee shall be constituted by the respective head of the department of the students.

5.3 The basic responsibilities of the Class Committee are to review periodically the progress of the classes, to discuss problems concerning curriculum and syllabi and the conduct of the classes. The type of assessment for the course will be decided by the teacher in consultation with the Class Committee and will be announced to the students at the beginning of the semester. Each Class Committee will communicate its recommendations to the Head of the Department and the Head of the Institution. The class committee, **without the student members,** will also be responsible for finalization of the semester results.

5.4 The Class Committee is required to meet at least thrice in a semester, once at the beginning of the semester, another time after the end-semester examination to finalise the grades, and once in between.

6.0 COURSE COMMITTEE

Each common theory course offered to more than one group of students shall have a "Course Committee" comprising all the teachers teaching the common course with one of them nominated as Course coordinator. The nomination of the Course coordinator shall be made by the Head of the Department / Head of the Institution depending upon whether all the teachers

teaching the common course belong to a single department or to several departments. The Course Committee shall meet as often as possible and ensure uniform evaluation of the tests and arrive at a common scheme of evaluation for the tests. Wherever it is feasible, the Course Committee may also prepare a common question paper for the test(s).

7.0 REGISTRATION AND ENROLMENT

7.1 For the first semester every student has to register and enroll for the courses he/she intends to undergo on a specified day notified to the student. The concerned Faculty Adviser will be present and guide the students in the registration/enrolment process.

7.2 For the subsequent semesters registration for the courses will be done by the student during a specified week before the end-semester examination of the previous semester. The curriculum gives details of the core and elective courses, project and seminar to be taken in different semester with the number of credits. The student should consult his/her Faculty Adviser for the choice of courses. The Registration form is filled in and signed by the student and the Faculty Adviser.

7.3 Late registration will be permitted with a prescribed fine up to two weeks from the last date specified for registration.

7.4 From the second semester onwards all students shall pay the prescribed fees and enroll on a specified day at the beginning of a semester.

A student will become eligible for enrolment only if he/she satisfies clause 9 and in addition he/she is not debarred from enrolment by a disciplinary action of the Institution. At the time of enrolment a student can drop a course registered earlier and also substitute it by another course for valid reasons with the consent of the Faculty Adviser. Late enrolment will be permitted on payment of a prescribed fine up to two weeks from the date of commencement of the semester.

7.5 Withdrawal from a course registered is permitted up to one week from the date of the completion of the first assessment test.

7.6 Change of a course within a period of 15 days from the commencement of the course, with the approval of Dean (AC), on the recommendation of the HOD, is permitted.

7.6.1 Courses withdrawn will have to be taken when they are offered next if they belong to the list of core courses.

7.7 SUMMER TERM COURSES

7.7.1 Summer term courses may be offered by a department on the recommendation by the Departmental Consultative Committee and approved by the Head of the Institution. No student should register for more than three courses during a summer term.

7.7.2 Summer term courses will be announced by the Head of the Institution at the end of the even semester before the commencement of the end semester examinations. A student will have to register within the time stipulated in the announcement. A student has to pay the fees as stipulated in the announcement.

7.7.3 Fast-track summer courses of 30 periods for 3 credit courses and 40 periods for 4 credit courses will be offered for students with I grades. They may also opt to redo such courses during regular semesters with slotted time-tables. Students with U grades will have the option either to write semester end arrears exam or to redo the courses during summer / regular semesters with slotted time-table, if they wish to improve their continuous assessment marks also.

The assessment procedure in a summer term course will also be similar to the procedure for a regular semester course.

7.7.4 Withdrawal from a summer term course is not permitted. No substitute examination will be held for the summer term courses.

8.0 TEMPORARY WITHDRAWAL FROM THE PROGRAMME

A student may be permitted by the Head of the Institution to temporarily withdraw from the programme up to a maximum of two semesters for reasons of ill health or other valid grounds. However the total duration for completion of the programme shall not exceed the prescribed number of semesters (vide clause 3.1).

9.0 MINIMUM REQUIREMENTS TO REGISTER FOR PROJECT / THESIS / DISSERTATION

9.1 A candidate is permitted to register for project semester, if he/she has earned the minimum number of credits specified below:

Programme	Minimum No. of credits to be earned to enrol for project semester
M.Tech. (Full time)	18 (III semester)
M.Tech. (Part-time)	18 (V semester)
M.C.A. (Full time)	45 (VI semester)
M.Sc. (Full-time)	28 (IV semester)

9.2 **M.Tech.:** If the candidate has not earned minimum number of credits specified, he/she has to earn the required credits (at least to the extent of minimum credit specified in clause 9.1) and then register for the project semester.

9.3 **M.C.A.:** If the candidate has not earned the required minimum number of credits specified he/she has to earn the required credits (at least to the extent of minimum credits specified in clause 9.1) and then register for the project work in subsequent semesters.

10.0 DISCIPLINE

10.1 Every candidate is required to observe discipline and decorous behaviour both inside and outside the campus and not to indulge in any activity, which will tend to bring down the prestige of the institution.

10.2 Any act of indiscipline of a candidate reported to the Head of the Institution will be referred to a Discipline and Welfare Committee for taking appropriate action.

10.3 Every candidate should have been certified by the HOD that his / her conduct and discipline have been satisfactory.

11.0 ATTENDANCE

11.1 Attendance rules for all Full Time Programme and Part time - day Time Programmes are given in the following sub-clauses.

11.2 A student is **shall earn 100% attendance** in the contact periods of every course, subject to a **a maximum relaxation of 25%** for genuine reasons like on medical grounds, representing the University in approved events etc., to become eligible to appear for the end-semester examination in that course,

failing which the student shall be awarded "I" grade in that course. If the course is a core course, the candidate should register for and repeat the course when it is offered next.

12.0 ASSESSMENTS AND EXAMINATIONS

12.1 The following rule shall apply to the full-time and part-time P.G. programmes (M.Tech./ M.C.A. / M.Sc.)

For lecture-based courses, normally a minimum of two assessments will be made during the semester. The assessments may be combination of tests and assignments. The assessment procedure as decided at the Class Committee will be announced to the students right at the beginning of the semester by the teacher and informed to Dean(AC)

12.2 There shall be one **examination** of three hours duration, at the end of the semester, in each lecture based course.

12.3 The evaluation of the Project work will be based on the project report and a Viva-Voce Examination by a team consisting of the supervisor concerned, an Internal Examiner and External Examiner to be appointed by the Controller of Examinations.

12.4 At the end of practical training or industrial attachment, the candidate shall submit a certificate from the organization where he/she has undergone training and also a brief report. The evaluation will be made based on this report and a Viva-Voce Examination, conducted internally by a Departmental Committee constituted by the Head of the Department.

13.0 WEIGHTAGES

13.1 The following shall be the weightages for different courses:

i)	**Lecture based course**		
	Two sessional assessments	-	50%
	End-semester examination	-	50%
ii)	**Laboratory based courses**		
	Laboratory work assessment	-	75%
	End-semester examination	-	25%
iii)	**Project work**		
	Periodic reviews	-	50%
	Evaluation of Project Report by External Examiner	-	20%
	Viva-Voce Examination	-	30%

13.2 The markings for all tests, tutorial assignments (if any), laboratory work and examinations will be on absolute basis. The final percentage of marks is calculated in each course as per weightages given in clause 13.1.

14.0 SUBSTITUTE EXAMINATION

14.1 A student who has missed for genuine reasons any one of the three assessments including end-semester examination of a course may be permitted to write a substitute examination. However, permissions to take up a substitute examination will be given under exceptional circumstances, such as accident or admissions to a hospital due to illness, etc.,

14.2 A student who misses any assessment in a course shall apply in a prescribed form to the Dean(AC) through the Head of the department within a week from the date of missed assessment. However the substitute tests and examination for a course will be conducted within two weeks after the last day of the end-semester examinations.

15.0 COURSEWISE GRADING OF STUDENTS AND LETTER GRADES:

15.1 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, but grading has to be relative grading

Letter grade	Grade points
S	10
A	9
B	8
C	7
D	6
E	5
U	0
I	-
W	-

Flexible range grading system will be adopted

"W" denotes withdrawal from the course.

"I" denotes inadequate attendance and hence prevention from End Semester examination.

"U" denotes unsuccessful performance in a course.

15.2 A student is considered to have completed a course successfully and earned the credits if he / she secure five grade points or higher. A letter grade U in any course implies unsuccessful performance in that course. A course successfully completed cannot be repeated for any reason.

16.0 METHOD OF AWARDING LETTER GRADE:

16.1 A final meeting of the Class Committee without the student member(s) will be convened within ten days after the last day of the semester end examination. The letter grades to be awarded to the students for different courses will be finalized at the meeting.

16.2 Three copies of the results sheets for each course, containing the final grade and three copies with the absolute marks and the final grade should be submitted by the teacher to the concerned Class Committee Chairman. After finalisation of the grades at the class committee meeting the Chairman will forward two copies of each to the Controller of Examinations and the other copies to the Head of the Department in which course is offered.

