Bapatla Engineering College

(*Autonomous*)

BAPATLA

SCHEME & SYLLABI

4 Year B.Tech. Program

(R14)

Department of Civil Engineering

Bapatla Engineering College:: Bapatla

(Autonomous under Acharya Nagarjuna University)

(Sponsored by Bapatla Education Society)

BAPATLA-522102 Guntur District, A.P.

www.becbapatla.ac.in

Bapatla Engineering College:: Bapatla
(Autonomous)

Academic Rules & Regulations for B. Tech Programme

(As Approved by The Academic Council &The Governing Body of the College)

(Amended in August 2014; Applicable to the students admitted into the First year B.Tech from the academic year 2014-2015 onwards).

1.0 EXTENT: All the rules and regulations, specified herein after, shall be read as a whole for the purpose of interpretation and when a doubt arises, the interpretation of the Chairman, Academic Council, Bapatla Engineering College (Autonomous) is final. As per the requirements of the Statutory Bodies, The Principal, Bapatla Engineering College (Autonomous), shall be the Chairman of the College Academic Council.

2.0 ADMISSIONS:

2.1 Admission into the First year of any Four Year B.Tech Programmes of study in Engineering: Admissions into the first year of B.Tech Programme of Bapatla Engineering College (Autonomous) (*Subsequently referred to as* B.E.C) will be as per the norms stipulated by Acharya Nagarjuna University and the Govt. of Andhra Pradesh from time to time.

2.2 Admission into the Second year of any Four year B.Tech Programmes of study in Engineering: Admissions into the second year of B.Tech Programme of B.E.C will be as per the norms stipulated by Acharya Nagarjuna University and the Govt. of Andhra Pradesh from time to time.

2.3 Admissions with advance standing: These may arise in the following cases:

1) When a student seeks transfer from other colleges to B.E.C and intends to pursue B.Tech at B.E.C in an eligible branch of study.
2) When students of B.E.C get transferred from one regulation to another regulation or from previous syllabus to revised syllabus.
3) When a student, after long discontinuity, rejoins the college to complete his/her Programme of study for the award of the degree.
4) When a student is not able to pursue his/her existing Programme of study but intends to get transferred to another Programme of study.

These admissions may be permitted by the Academic Council of B.E.C as per the norms stipulated by the statutory bodies and the Govt. of Andhra Pradesh from time to time. In all such cases for admission, when needed, permissions from the statutory bodies are to be obtained and the Programme of study at B.E.C will be governed by the transitory regulations stipulated in *5.3.*

3.0 DURATION OF THE PROGRAMME AND MEDIUM OF INSTRUCTION: The duration of the B.Tech. Programme is for four academic years consisting of two semesters in each academic year. The medium of instruction and examinations is English. The timeline of a semester is as follows.

SNo	Activity	Description
1.	Number of Semesters in an Academic Year	Two
2.	Regular Semester duration in Weeks	20
3.	Academic Activities Schedule	
	Course Work& Internal Assessment	17 Weeks
	Examination Preparation	1 Week
	Examinations	2 Weeks
4.	Evaluation	Continuous Internal Evaluation (CIE) with a weightage of 40% and Semester End Examinations (SEE) with a weightage of 60%of the student's performance in course/laboratory work and other activities, if any.
5.	Other Items	The minimum number of working days in an academic year shall be 180.
		Academic schedules prescribed by the college shall beadhered to by all the concerned.
		Students failing in any course shall register for the supplementary examination and shall secure a pass grade in SEE afresh in that course. This shall continue until a pass grade is obtained in the said course.

4.0 MINIMUM No. of INSTRUCTION DAYS:

Each semester shall consist of a minimum of 90 instruction days.

5.0 Programmes of study in B.Tech:

5.1 The Four year B.Tech Programme is offered in the following branches of study:

S.No.	Title of the UG Programme	Abbreviation
1.	Civil Engineering	CE
2.	Chemical Engineering	CH
3.	Computer Science & Engineering	CS
4.	Electrical & Electronics Engineering	EE
5.	Electronics& Communications Engineering	EC
6.	Electronics & Instrumentation Engineering	EI
7.	Information Technology	IT
8.	Mechanical Engineering	ME

5.2 Structure of the Programme:

5.2.1 Each Programme of a Discipline or a branch of study shall consist of:

1) General courses in Basic Sciences, Basic Engineering Sciences, Social Sciences&Humanities.
2) Interdisciplinary courses in Engineering to impart the fundamentals of Engineering to the student.
3) Compulsory core courses to impart broad based knowledge needed in the branch of studyconcerned.
4) Elective courses are to be chosen by the student based on his/her interest and specialization preferred from the list of electives offered.
5) A Term paper and a Project approved by the Department to be submitted in the fourth year of study.

Every Programme of study shall be designed to have 45-50 theory courses and 20-25 laboratory courses and the distribution of types of courses from the above is indicated in the following table.