17.0 DECLARATION OF RESULTS:

17.1 After finalisation by the Class Committee as per clause 16.1 the Letter Grades awarded to the students in the each course shall be announced on the departmental notice board after duly approved by the Controller of Examinations. In case any student feels aggrieved, he/she can apply for revaluation after paying the prescribed fee for the purpose, within two weeks from the commencement of the semester immediately following the announcement of results. A committee will be constituted by the Controller of Examinations comprising the Chairperson of the concerned Class Committee (Convener), the teacher concerned and another teacher of the department who is knowledgeable in the concerned course. If the Committee finds that the case is genuine, it may jointly revalue the answer script and forward the revised mark to the Controller of Examinations with full justification for the revision if any.

17.2 The **"U"** grade once awarded stays in the grade sheet of the students and is not deleted when he/she completes the course successfully later. The grade

acquired by the student later will be indicated in the grade sheet of the appropriate semester.

18.0 COURSE REPETITION AND ARREARS EXAMINATION

18.1 A student should register to re-do a core course wherein "I" or "W" grade is awarded. If the student is awarded "I", or "W" grade in an elective course either the same elective course may be repeated or a new elective course may be taken.

18.2 A student who is awarded "U" grade in a course shall write the end-semester examination as arrear examination , at the end of the next semester, along with the regular examinations of next semester courses. **The marks earned earlier in the continuous assessment tests for the course, will be used for grading along with the marks earned in the end-semester arrear examination for the course.**

19.0 GRADE SHEET

19.1 The grade sheet issued at the end of the semester to each student will contain the following:

(i) the credits for each course registered for that semester.

(ii) the performance in each course by the letter grade obtained.

(iii) the total credits earned in that semester.

(iv) the Grade Point Average (GPA) of all the courses registered for that semester and the Cumulative Grade Point Average (CGPA) of all the courses taken up to that semester.

19.2 The GPA will be calculated according to the formula

$$GPA = \frac{\sum_i (C_i)(GP_i)}{\sum_i C_i}$$

where C_i is the number of credits assigned for i^{th} course
GP_i - Grade point obtained in the i^{th} course
For the cumulative grade point average (CGPA) a similar formula is used except that the sum is over all the courses taken in all the semesters completed up to the point in time.

I and W grades will be excluded for GPA calculations.

U, I and W grades will be excluded for CGPA calculations.

19.3 Classification of the award of degree will be as follows:

CGPA	Classification
8.50 and above, having completed in first appearance in all courses	First class with Distinction
6.50 and above, having completed within a period of 2 semesters beyond the programme period.	First Class
All others	Second Class

However, to be eligible for First Class with Distinction, a candidate should not have obtained U or I grade in any course during his/her study and should have completed the P.G. Programme within a minimum period covered by the minimum duration (clause 3.1) plus authorized break of study, if any (clause 8). To be eligible for First Class, a candidate should have passed the examination in all courses within the specified minimum number. of semesters reckoned from his/her commencement of study plus two semesters. For this purpose, the authorized break of study will not be counted. The candidates who do not satisfy the above two conditions will be classified as second class. For the purpose of classification, the CGPA will be rounded to first decimal place. For the purpose of comparison of performance of candidates and ranking, CGPA will be considered up to three decimal places.

20 ELIGIBILITY FOR THE AWARD OF THE MASTERS DEGREE

20.1 A student shall be declared to be eligible for the award of the Masters Degree, if he/she has:

i) registered for and undergone all the core courses and completed the Project Work,

ii) successfully acquired the required credits as specified in the Curriculum corresponding to his/her programme within the stipulated time,

iii) successfully completed the field visit/industrial training, if any, as prescribed in the curriculum.

iv) has no dues to the Institution, Hostels and Library.

v) no disciplinary action is pending against him/her

20.2 The award of the degree must be approved by the University.

21.0 POWER TO MODIFY:

Notwithstanding all that have been stated above, the Academic Council has the right to modify any of the above regulations from time to time.

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M.TECH. CONSTRUCTION ENGINEERING AND PROJECT MANAGEMENT
(Four Semesters / Full time)

SEMESTER I

S.No	Code	Subject Name	L	T	P	C	TC
		Theory					
1	CE 615	Management Theory & Practices	3	0	0	3	
2	CE 616	Modern Construction Practices	3	0	0	3	
3	CE 617	Financial Accounting & Management	3	0	0	3	
4	CE 618	Construction Planning, Scheduling & Control	3	0	0	3	
5	CEY1--	Elective I	3	0	0	3	
6	CEY1--	Elective II	3	0	0	3	
		Practical					
1	CE619	Computer Workshop I	0	0	3	1	**19**

SEMESTER II

S.No	Code	Subject Name	L	T	P	C	TC
		Theory					
1	CE 620	Project Planning & Appraisal	3	0	0	3	
2	CE 621	Construction Personnel Management	3	0	0	3	
3	CE 622	Contract Laws and Regulations	3	0	0	3	
4	CEY 1--	Elective III	3	0	0	3	
5	CEY 1--	Elective IV	3	0	0	3	
6	CEY 1--	Elective V	3	0	0	3	
		Practical					
1	CE 623	Computer Workshop II	0	0	3	1	**19**

SEMESTER III

S.No	Code	Subject Name	L	T	P	C	TC
		Theory					
1	CEY1--	Elective VI	3	0	0	3	
2	CEY1--	Elective VII	3	0	0	3	
3	CEY1--	Elective VIII	3	0	0	3	
4	CE 715	Project Work Phase I	0	0	12	6*	
5	CE 716	Seminar	0	0	3	1	**10**

SEMESTER IV

S.No	Code	Subject Name	L	T	P	C	TC
		Theory					
1	CE 715	Project Work Phase II	0	0	35	18*	**24**

Total : 72

* ***Note :*** Credits for project work (Phase-I) on third Semester will be accounted along with project work (Phase-II) of 4th Semester.

ELECTIVES

Semester I					
Code	**Subject Name**	**L**	**T**	**P**	**C**
CEY 101	System Integration in Construction	3	0	0	3
CEY 102	Construction Quality Control & Management	3	0	0	3
CEY 103	Project Safety Management	3	0	0	3
CEY 104	Principles of Architecture & Landscaping	3	0	0	3
Semester II					
CEY 111	Urban Planning & Design	3	0	0	3
CEY 112	Pavement Engineering and Management	3	0	0	3
CEY 113	Environmental Impact Assessment	3	0	0	3
CEY 114	Principles of Sustainable Development	3	0	0	3
CEY 009	Maintenance & Rehabilitation of Structures	3	0	0	3
CEY 116	Energy Conservation Techniques in Building Construction	3	0	0	3
Semester III					
CEY 121	Total Quality Management	3	0	0	3
CEY 122	Business Ethics for Civil Engineers	3	0	0	3
CEY 123	Management Information System	3	0	0	3
CEY 124	Infrastructure Development and Financing	3	0	0	3
CEY 125	Transportation Planning and Management	3	0	0	3
CEY 126	Remote Sensing & GIS in Civil Engineering	3	0	0	3
CEY 127	Construction Equipment & Management	3	0	0	3

SPECIAL ELECTIVES

CEY 137	Probability and Statistics for Civil Engineers	3	0	0	3

SYLLABUS

SEMESTER - 1

CE 615 MANAGEMENT THEORY & PRACTICE

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UNIT I INTRODUCTION 5

Management - definitions, types of managers; managerial roles and functions; Science or Art? - Administration vs Management, External environment - Managing people and organizations in the context of New Era- Managing for competitive advantage - the Challenges of Management - Corporate Social responsibility- Managerial Ethics.

UNIT II MANAGEMENT THEORIES 8

Perspectives on Management: Scientific Management (Fredrick W.Taylor, Frank and Lillian Gilbreth), Human Relations (Elton Mayo, Douglas Mc Gregor's Theory X and Theory Y, William Ouchi's Theory Z), the Systems Approach, the Contingency Approach, the Mckinsey 7-S Framework

UNIT III PLANNING AND DECISION MAKING 8

Nature of planning, Steps in planning, types of planning, Levels of planning - The Planning Process. - Planning practices in USA, Japan and China. Problem and Opportunity finding, the nature of Managerial Decision Making, the Rational Model of Decision Making, Challenges to the Rational Model. Improving the Effectiveness of Decision Making Tools and Techniques, Role of Boards and Committees in Decision Making - Decision making practices abroad.

UNIT IV ORGANISATION AND LEADERSHIP 12

Organising Nature of organizing, organization levels and span of management - Factors determining span - Organisational design and structure - departmentation, line and staff concepts, staffing - delegation, decentralization and recentralisation of authority - responsive organizations -Global organizing.Leading Vs Managing - Trait approach and Contingency approaches to leadership - Dimensions of Leadership - Leadership Behavior and styles - developing leadership skills - transformational leaders - Leadership in Cross-cultural environment - Evaluating Leader- Women and Corporate leadership -Motivational theories- Building Groups into Teams, Intergroup Behavior, conflict and negotiation - Global leading.

UNIT V COMMUNICATION **12**

Importance of Communication, Interpersonal communication Barriers to Effective communication, Communication in Organizations, Using Communication Skills to manage Conflicts. Communicating for understanding and results, creating productive interpersonal relationships, Guidelines to improve written and oral communication- communication practices in India and abroad. Controlling Basic control process- control as a feedback system - Feed Forward Control - Requirements for effective control - control techniques - Overall controls and preventive controls - Global controlling.

TOTAL: 45 PERIODS

REFERENCES:

1. Stoner, Freeman and Gilbert, Jr. Management, 6/e, Pearson Education, New Delhi, 2006
2. Koontz, Weihrich & Aryasri, Principles of Management, TMH, New Delhi, 2007
3. Heinz Weihrich, Harold Koontz: Management A Global Perspective, 10/e, Tata McGraw Hill, 2007
4. Daft, The New Era of Management, Thompson, 7/e New Delhi, 2007
5. Schermerhorn: Management 8ed,Wiley India 2006
6. Prem Vrat, K K Ahuja, P K Jain, Case Studies in Management, Vikas Publishing House Pvt. Ltd., 2006.
7. Lussier: Effective Leadership, Thomson, 2007
8. Robbins: Management 7/e Pearson Education, 2006
9. Griffin:Management 8ed, Biztantra, 2005
10. Mullins: Management and Organisational Behaviour, Pearson, 2007

CE 616 MODERN CONSTRUCTION PRACTICES

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UNIT I SPECIAL CONCRETES **9**

High Strength and High Performance Concrete - Fibre Reinforced Concrete, Self compacting concrete, Alternate Materials to concrete.

UNIT II METALS & COMPOSITES **9**

Steels - New Alloy Steels - Aluminum and its Products - Plastics - Fibre Reinforced Polymers (FRP)

UNIT III SUB STRUCTURE CONSTRUCTION **9**

Box jacking - pipe jacking - Under water construction of diaphragm walls and basement - Tunneling techniques - piling techniques - driving well and caisson - sinking cofferdam - cable anchoring and grouting - large reservoir construction - well points - dewatering and stand by plant equipment for underground open excavation.

UNIT IV SUPER STRUCTURE CONSTRUCTION FOR BUILDINGS **9**

Vacuum dewatering of concrete flooring - concrete paving technology - techniques of construction for continuous concreting operation in tall buildings of various shapes and varying sections - erection techniques for tall structures, large span structures - launching techniques for heavy decks - insitu prestressing in high rise structures, erecting lightweight components on tall structures.

UNIT V CONSTRUCTION OF SPECIAL STRUCTURES **9**

Construction sequence in cooling towers, silos, chimney, sky scrapers, bow string bridges, cable stayed bridges - launching and pushing of box decks - Advanced construction techniques for offshore structures - support structure for heavy equipment and conveyor and machinery in heavy industries - erection of articulated structures, braced domes and space decks.

TOTAL : 45 PERIODS

REFERENCES:

1. Santhakumar.A.R., Concrete Technology, Oxford University press, New Delhi. 2007.
2. Mamlouk, M.S. and Zaniewski, J.P., Materials for Civil and Construction Engineers, Prentice Hall Inc., 1999.
3. Shetty M.S, Concrete Technology: Theory and Practice, S.Chand & Company Ltd., 2005.
4. ACI Report 440.2R-02, "Guide for the design and construction of externally bonded RP systems for strengthening concrete structures", American Concrete Institute, 2002.
5. Patrick Powers. J., Construction Dewatering: New Methods and Applications, John Wiley & Sons, 1992.
6. Jerry Irvine, Advanced Construction Techniques, CA Rocketr, 1984.
7. Sankar, S.K. and Saraswati, S., Construction Technology, Oxford University Press, New Delhi, 2008.

CE 617 FINANCIAL ACCOUNTING & MANAGEMENT

L	T	P	C
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UNIT I INTRODUCTION TO ACCOUNTING **7**

Introduction to Accounting - Meaning of Accounting ,Branches of accounting, Objectives of accounting -fundamental concepts-Principles and rules of accounting Double entry Book Keeping -classification of accounts

UNIT II BASIC ACCOUNTING **10**

Basic accounting cycles -Journal, ledger and trial balance sheet Financial statements Characteristics-Limitations-Financial Statement analysis. Ratio Analysis

UNIT III CASH FLOW **8**

Cash flow statement, Meaning and concepts of fund flow & cash flow, Difference between fund flow statement and income statement. Preparation and Interpretation of Fund Flow & Cash flow Statement.

UNIT IV COST ACCOUNTING **10**

Cost accounting, Meaning and objective, Classification, Elements of cost Accounting, Elements of costs, Preparation of cost sheet, Allocation and absorption of overheads Direct cost-Overheads-Cost sheet .Standard Costing and Variance Analysis -Marginal Costing Cost- Volume Profit Analysis-Breakeven point .Application of Marginal costing techniques to managerial decision making.

UNIT V BUDGETING **8**

Budgetary Control ,Types of budgets-Techniques for Budgeting

Cash Budget-Functional Budgets-Flexible Budgets-Preparation and Interpretation

REFERENCES:

1. Ramachandran N. Kalani Kumar ram- Financial Accounting for Management - Tata Mc Graw Hill-2006
2. Robert N. Anthony david F. Hawkins Kenneth A. Merchant- Accounting Text and Cases- Tata Mc Graw Hill-2007.
3. Collis - Business Accounting- Palgrave Macmillan -2007

4. Ashok Banerjee -Financial- Accounting for Management - Vikas publishing -2006.

5. S.N. Maheswari S.K. Maheswari-Accounting for Management-Vikas publishing -2006

6. S.K. Bhattacharyya john Dearden-costing for Management -Vikas publishing -2002

7. Khan My Jain P.K- Management Accounting: Text, Problems and Cases 4th Edition-Tata MCGraw Hill -2007

8. Kothari RajeshGodha Abishek -Management Accounting: concepts and Application - Macmillan India Ltd 2006

9. Anthony N. Robert et.al- Accounting Text and Cases 12th edition- Tata MCGraw Hill -2007

10. Tulsian P.C-Fundamentals of Accounting for CA Common Proficiency Test (CPT) -Tata McGraw Hill-2005

11. Prasanna Chandra- Fundamentals of Financial Management : 4th Edition-Tata McGraw Hill -2007

12. Ronald w. Hiltion- Managerial accounting -Tata NCGraw Hill-2005

13. Jan R. Williams Susan F.Haka Mark S. Bettner -Financial & Managerial Accounting The Basis for Business Decisions-Tata McGraw Hill-2005

14. Jain & Narang- Cost Accounting - Kalyani Publisher -2005

15. Banerje-Cost Accounting -PHI-2006

16. Nigam & Jain -Cost Accounting -PHI-2006

CE 618 CONSTRUCTION PLANNING SCHEDULING AND CONTROL **L T P C 3 0 0 3**

UNIT I CONSTRUCTION PLANNING **9**

Basic Concepts in the Development of Construction Plans - Choice of Technology and Construction Method - Defining Work Tasks - Defining Precedence Relationships among Activities - Estimating Activity Durations - Estimating Resource Requirements for Work Activities - Coding Systems

UNIT II SCHEDULING PROCEDURES AND TECHNIQUES **9**

Construction Schedules - Critical Path Method - Scheduling Calculations - Float - Presenting Project Schedules - Scheduling for Activity-on-Node and with Leads, Lags, and Windows - Scheduling with Resource Constraints and Precedences - Use of Advanced Scheduling Techniques - Scheduling with Uncertain Durations - Calculations for Monte Carlo Schedule Simulation - Crashing and Time/Cost Tradeoffs - Improving the Scheduling Process.

UNIT III COST CONTROL, MONITORING AND ACCOUNTING **9**

The Cost Control Problem - The Project Budget - Forecasting for Activity Cost Control - Financial Accounting Systems and Cost Accounts - Control of Project Cash Flows - Schedule Control - Schedule and Budget Updates - Relating Cost and Schedule Information.

UNIT IV QUALITY CONTROL AND SAFETY DURING CONSTRUCTION9

Quality and Safety Concerns in Construction - Organizing for Quality and Safety - Work and Material Specifications - Total Quality Control - Quality Control by Statistical Methods - Statistical Quality Control with Sampling by Attributes - Statistical Quality Control with Sampling by Variables - Safety

UNIT V ORGANIZATION AND USE OF PROJECT INFORMATION **9**

Types of Project Information - Accuracy and Use of Information - Computerized Organization and Use of Information - Organizing Information in Databases - Relational Model of Databases - Other Conceptual Models of Databases - Centralized Database Management Systems - Databases and Applications Programs - Information Transfer and Flow.

TOTAL: 45 PERIODS

REFERENCES:

1. Chitkara, K.K. Construction Project Management: Planning, Scheduling and Control, Tata McGraw-Hill Publishing Company, New Delhi, 1998.
2. Calin M. Popescu, Chotchai Charoenngam, Project Planning, Scheduling and Control in Construction: An Encyclopedia of terms and Applications, Wiley, New York, 1995.
3. Chris Hendrickson and Tung Au, Project Management for Construction - Fundamental Concepts for Owners, Engineers, Architects and Builders, Prentice Hall, Pittsburgh, 2000.
4. Willis, E. M., Scheduling Construction Projects, John Wiley & Sons, 1986.
5. Halpin, D. W., Financial and Cost Concepts for Construction Management, John Wiley & Sons, New York, 1985.

CE 619	COMPUTER WORKSHOP -I	L T P C 0 0 3 1

M.S. PROJECT

Planning & Scheduling of Multi storied building

Planning & Scheduling of Road construction project.