Humanities & Social Science, Basic Science and Engineering Science courses	30 -45%
Professional Core courses	45-50%
Professional Elective and Open Elective Courses	10-15%
Major Project / Seminar, etc	5-10%

Note: All components prescribed in the curriculum of any Programme of study shall be conducted and evaluated.

5.2.2 Contact hours: Depending on the complexity and volume of the course, the number of contact hours per week will be determined.

5.2.3 Credits: Credits are assigned to each course as per norms mentioned in the following table.

Subject	Credits
Theory Course(4 Periods/Week) or (4 Periods + 1 Self Study/Week)	03
Theory Course with additional Tutorial Period	04
Laboratory Course(3 Periods/Week)	02
Term paper(2 Periods/Week)	01
Business communication &Presentation Skills Lab (2 Periods/Week)	01
Final year Project (12 Periods/Week)	10

5.3 Transitory Regulations: For students admitted under advance standing (mentioned in 2.3) these transitory regulations will provide the *modus operandi*.

At the time of such admission, based on the Programme pursued (case by case)

1) Equivalent courses completed by the student are established by the BOS concerned.
2) Marks/Credits are transferred for all such equivalent courses and treated as successfully cleared in the Programme of study prescribed by B.E.C.
3) A Programme chart of residual courses not cleared will be derived and a Programme of study with duration specified will be prescribed for pursuit at B.E.C.
4) Marks obtained in the previous system if the case be, are converted to grades and CGPA is calculated accordingly.

All other modalities and regulations governing shall be the same as those applicable to the stream of students with whom such a candidate is included into.

5.4 Curriculum for each Programme of study:

1) The Four year curriculum of any B.Tech Programme of study in any branch of engineering is formulated based on the guidelines mentioned in 5.2 and will be recommended by the Board of Studies concerned and is approved by the Academic Council of the college.
2) In the case of students admitted through lateral entry, the respective regular curriculum contents from the second year onwards are to be pursued by such students.
3) In the case of students admitted under advanced standing, the Programme curriculum will be prepared by the Board of Studies concerned and the same shall be approved by the Academic Council.
4) After approval from the Academic Council, Programme curriculum for the same shall be prepared and made available to all the students along with the academic regulations.

Table below shows a typical curriculum frame work for B.Tech Degree program.

S.No.	Subject Area	Average no. of credits
1.	Humanities & Social Sciences courses	14
2.	Basic Science Courses	35
3.	Engineering Science	32
4.	Professional Core courses	96
5.	Professional Elective Courses	16
6.	Major Project	11
7.	Open Electives	3
	TOTAL	207

The students admitted through the Lateral Entry scheme have to complete 155 credits

5.5 The Maximum duration permitted to pursue the programme and cancellation of admission:

5.5.1 The maximum duration permitted for any student to successfully complete any four year B.Tech. Programme of study shall be:

1) Eight academic years in sequence from the year of admission for a normal student admitted into the first year of any Programme,
2) Six academic years in sequence from the year of admission for a Lateral entry student admitted into the second year of any Programme, and
3) For students admitted with advanced standing, the maximum time for completion of Programme study shall be twice the period in terms of academic years in sequence, stipulated in the Programme curriculum defined at the time of admission.

5.5.2 In case, any student fails to meet the applicable conditions for the eligibility of degree in the maximum stipulated period as mentioned in *5.5.1*, his/her admission stands cancelled.

6.0 EXAMINATION SYSTEM & EVALUATION:

6.1 The performance of the students in each semester shall be assessed course wise. All assessments will be done on absolute mark basis. However, for the purpose of reporting the performance of a candidate, letter grades and grade points will be awarded as per section *11.0.* The performance of a student in each course is assessed with AlternateAssessment Tests, term examinations on a continuous basis during the semester called Continuous Internal Evaluation (CIE) and a Semester End Examination (SEE) conducted at the end of the semester. For each theory, design and/or drawing course, there shall be a comprehensive Semester End Examination (SEE) of three hours duration at the end of each Semester, except where stated otherwise in the detailed Scheme of Instruction.

6.2 The distribution of marks between Continuous Internal Evaluation (CIE) and Semester End Examination (SEE) to be conducted at the end of the semester will be as follows:

Nature of the Course	CIE	SEE
Theory subjects	40	60
Drawing	40	60
Practical	40	60
Business communication & presentation Skills Lab	20	30
Term Paper	20	30
Project work	50	100

6.3 Continuous Internal Evaluation (CIE) in Theory and Drawing subjects:

1. Ineach Semester there shall be two Term examinations and two tests from any of the*Alternate Assessment Tools(AAT)*likeHome Assignment, Class Test, Problem Solving, Group Discussion, Quiz, Seminar and Field Study in every

theory course. The Alternate Assessment Tool with detailed modality of evaluation for each courseshall be finalized by the teacher concerned before beginning of the course with the permission of HOD concerned and the PRINCIPAL.