Prepare the resource sheet, assign &level the resource

Preparing different reports available in MS Project

Plot the variance graphs for the given project

STADDPRO

Analysis and design of continuous beam with various loading systems

Plane frame with two bay and G+ 4 stories

TOTAL :45 PERIODS

REFERENCES:

1. M.S Project Manual
2. STADD Pro . Manual

SEMESTER - II

CE 620 PROJECT PLANNING AND APPRAISAL

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UNIT I PROJECT FORMULATION 10

Project - Concepts - Capital investments - Generation and Screening of Project Ideas - Project identification - Preliminary Analysis, Market, Technical, Financial, Economic and Ecological - Pre-Feasibility Report and its Clearance, Project Estimates and Techno-Economic Feasibility Report, Detailed Project Report - Different Project Clearances required

UNIT II PROJECT COSTING 10

Project Cash Flows - Time Value of Money - Cost of Capital

UNIT III PROJECT APPRAISAL 15

NPV - BCR - IRR - ARR - Urgency - Pay Back Period - Assessment of Various Methods - Indian Practice of Investment Appraisal - International Practice of Appraisal - Analysis of Risk - Different Methods - Selection of a Project and Risk Analysis in Practice

UNIT IV PROJECT FINANCING 5

Project Financing - Means of Finance - Financial Institutions - Special Schemes - Key Financial Indicators - Ratios

UNIT V PRIVATE SECTOR PARTICIPATION 5

Private sector participation in Infrastructure Development Projects - BOT, BOLT, BOOT - Technology Transfer and Foreign Collaboration - Scope of Technology Transfer

TOTAL: 45 PERIODS

REFERENCES:

1. Prasanna Chandra, Projects - Planning, Analysis, Selection, Implementation Review,Tata McGraw Hill Publishing Company Ltd., New Delhi. 2006.
2. Joy P.K., Total Project Management - The Indian Context, New Delhi, Macmillan India Ltd., 1992
3. United Nations Industrial Development Organisation (UNIDO) Manual for the Preparation of Industrial Feasibility Studies, (IDBI Reproduction) Bombay, 1987
4. Barcus, S.W. and Wilkinson.J.W., Hand Book of Management Consulting Services, McGraw Hill, New York, 1986.

CE 621 CONSTRUCTION PERSONNEL MANAGEMENT

L	T	P	C
3	0	0	3

UNIT I MANPOWER PLANNING **10**

Manpower Planning, Organising, Staffing, directing, and controlling - Personnel Principles

UNIT II ORGANISATION **10**

Organisation - Span of Control - Organisation Charts - Staffing Plan - Development and Operation of human resources - Managerial Staffing - Recruitment - Selection - Placement, Training and Development.

UNIT III HUMAN BEHAVIOUR **10**

Introduction to the field of people management - basic individual psychology; motivation - Job design and performance management - Managing groups at work - self-managing work teams - intergroup behaviour and conflict in organisations - Leadership - Behavioural aspects of decision-making; and communication for people management

UNIT IV WELFARE MEASURES **5**

Compensation - Safety and health - GPF - EPF - Group Insurance - Housing - Pension - Laws related to welfare measures.

UNIT V MANAGEMENT AND DEVELOPMENT METHODS **10**

Compensation - Wages and Salary, Employee Benefits, employee appraisal and assessment - Employee services - Safety and Health - Discipline and discharge - Special Human resource problems, Performance appraisal - Employee hand book and personnel manual - Job descriptions and organization structure and human relations - Productivity of Human resources.

TOTAL: 45 PERIODS

REFERENCES:

1. Carleton Counter II and Jill Justice Coutler , The Complete Standard Handbook of Construction Personnel Management, Prentice-Hall, Inc., New Jersey, 1989.
2. Memoria,C.B., Personnel Management, Himalaya Publishing Co., 1997.
3. Josy.J. Familaro, Handbook of Human Resources Administration, McGraw-Hill International Edition, 1987.
4. Charles D Pringle, Justin Gooderi Longenecter, Management, CE Merril Publishing Co. 1981.
5. Dwivedi R.S, Human Relations and Organisational Behaviour, Macmillian India Ltd.,2005.

CE 622 CONTRACT LAWS AND REGULATIONS

L	T	P	C
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UNIT I CONSTRUCTION CONTRACTS **10**

Indian Contracts Act - Elements of Contracts - Types of Contracts - Features - Suitability - Design of Contract Documents - International Contract Document - Standard Contract Document - Law of Torts

UNIT II TENDERS **10**

Prequalification - Bidding - Accepting - Evaluation of Tender from Technical, Contractual and Commercial Points of View - Contract Formation and Interpretation - Potential Contractual Problems - World Bank Procedures and Guidelines - Tamilnadu Transparency in Tenders Act.

UNIT III ARBITRATION **5**

Comparison of Actions and Laws - Agreements - Subject Matter - Violations - Appointment of Arbitrators - Conditions of Arbitration - Powers and Duties of Arbitrator - Rules of Evidence - Enforcement of Award - Costs

UNIT IV LEGAL REQUIREMENTS **10**

Insurance and Bonding - Laws Governing Sale, Purchase and Use of Urban and Rural Land - Land Revenue Codes - Tax Laws - Income Tax, Sales Tax, Excise and Custom Duties and their Influence on Construction Costs - Legal Requirements for Planning - Property Law - Agency Law - Local Government Laws for Approval - Statutory Regulations

UNIT V LABOUR REGULATIONS **10**

Social Security - Welfare Legislation - Laws relating to Wages, Bonus and Industrial Disputes, Labour Administration - Insurance and Safety Regulations - Workmen's Compensation Act - Indian Factory Act - Tamilnadu Factory Act - Child Labour Act - Other Labour Laws

TOTAL: 45 PERIODS

REFERENCES:

1. Gajaria G.T., Laws Relating to Building and Engineering Contracts in India, M.M.Tripathi Private Ltd., Bombay, 1982
2. Jimmie Hinze, Construction Contracts, McGraw Hill, 2001
3. Joseph T. Bockrath, Contracts and the Legal Environment for Engineers and Architects, McGraw Hill, 2000.
4. Kwaku, A., Tenah, P.E. Jose M.Guevara, P.E., Fundamentals of Construction Management and Organisation, Printice Hall, 1985.
5. Patil. B.S, Civil Engineering Contracts and Estimates, Universities Press (India) Private Limited, 2006.

CE 623	Computer workshop - II	L T P C 0 0 3 1

PRIMAVERA

Planning & Scheduling of Multi storied building

Planning & Scheduling of Road construction project

Prepare the resource sheet, assign &level the resource

Preparing different reports available in Primavera

Plot the variance graphs for the given project

ArcGIS

Georeferencing and rectifying toposheets/maps/satellite image

Creating geodatabase, feature dataset, feature class

Digitising

Adding attributes

REFERENCES :

1. Primavera Manual.
2. www.ESRI.com
3. Introduction- to Arc GIS - I - IV, GIS Education solutions from ESRI
4. Kang - tsung Chang "Geographical information system" Tata Mcgraw Hill Publishing company Ltd.2008
5. C.P Lo and Albert K.W Yeung concepts and Techniques of Geographic information system Pearson educations inc, 2009

Total : 45 PERIODS

ELECTIVES

Semester - I

CEY 101 SYSTEM INTEGRATION IN CONSTRUCTION

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UNIT I STRUCTURAL INTEGRATION **9**

Structural System, Systems for enclosing Buildings, Functional aesthetic system, Materials Selection and Specification.

UNIT II ENVIRONMENTAL FACTORS **9**

Qualities of enclosure necessary to maintain a specified level of interior environmental quality - weather resistance - Thermal infiltration - Acoustic Control - Transmission reduction - Air quality - illumination - Relevant systems integration with structural systems.

UNIT III SERVICES **9**

Plumbing - Electricity - Vertical circulation and their interaction - HVAC

UNIT IV MAINTENANCE **9**

Component longevity in terms of operation performance and resistance to deleterious forces - Planning systems for least maintenance materials and construction - access for maintenance - Feasibility for replacement of damaged components - equal life elemental design - maintenance free exposed and finished surfaces.

UNIT V SAFETY **9**

Ability of systems to protect fire - Preventive systems - fire escape system design - Planning for pollution free construction Environmental Hazard free Construction execution.

TOTAL: 45 PERIODS

REFERENCES:

1. William T. Mayer, Energy Economics and Building Design , McGraw-Hill Book Company, 1983.
2. Peter R. Smith and Warren G. Julian, Building Services, Applied Science Publishers Ltd., London, 1993.

3. A.J.Elder and Martiz Vinden Barg, Handbook of Building Enclosure, McGraw-Hill Book Company, 1983.

4. Jane Taylor and Gordin Cooke, The Fire Precautions Act in Practices, 1987.

5. David V.Chadderton, Building Services Engineering, Taylar and Francis, 2007.

CEY 102	CONSTRUCTION QUALITY CONTROL & MANAGEMENT	L	T	P	C
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UNIT I QUALITY MANAGEMENT **9**

Introduction - Definitions and objectives - Factor influencing construction quality - Responsibilities and authority - Quality plan - Quality Management Guidelines - Quality circles.

UNIT II QUALITY SYSTEMS **9**

Introduction - Quality system standard - ISO 9000 family of standards - Requirements - Preparing Quality System Documents - Quality related training - Implementing a Quality system - Third party Certification.

UNIT III QUALITY PLANNING **9**

Quality Policy, Objectives and methods in Construction industry - Consumers satisfaction, Ergonomics - Time of Completion - Statistical tolerance - Taguchi's concept of quality - Codes and Standards - Documents - Contract and construction programming - Inspection procedures - Processes and products - Total QA / QC programme and cost implication.

UNIT IV QUALITY ASSURANCE AND CONTROL **9**

Objectives - Regularity agent, owner, design, contract and construction oriented objectives, methods - Techniques and needs of QA/QC - Different aspects of quality - Appraisals, Factors influencing construction quality - Critical, major failure aspects and failure mode analysis, -Stability methods and tools, optimum design - Reliability testing, reliability coefficient and reliability prediction.

UNIT V QULAITY IMPROVEMENT TECHNIQUES **9**

Selection of new materials - Influence of drawings, detailing, specification, standardization - Bid preparation - Construction activity, environmental safety, social and environmental factors - Natural causes and speed of construction - Life cycle costing - Value engineering and value analysis.

TOTAL: 45 PERIODS

REFERENCES:

1. James, J.o' Brian, Construction Inspection Handbook - Quality Assurance and Quality Control, Van Nostrand, New York, 1989.
2. Kwaku, A., Tena, Jose, M. Guevara, Fundamentals of Construction Management and Organisation, Reston Publishing Co., Inc.,Virginia, 1985.

3. Juran Frank, J.M. and Gryna, F.M. Quality Planning and Analysis, Tata McGraw Hill, 1993

4. Hutchins.G, ISO 9000, Viva Books, New Delhi, 2000

5. Clarkson H. Oglesby, Productivity Improvement in Construction, McGraw-Hill, 1989.

6. John L. Ashford, The Management of Quality in Construction, E & F.N.Spon, New York, 1989.

CEY 103 PROJECT SAFETY MANAGEMENT

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UNIT I CONSTRUCTION ACCIDENTS **10**

Accidents and their Causes - Human Factors in Construction Safety - Costs of Construction Injuries - Occupational and Safety Hazard Assessment - Legal Implications

UNIT II SAFETY PROGRAMMES **10**

Problem Areas in Construction Safety - Elements of an Effective Safety Programme - Job-Site Safety Assessment - Safety Meetings - Safety Incentives

UNIT III CONTRACTUAL OBLIGATIONS **5**

Safety in Construction Contracts - Substance Abuse - Safety Record Keeping

UNIT IV DESIGNING FOR SAFETY **15**

Safety Culture - Safe Workers - Safety and First Line Supervisors - Safety and Middle Managers - Top Management Practices, Company Activities and Safety - Safety Personnel - Sub contractual Obligation - Project Coordination and Safety Procedures - Workers Compensation

UNIT V OWNERS' AND DESIGNERS' OUTLOOK CASE STUDIES **5**

TOTAL: 45 PERIODS

REFERENCES:

1. Jimmy W. Hinze, Construction Safety, Prentice Hall Inc., 1997.
2. Richard J. Coble, Jimmie Hinze and Theo C. Haupt, Construction Safety and Health Management, Prentice Hall Inc., 2001.
3. Tamilnadu Factory Act, Department of Inspectorate of factories, Tamil Nadu.

CEY 104 PRINCIPLES OF ARCHITECTURE & LANDSCAPING

L	T	P	C
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UNIT I ARCHITECTURAL DESIGN **6**

Architectural design - an analysis - Integration of function and aesthetics - Introduction to basic elements and principles of design.

UNIT II CLIMATE RESPONSIVE DESIGN **7**

Factors that determine climate - Characteristics of climate types - Design for various climate types - Passive and active energy controls.

UNIT III BUILDING TYPES **12**

Residential, institutional, commercial and Industrial - Planning concepts - Application of anthropometry and space standards - Interelationships of functions - Safety standards - Building rules and regulations - Integration of building services.

UNIT IV ENVIRONMENTAL DESIGN **10**

Surveys - Site analysis - Development control - Zoning regulations - Layout regulations - Urban planning standards - Layout design concepts.

UNIT V SITE PLANNING **10**

Urban reneual - Conservation - Principles of Landscape design - Case studies.

TOTAL :45 PERIODS

REFERENCES:

1. Francis D.K. Ching, "Architecture: Form, Space and Order", VNR, N.Y., 1999.
2. Givoni B., "Man Climate and Architecture ", Applied Science, Barking ESSEX, 1982.
3. Edward D. Mills, "Planning the Architects Handbook", Butterworth London, 1995.
4. Gallian B. Arthur and Simon Eisner, "The Urban Pattern - City Planning and Design",
5. Affiliated Press Pvt. Ltd., New Delhi, 1995.
6. Margaret Roberts, "An Introduction to Town Planning Techniques", Hutchinson, London,1990.

Semester - II

CEY 111	URBAN PLANNING & DESIGN	L	T	P	C
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UNIT I INTRODUCTION **9**

Definition of Terms - Human Settlement, Town/City, Region, City Region, Urbanisation, Suburbanisation, Urban Sprawl, Urban Fringe, Central Business District (CBD), Trend of Urbanisation at International, National, State and District levels .National and Regional Development Policies and Strategies - Urbanisation, Housing and Transportation Sustainable Urban Development- Definition and Principles.

UNIT II PLANNING PROCESS **9**

Types of Urban and Regional Plans, Stages in the Planning Process - Delineation of Planning Areas, Goals and Objectives of Plans, Surveys and Analysis, Formulation of Plans, Evaluation of Alternative Plans, Plan Implementation, Legal, Financial and Institutional Constraints in the Planning Process .Social Orientation in the Planning Process.

UNIT III DEVELOPMENT MANAGEMENT SYSTEMS **9**

Development Control Rules - Zoning Regulations, Sub Divisional Regulations, Building Bye-laws, Co-ordination between Urban Local Bodies and Other Functional Agencies such as Water supply & Sewerage Boards, Housing Boards including Slum Boards and Planning Authorities

UNIT IV ARCHITECTURAL DESIGN **9**

Architectural design - principle of architecture - factors that determine climate - various design for climate - principle of landscape design

UNIT V MANAGEMENT INFORMATION AND DECISION SUPPORT SYSTEM **9**

Database, Management information system, Decision Support system for Land Suitability, Urban Renewal and Network Analysis.

TOTAL: 45 PERIODS

TEXT BOOKS:

1. Gallian B Arthur and Simon Eisner, The Urban Pattern, City Planning and Design, Affiliated Press Pvt. Ltd, New Delhi, 1995.

2. Margaret Roberts, An Introduction to Town Planning and Planning Techniques, Hutchinson, London, 1990.

REFERENCES:

1. Master Plans for Cities and Towns prepared by Planning Authorities, 2011Chennai Metropolitan Development Authority, 1995.

2. Development Control Rules for Chennai Metropolitan Area, CMDA, Chennai, 2002.

3. Rangwala S C, Town Planning, Charotar Publishing House, 1987.

4. Francis D.K.Ching "Architecture: Forms, space and order ", VNR, N.Y.1999

CEY 112 PAVEMENT ENGINEERING AND MANAGEMENT

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UNIT I PAVEMENT CHARACTERISTICS AND TESTING **10**

Road Pavements and pavement layers - types, functions, choice Factors affecting design and Performance of flexible and rigid pavements - Pavement design factors, loads - axle load Distribution, ESWL, EWL,VDF due to varying loads and CSA , Sub grade support - CBR and plate bearing tests, Resilient Modulus, fatigue tests, permanent deformation Pavement material Characteristics, climatic, drainage and environmental factors, their effects and evaluation. Factors affecting design and performance of airport pavements.

UNITI II PAVEMENT ANALYSIS **10**

Stresses and Deflection / strain in flexible pavements: Application of elastic theory, stresses, deflections / strains in single, two and three layer system, Applications in pavement design.

UNIT III FLEXIBLE PAVEMENT DESIGN **10**

Empirical, semi empirical and theoretical design approaches, principle, advantages and application. Design steps by CBR method as per IRC, outline of other common design methods such as AASHTO and Asphalt Institute methods.

UNIT IV RIGID PAVEMENT DESIGN **10**

General design principle, Stresses in rigid pavements, stresses due to wheel loads and temperature variations, design of cement concrete pavements (joints and slab thickness) as per IRC guidelines. Design features of CRCP, SFRC and ICBP

UNIT V PAVEMENT MANAGEMENT **5**

Pavement management system - Pavement deterioration, objects and Principle of pavement management, use of HDM - 4

TOTAL: 45 PERIODS

REFERENCES:

1. Yoder and Witczak, 'Principles of Pavement Design' John Wiley and sons Inc(second edition) 1975
2. Yang, 'Design of functional pavements', Tata McGraw - Hill Book Co.

3. Huang, 'Pavement Analysis', Elsevier Publications

4. David Croney, Paul Croney, 'Design & Performance of Road Pavements', Mc Graw hill Book Co.

5. W.Ronald Hudson, Ralph Haas and Zeniswki 'Modern Pavement Management' Tata McGraw - Hill and Co

6. IRC 37-2001, IRC 81-1997, IRC 58 - 2002, IRC 59 - 1976, IRC 101-1988, Indian Roads Congress

7. Khanna and Justo 'Highway Engineering' Nemchand & Bros, Roorkee

CEY 113 ENVIRONMENTAL IMPACT ASSESSMENT **L T P C**
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UNIT I FUNDAMENTALS **7**

Environmental Impact Assessment (EIA)- Environmental Impact Statement - EIA in Project Cycle- Legal and Regulatory aspects in India according to Ministry of Environment and Forests-Types and Limitations of EIA - Cross sectoral issues and terms of reference in EIA - Public Participation in EIA and NGO's Organisations in Environment decision making.

UNIT II COMPONENTS AND METHODS FOR EIA **10**

Components of EIA - Processes - Screening- Scoping- Setting- Analysis- Mitigation. Matrices- Networks - Checklists - Connections and combinations of processes - Cost benefit analysis - Analysis of alternatives - Software packages for EIA - Expert systems in EIA.

UNIT III SOCIO-ECONOMIC IMPACT ASSESSMENT **8**

Prediction tools for EIA - Mathematical modeling for impact prediction - Assessment of impacts - air - water - soil - noise - biological -- Socio-cultural environments -Cumulative Impact Assessment - Documentation of EIA findings - planning - organization of information and visual display materials - Report preparation.

UNIT IV ENVIRONMENTAL MANAGEMENT PLAN **10**

Environmental Management Plan - preparation, implementation and review - Mitigation and Rehabilitation Plans - Policy and guidelines for planning and monitoring programmes - Post project audit - Ethical and Quality aspects of Environmental Impact Assessment.

UNIT V CASE STUDIES **10**

Case studies related to the following sectors- Infrastructure - Mining - Industrial - Thermal Power - River Valley and Hydroelectric - Nuclear Power.

TOTAL: 45 PERIODS

REFERENCES:

1. Lawrence, D.P., Environmental Impact Assessment - Practical solutions to recurrent problems, Wiley-Interscience, New Jersey, 2003.
2. World Bank -Source book on EIA
3. Petts, J., Handbook of Environmental Impact Assessment, Vol., I and II, Blackwell Science, London, 1999.
4. Canter, L.W., Environmental Impact Assessment, McGraw Hill, New York. 1996.
5. Biswas.A.K. and Agarwala. S.B.C. environmental Impact Assessment for developing countries, Butterworth Heinemann, London 1994. source book.

CEY 114 PRINCIPLES OF SUSTAINABLE DEVELOPMENT

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UNIT I CONCEPT OF SUSTAINABLE DEVELOPMENT **9**

Environment and Development - Population poverty and Pollution -Global and Local environmental issues -Resource Degradation- Green house gases- Desertification-industrilization -Social insecurity, Globalization and environment. History and emergence of the concept of sustainable development-Objectives of Sustainable Development

UNIT II COMPONENTS AND DIMENSIONS OF SUSTAINABLE DEVELOPMENT **9**

Components of Sustainability -Complexity of growth and equity -Social economic and environmental dimensions of sustainable development - Environment- Biodiversity- Natural-Resources- Ecosystem integrity- Clean air and water-Carrying capacity- Equity, Quality of Life, Prevention, Precaution- Preservation and Public Participation Structural and functional linking of developmental dimensions.

UNIT III FRAMEWORK FOR ACHIEVING SUSTAINABILITY **9**

Operational guidelines- interconnected prerequisites for sustainable development Empowerment of Women, children, Youth , Indigenous People, Non-Governmental Organizations Local Authorities, Business and industry- Science and Technology for sustainable development- performance indicators of sustainability and assessment mechanism- Constraints and barriers for sustainable development.

UNIT IV SUSTAINABLE DEVELOPMENT OF SOCIO ECONOMIC SYSTEMS **9**

Demographic dynamics of sustainability - Policies for socio-economic development -Strategies for implementing eco-development programmes - Sustainable development through trade -Economic growth -Action plan for implementing sustainable development -Urbanization and sustainable Cities -Sustainable Energy and Agriculture -sustainable livelihoods.

UNIT V SUSTAINABLE DEVELOPMENT AND INTERNATIONAL RESPONSE **9**

Role of developed countries in the development of developing countries- international summits-stockholm to johanesburg -Rio principles-Agenda21-

Conventions-Agreements- Tokyo Declaration -Doubling statement-Transboundary issues integrated approach for resources protection and management

TOTAL: PERIODS 45

REFERENCES:

1. Sayer J. and Campbell, B. The Science of Sustainable Development: Local Livelihoods and the Global environment (Biological conservation restoration & Sustainability Cambridge university Press London 2003
2. Kirkby J. O keefe P. and Timberlake, Sustainable Development, Earthscan Publication London, 1993.
3. Mackenthun K,M Concepts in Environmental Management Lewis Publications London,1988.
4. Bowers J, Sustainability and Environmental Economics - An Alternative Text Logman London 1997.

CEY 009	MAINTENANCE AND REHABILITATION OF STRUCTURES	L	T	P	C
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UNIT I MAINTENANCE AND REPAIR STRATEGIES 8

Definitions : Maintenance, repair and rehabilitation, Facets of Maintenance, importance of Maintenance, Assessment procedure for evaluating a damaged structure, Various aspects of inspection, Destructive and non - destructive testing techniques.

UNIT II CAUSES FOR FAILURES 8

Effects due to climate, temperature, chemicals, wear and erosion, Design and construction errors, Corrosion - Mechanism, causes, consequences and remedial measures, Effect of cover thickness and cracking on durability of concrete.

UNIT III MATERIALS FOR REPAIR 12

Special concretes and mortar, concrete chemicals, Epoxy, Special elements for accelerated strength gain, Expansive cement, Polymer concrete composites, Ferro cement, Fibre reinforced concrete, Fibre reinforced polymer composites, Methods of corrosion protection - corrosion inhibitors, protective coating materials for rebar and concrete, corrosion resistant steel, cathodic protection, micro concrete.

UNIT IV TECHNIQUES FOR REPAIR 9

Rust converters and polymer coating for rebars during repair, Repair mortar for cracks, Bonding agents, Epoxy injection, Guniting and Shotcrete, FRP and Ferro cement Jacketing, vacuum concreting, Bonding plates, Overlays, Protective coatings, Shoring and underpinning.

UNIT V CASE STUDIES 8

Repairs to overcome low member strength, Deflection, Cracking, Chemical attack, Damage due to wear, leakage, fire, marine exposure and corrosion. Engineered demolition techniques for Dilapidated structures - case studies.

TOTAL: 45 PERIODS

TEXT BOOKS:

1. A.R. Santha Kumar, " Concrete Technology", Oxford University Press, (2007).
2. M.S. Shetty, "Concrete Technology - Theory and Practice", S. Chand & Company Limited, (2008).
3. Orched, "Concrete Technology Vol. I and II,

REFERENCES :

1. Lakshmipathy, M. et al. ''Lecture notes of Workshop on "Repairs and Rehabilitation of Structures", 29 - 30th October 1999.
2. Yoshihiko Ohama, "Hand Book of Polymer - Modified Concrete and Mortars", Noyes Publications,(1995).

CEY 116 ENERGY CONSERVATION TECHNIQUES IN BUILDING CONSTRUCTION **L T P C 3 0 0 3**

UNIT I INTRODUCTION **6**

Fundamentals of energy- Energy Production Systems-Heating, Ventilating and Air-conditioning

- Solar Energy and Conservation - Energy Economic Analysis Energy conservation and audits-

Domestic energy consumption - savings -challenges -primary energy use in buildings

Residential - Commercial -Institutional and public buildings -Legal requirements for conservation of fuel and power in buildings.

UNIT II ENVIRONMENTAL **7**

Energy and resource conservation - Design of green buildings - Evaluation tools for building energy - Embodied and operating energy - Peak demand - Comfort and Indoor Air quality - Visual and acoustical quality - Land, water and materials - Airborne emissions and waste management.

UNIT III DESIGN **8**

Natural building design consideration - Energy efficient design strategies - Contextual factors - Longevity and process Assessment - Renewable Energy Sources and design - Advanced building Technologies - Smart buildings - Economies and cost analysis.

UNIT IV SERVICES **12**

Energy in building design - Energy efficient and environment friendly building - Thermal phenomena - thermal comfort - Indoor Air quality - Climate, sun and Solar radiation, - Psychometrics - passive heating and cooling systems - Energy Analysis - Active HVAC systems - Preliminary Investigation - Goals and policies - Energy audit - Types of Energy audit - Analysis of results - Energy flow diagram - Energy consumption / Unit Production - Identification of wastage- Priority of conservative measures - Maintenance of energy management programme

UNIT V ENERGY MANAGEMENT **12**

Energy management of electrical equipment - Improvement of power factor - Management of maximum demand - Energy savings in pumps - Fans -

Compressed air systems - Energy savings in Lighting systems - Air conditioning systems - Applications - Facility operation and maintenance - Facility modifications - Energy recovery dehumidifier - Waste heat recovery - Steam plants and distribution systems - Improvement of boiler efficiency - Frequency of blow down - Steam leakage - steam Flash and condense return.

TOTAL: 45 PERIODS

REFERENCES:

1. Moore F., Environmental Control system Tata McGraw - Hill, Inc. 1994.
2. Brown, GZ, Sun, Wind and light: Architectural design strategies, John Wiley & Sons, 1985.
3. Cook, J, Award - Winning passive Solar Design, Tata McGraw - Hill, 1984.
4. J.R. Waters, Energy conservation in Buildings: A Guide to part L of the Building Regulations, Blackwell Publishing, 2003.

SEMESTER - III

CEY 121 TOTAL QUALITY MANAGEMENT

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UNIT I INTRODUCTION 9

Definition of Quality, Dimensions of Quality, Quality Planning, Quality costs - Analysis Techniques for Quality Costs, Basic concepts of Total Quality Management, Historical Review, Principles of TQM, Leadership - Concepts, Role of Senior Management, Quality Council, Quality Statements, Strategic Planning, Deming Philosophy, Barriers to TQM Implementation.

UNIT II TQM PRINCIPLES 9

Customer satisfaction - Customer Perception of Quality, Customer Complaints, Service Quality, Customer Retention, Employee Involvement - Motivation, Empowerment, Teams, Recognition and Reward, Performance Appraisal, Benefits, Continuous Process Improvement - Juran Trilogy, PDSA Cycle, 5S, Kaizen, Supplier Partnership - Partnering, sourcing, Supplier Selection, Supplier Rating, Relationship Development, Performance Measures - Basic Concepts, Strategy.

UNIT III STATISTICAL PROCESS CONTROL (SPC) 9

The seven tools of quality, Statistical Fundamentals - Measures of central Tendency and Dispersion, Population and Sample, Normal Curve, Control Charts for variables and attributes, Process capability, Concept of six sigma, New seven Management tools.

UNIT IV TQM TOOLS 9

Benchmarking - Reasons to Benchmark, Benchmarking Process, Quality Function Deployment (QFD) - House of Quality, QFD Process, Benefits, Taguchi Quality Loss Function, Total Productive Maintenance (TPM) - Concept, Improvement Needs, FMEA - Stages of FMEA.

UNIT V QUALITY SYSTEMS 9

Need for ISO 9000 and Other Quality Systems, ISO 9000:2000 Quality System - Elements, Implementation of Quality System, Documentation, Quality Auditing, TS 16949, ISO 14000 - Concept, Requirements and Benefits.

TOTAL: 45 PERIODS

TEXT BOOK:

1. Dale H.Besterfiled, et al., Total Quality Management, Pearson Education, Inc. 2003. (Indian reprint 2004). ISBN 81-297-0260-6.

REFERENCES:

1. James R.Evans & William M.Lidsay, The Management and Control of Quality, (5thEdition), South-Western (Thomson Learning), 2002 (ISBN 0-324-06680-5).
2. Feigenbaum.A.V. "Total Quality Management, McGraw Hill, 1991.
3. Oakland.J.S. "Total Quality Management Butterworth - Hcinemann Ltd., Oxford. 1989.
4. Narayana V. and Sreenivasan, N.S. Quality Management - Concepts and Tasks, New Age International 1996.
5. Zeiri. "Total Quality Management for Engineers Wood Head Publishers, 1991.

CEY 122 BUSINESS EHTICS FOR CIVIL ENGINEERS

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UNIT I HUMAN VALUES **10**

Morals, Values and Ethics - Integrity - Work Ethics - Service Learning - Civic Virtue - Respect for Others - Living Peacefully - caring - Sharing - Honesty - Courage - Valuing Time - Co-operation - Commitment - Empathy - Self-Confidence - Character - Spirituality

UNIT II ENGINEERING ETHICS **9**

Senses of 'Engineering Ethics' - variety of moral issues - types of inquiry - moral dilemmas - moral autonomy - Kohlberg's theory - Gilligan's theory - consensus and controversy - Models of Professional Roles - theories about right action - Self-interest - customs and religion - uses of ethical theories.

UNIT III ENGINEERING AS SOCIAL EXPERIMENTATION **9**

Engineering as experimentation - engineers as responsible experimenters - codes of ethics - a balanced outlook on law - the challenger case study

UNIT IV SAFETY, RESPONSIBILITIES AND RIGHTS **9**

Safety and risk - assessment of safety and risk - risk benefit analysis and reducing risk - the three mile island and Chernobyl case studies. Collegiality and loyalty - respect for authority - collective bargaining - confidentiality - conflicts of interest - occupational crime - professional rights - employee rights - Intellectual Property Rights (IPR) - discrimination.

UNIT V GLOBAL ISSUES **8**

Multinational corporations - Environmental ethics - computer ethics - weapons development - engineers as managers-consulting engineers-engineers as expert witnesses and advisors -moral leadership-sample code of Ethics like ASME, ASCE, IEEE, Institution of Engineers (India), Indian Institute of Materials Management, Institution of electronics and telecommunication engineers (IETE), India, etc.

TOTAL: 45 PERIODS

TEXT BOOKS :

1. Mike Martin and Roland Schinzinger, "Ethics in engineering", McGraw-Hill, New York 1996.

2. Govindarajan M, Natarajan S, Senthil Kumar V.S, "Engineering Ethics", Prentice Hall of India, New Delhi, 2004.

REFERENCES :

1. Charles D. Fleddermann, "Engineering Ethics", Pearson Education/ Prentice Hall, New Jersey, 2004 (Indian Reprint)

2. Charles E Harris, Michael S. Protchard and Michael J Rabins, "Engineering Ethics Concepts and Cases", Wadsworth Thompson Learning, United States, 2000 (Indian Reprint now available)

3. John R Boatright, "Ethics and the Conduct of Business", Pearson Education, New Delhi, 2003

4. Edmund G Seebauer and Robert L Barry, "Fundamentals of Ethics for Scientists and Engineers", Oxford University Press, Oxford, 2001.

CEY 123 MANAGEMENT INFORMATION SYSTEM

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UNIT I INTRODUCTION **7**

Information Systems - Establishing the Framework - Business Models - Information System Architecture - Evolution of Information Systems.

UNIT II SYSTEM DEVELOPMENT **8**

Modern Information System - System Development Life Cycle - Structured Methodologies - Designing Computer Based Methods, Procedures, Control - Designing Structured Programs.

UNIT III INFORMATION SYSTEMS **10**

Integrated Construction Management Information System - Project Management Information System - Functional Areas, Finance, Marketing, Production, Personnel - Levels, DSS, EIS, and ES - Comparison, Concepts and Knowledge Representation - Managing International Information System.

UNIT IV IMPLEMENTATION AND CONTROL **10**

Control - Testing Security - Coding Techniques - Defection of Error - Validating - Cost Benefit Analysis - Assessing the value and risk of Information System.

UNIT V SYSTEM AUDIT **10**

Software Engineering qualities - Design, Production, Service, Software specification, Software Metrics, Software quality assurance - Systems Methodology - Objectives - Time and Logic, Knowledge and Human Dimension - Software life cycle models - Verification and Validation.

TOTAL: 45 PERIODS

REFERENCES:

1. Kenneth C Laudon and Jane Price Laudon, Management Information Systems Organisation and Technology, Prentice Hall, 1996.
2. Gordon B. Davis, Management Information System: Conceptual Foundations, Structure and Development, McGraw Hill, 1974.
3. Joyce J Elam, Case series for Management Information Systems , Simon and Schuster, Custom Publishing, 1996.

4. Ralph H Sprague and Huge J Watson, Decision Support for Managers, Prentice Hall, 1996.

5. Michael W. Evans and John J Marciniah, Software Quality assurance and Management, John Wiley and Sons, 1987.

6. Card and Glass, Measuring Software Design quality , Prentice Hall, 1990.

CEY 124	INFRASTRUCTURE DEVELOPMANT AND FINANCING	L	T	P	C
		3	0	0	3

UNIT I INTRODUCTION **9**

Definition of Infrastructure and its importance - Need for infrastructure development - Issues - Overview and current scenario in India - Demand and supply gap and resource requirements

UNIT II ROLE OF PUBLIC AND PRIVATE SECTORS **9**

Role of Government in infrastructure development - Private sector participation in investment and management - Political economy - Project structuring and implementation-BOT, BOLT, BOOT schemes

UNIT III INFRASTRUCTURE FINANCING **9**

Concepts of project financing - Appraisal and financing of project - Infrastructure financing -Financing through international capital markets - Particular reference to urban infrastructure, road, airport, ports, water and sanitation projects - some Indian and foreign examples

UNIT IV PROJECT STRUCTURING AND IMPLEMENTATION **9**

Resource mobilization strategies - Unbundling - Environmental concerns and its impact on infrastructure development - Tendering, bidding and financing - Risks of financing - Role of judiciary in bid evaluation

UNIT V CASE STUDIES **9**

A study of a few World bank reports, at least one each on different infrastructure projects Case studies of at least one project in each of the infrastructure referred in this course

TOTAL: 45 PERIODS

TEXT BOOK:

1. G. Raghram, Rekha jain, Sidharth Sinha, Prem Pangotra, Sebastian Morris, "Infrastructure Development and Financing" Macmillan India Ltd.,

REFERENCES:

1. Alexander, Lan Mayer¸ Colin and weeds, Helen, Regulatory Structure And risk andinfrastructure Firms : An International comparison, World Bank, Washington, D.C. 1997. All India Management Association, New Delhi, Global Trends in Finance Opportunities. For India ,Excel Books New Delhi,1998.

2. Baumol, William J. Panzar John C., Willig Robert D. Rev. Ed. Contestable markets and the Theory of Industry Structure, San Diego, Harcourt Barce Jovanovich, 19988. Borckman, Royston A.C. Ed. Williams Allen,E.D Urban Infrastructure finance, Manila Asian Development Bank, 1996.

3. Carter, Laurence, Sader, frank and Holtedahal , Pernille foreign Direct Investment in central and Eastern European infrastructures, World Bank, Washington D.C. 1996.

4. Chandavarkar , Anand, Infrastructure , finance issues, institutions, and policies Washington D.C., World Bank 1994.

5. Kohli, Harinder Ed., Mody, Ashoka Ed. And witon Ed., choices for Efficient Private provision of infrastructure in East world Bank, Washington D.C.1997.

6. Mody Ashoka Ed., Infrastructure Delivery private Imitative and the Public Good World Bank, Washington.D.C.1996.

7. Raymont, partick Manchester, IT infrastructure: An introduction Blackwell ,1994. Suhubeler, peter participation and partnership in Urban infrastructure management world, Bank Washington D.C.1996.

8. United nations Industrial development Organisation Guidelines for infrastructure Development through Build -Operate-Transfer (BOT) Projects, Vienna, 1996.

9. World Bank , world Development Report 1994. Infrastructure for Development Oxford university Press, New York.

CE 125 TRANSPORTATION PLANNING AND MANAGEMENT

L	T	P	C
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UNIT I TRANSPORTATION SYSTEMS **7**

Systems Approach to Transport Planning - Interdependence of the Landuse and Traffic- Stages in Transportation Planning - Transport Planning Considerations Travel Forecasting Process - Statutory Land Use Planning Process - Planning Issues

UNIT II TRANSPORTATION INVENTORIES & TRAVEL DEMAND FORECASTING **11**

Concepts of Zoning - Methods of Transportation Surveys - Inventory of Transport and other activities - Planning Studies and Methods - Development of Planning Process Conventional Modeling Process - Four Stage Modeling Processes - Trip Generation Models - Trip Distribution Models and Calibration - Advancement in Trip End Modeling

UNIT III ROUTE AND MODE CHOICE MODELING **9**

Methods of Trip Assignment Models - Multi Modal Trip Assignment - Mode Choice and Modal Split Models - Advancement in Route Choice and Mode Choice Modeling

UNIT IV LAND USE TRANSPORT MODEL (LUT) **9**

Accessibility Measures and Basic Theories - Lowery Derivatives Model- Garim Model - Basics of Systems Approach in LUT Model- Classification of Land use Models - Intercity Travel Demand Models - Transit Planning and Services

UNIT V TRANSPORT MANAGEMENT **9**

History of transport with special reference to road transport in India Modes of Road transport Organization- Service station and its functions, General layout of modern service station, Spare parts section and dealership service section, Accounts and books, Different types of cards and their use in maintaining service station records Structure of fleet organization, management of fleet State transport - optimum utilization of fleet, theory of fares/freight Roadworthiness requirement, Maintenance of logbook, History sheet, Causes, and prevention of Road Accident, Analysis of Accident, Economy of replacement, Assessment of used vehicles for sale and purchase, Training of Drivers and Mechanics. Taxation - Structure and formalities relating to calculating and paying the relevant taxes.

TOTAL: 45 PERIODS

REFERENCES:

1. Jotin Khisty C, Kent Lall B, Transportation Engineering - An Introduction, Third Edition, Prentice Hall of India, New Delhi, 2002
2. Papacostas C.S., Prevedouros, Transportation Engineering and Planning, Third Edition, Prentice Hall of India, New Delhi, 2002
3. John D.Edwards (Edr.), Transportation Planning Hand Book, Second Edition, Institute of Transportation Engineers, Prentice Hall Inc., Washington DC, USA, 1999
4. John W Dicky, Metropolitan Transportation Planning - A Decision Oriented Approach, McGraw Hill, New York, 1984
5. O'Flaherty C.A, Transport Planning and Traffic Engineering, Elesevier Publications, New Delhi,1997
6. Transport Management Vol. III' and IV by Central Institute of Road Transport Pune.

CEY 126	REMOTE SENSING AND GIS IN CIVIL ENGINEERING	L	T	P	C
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UNIT I REMOTE SENSING **9**

Concepts of remote sensing- Energy sources and radiation principles-Energy interactions in the atmosphere- spectral reflectance of earth surface features-concepts of microwave remote sensing- Visual interpretation-digital image processing- Image preprocessing- image enhancement-image classification-Remote sensing satellites.

UNIT II BASIC CONCEPTS OF GIS **9**

Basic concepts and components- Hardware, software-Spatial and non-spatial data- Georeferencing- map projection- Types of projection- simple analysis-Data retrieval and querying-data input

UNIT III DATA STRUCTURES AND ANALYSIS **9**

Data base- Data base models- Raster and Vector data structures- Topology-GIS modeling- Raster and Vector data analysis- Buffering and overlaying techniques- DEM TIN and DTM- Network analysis- Output devices, errors, types of errors.

UNIT IV APPLICATIONS IN TRANSPORTATION MANAGEMENT **9**

Highway and railway alignment, location of transport terminals, and road side facilities, bus stops, route optimization, accident analysis-Integration of GIS, GPS, and remote sensing techniques, Advanced traveler information system and automatic vehicle location system.

UNIT V APPLICATIONS IN WATER AND ENVIRONMENT MANAGEMENT **9**

GIS in watershed management, Irrigation management, drought management, Flood management, waste land management- management and monitoring of environment-conservation of resources.

TOTAL : 45 PERIODS

REFERENCE:

1. Burrow P.A. Principles of GIS for Land Resources Assessment, Oxford Publication, 1994.
2. Marble D.F., CalkinsH.W and Penquest, Basic readings in GIS, Speed System Ltd.New York, 1984

3. Lillisand T.M aand Kiefer R.W. Remote sensing and image interpretation, John Wiley and Sons, New york, 2004

4. C.P.Lo and Yeung, A.K.W, Concepts and technologies of Geographic Information systems, Prentice Hall India, New Delhi, 2004

5. Lintz.J. and Simonet, Remote Sensing of Environment

6. M.G. Srinivas, Remote sensing applications, Narosa Publishing House

7. Marble D.F., Calkins H.W and Penquest, Basic Readings in GIS, Speed System Ltd. New York, 1984

CEY127	CONSTRUCTION EQUIPMENT AND MANAGEMENT	L	T	P	C
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UNIT I CONSTRUCTION EQUIPMENT MANAGEMENT: 12

Identification-Planning-Equipment management in projects -Maintenance management-Replacement-Cost control of equipment-Depreciation Analysis-Safety Management.

UNIT II EARTH WORK EQUIPMENTS 8

Fundamentals of earthwork operations-Earth moving opertions-Types of Earthwork Equipment-Tractors,Motor Graders,Scrapers,Front end waders,Earth Movers

UNIT III OTHER CONSTRUCTION EQUIPMENTS 9

Equipment for Dredging,Trenching,Tunneling,Drilling,Blasting-Equipment for compaction-Erection Equipment-Types of pumps used in construction-Equipment for Dewatering and Grouting-Foundation and Pile Driving Equipment.

UNIT IV MATERIALS HANDLING EQUIPMENT 8

Forklifts and Related Equipment-Portable Material Bins-Conveyors-cranes Hauling Equipment

UNIT V EQUIPMENT FOR PRODUCTION OF AGGREGATE AND CONCRETING 8

Crushers-Feeders-Screening Equipment-Handling Equipment-Batching and Mixing Equipment- Hauling, Pouring and Pumping Equipment-Transporters

TOTAL: 45PERIODS

REFERENCES:

1. Peurifoy, R.L., Ledbetter, W.B.and Schexnayder, C., " Construction Planning, Equipment and Methods", 5th Edition, Tata McGraw - Hill, Singapore, 1995.
2. Sharma S.C. "Construction Equipment and Management", Khanna Publishers New Delhi, 1988.
3. Deodhar, S.V. "Construction Equipment and Job Planning", Khanna Publishers, New Delhi, 1988.
4. Dr. Mahesh Varma, "Construction Equipment and its Planning and Application", Metro-politan Book Company, New Delhi, 1983.

SPECIAL ELECTIVES

CEY 137	PROBABILITY AND STATISTICS FOR CIVIL ENGINEERS	L	T	P	C
		3	0	0	3

UNIT I PROBABILITY AND PROBABILILTY DISTRIBUTIONS 9

Probability: Concepts- probability laws- Baye's theorem-Frequency distribution-measures of central tendency and dispersion- probability distributions-Exponential discrete distributions- Binomial - Poisson - continuous-normal-log normal- Weibull-Gamma

UNIT II SAMPLING AND PARAMETER ESTIMATION 9

Sampling- different methods- sample error- confidence intervals- sampling distributions- Estimation of parameters- method of moments- method of maximum likelihood and principle of least squares

UNIT III TESTING OF HYPOTHESIS 9

Tests based on Normal, t, chi-square distributions for mean and variance-Analysis of variance-one way and two way classification

UNIT IV CORRELATION, REGRESSION AND TIME SERIES ANALYSIS 9

Simple and linear correlation - Rank correlation- Simple regression - multiple regression- multiple and partial correlation coefficient- Time series analysis-methods of semi-average-weighted average- moving average - least square-ratio to trend

UNIT V RANDOM PROCESS AND SIMULATION 9

Random process classification- stationery random process- Markov process-Markov chain - simulation - definition - random number generation- Monte Carlo simulation - simulation model building- validation

TOTAL : 45 PERIODS

REFERENCES:

1. Richard A. Johnson- "Probability & Statistics for Engineers - Pearson Education 6th ed, Indian Reprint , 2002
2. Jerry Banks, John S. Carson Barry L. Nelson "Discrete - Event system simulation - Prentice Hall India , Delhi 1999.
3. A.M. Natarajan- "Operations Research", Pearson Education, 2006.
4. S.C.Gupta & V.K. Kapoor, "Fundamentals of Mathematical Statistics", Sultan Chand, New Delhi, 2005.