The Term Examination is conducted in the regular mode according to a schedule which will be common for a particular year of study. The maximum weightage for Term Examinations, AAT and the calculation of marks for CIE in a theory course is given in the following table.

Weightage for different heads to calculate CIE for 40 marksin a Theory course			
Particulars	Term Exams (Max. 25 marks)	AAT (Max. 10 marks)	Attendance (Max.5 marks)
Better Performed exam	75% of marks obtained	50% of marks obtained	5
Other exam	25% of marks obtained	50% of marks obtained	

2. For drawing courses, there shall be only two Term examinations in a semester with no Alternate Assessment Tool. In case of such courses a maximum of 10 marks shall be given for day-to-day class work and a maximum of 25 marks shall be awarded to the Term examinations taking into account the performance of both the Term examinations giving weightage as prescribed above.

3. A maximum weightage of 5 marks will be given in the CIE for attendance in all theory and drawing courses as indicated in *7.1.1.*

6.4 Semester End Examination (SEE) in Theory, Design and/or Drawing course:

1) For each theory, design and/or drawing course, there shall be a comprehensive Semester End Examination (SEE) of three hours duration at the end of each Semester for 60 marks, except where stated otherwise in the detailed Scheme of Instruction. Question paper setting shall be entrusted to external examiners from the panels approved by the respective Boards of Studies.

2) A minimum of 24(40%) marksare to be secured exclusively in the Semester End Examination (SEE) of theory, design and/or drawing course and a minimum total of 40 marks in SEE and CIE put together in a theory, design and/or drawing course is to be secured in order to be declared as passed in that course and for the award of the grade in the course.

6.5 Continuous Internal Evaluation (CIE) in laboratory courses:

1) The evaluation for Laboratory course is based on SEE and CIE. The CIE for 40 marks comprises of 20 marks for day to day laboratory work, 5 marks for record submission and 15 marks for a laboratory examination at the end of the semester.

2) In any semester, a minimum of 90 percent of prescribed number of experiments / exercises specified in the syllabi for laboratory course shall be taken up by the students. They shall complete these experiments / exercises in all respects and get the record certified by the internal lab teacher concerned and the Head of the Department concerned to be eligible to appear for the Final Examination in that laboratory course.

6.6 Semester End Examination (SEE) in laboratory courses:

1) For each laboratory course, the Semester End Examination (SEE) shall be conducted by one internal and one external examiner appointed by the Principal and the duration of the exam shall be for three hours. The SEE is for 60 marks which include 10 marks for write up, 30 marks for lab experiment/exercise, 5 marks for record, and 15 marks for Viva-voce.

2) A minimum of 30(50%) marks shall be obtained in SEE and a minimum total of 40 marks in SEE and CIE put together in a laboratory course are to be secured in order to be declared as passed in the laboratory course and for the award of the grade in that laboratory course.

6.7. Evaluation of Term Paper and Business Communication &Presentation Skills Lab:

1) A term paper is to be submitted by each student in the 7^{th} semester which would be a precursor to the project work to be done in the 8^{th} semester, andBusiness Communication & Presentation Skills Labis to be taken up in the 7^{th} semester. The evaluation is based on CIE for 20 marks, which includes a minimum of two seminars/presentations for 10 marks and the report submitted at the end of the semester which is evaluated for 10 marks.

2) The Semester End Examination (SEE) shall be conducted for 30 marks by one internal and one external examiner appointed by the Principal.The SEE contains Viva-voce and the demonstration of the model developed or work performed as a part of the term paper.

3) A minimum of 15(50%) marks shall be obtained in SEE and a minimum total of 20 marks in SEE and CIE put together in the term paper are to be secured in order to be declared as passed in the term paper and for the award of the grade in the term paper.

6.8 Evaluation of Project:

1) In case of the Project work, the evaluation shall be based on CIE and SEE. The CIE for 50 marks consists of a minimum of two Seminars/ presentations for 25 marks and the Project Report submitted at the end of the semester which is evaluated for 25 marks.

2) SEE shall be in the form of a Viva- voce and the demonstration of the thesis work for 100 marks. Viva-voce Examination in Project Work shall be conducted by one internal examiner and one external examiner to be appointed by the Principal. A

minimum of 50 marks shall be obtained in SEE exclusively and a minimum total of 60 marks in SEE and CIE put together are to be secured in order to be declared as passed in the Project and for the award of the grade.

6.9 A student who could not secure a minimum of 50% aggregate marks in CIE of a semester is not eligible to appear for the Semester End Examinations conducted at the end of the semester and shall have to repeat that semester.

NOTE : A student who is absent for any Test / Exam / Seminar / Presentation as a part of Continuous Internal Evaluation (CIE), for any reason whatsoever, shall be deemed to have scored zero marks in the respective component and no provision for make-up shall be provided.

6.10 Make-up Test: A student can appear for a Make-up Test in a single theory subject of a semester to improve marks in the Continuous Internal Evaluation (CIE) subject to the following:

If the student becomes eligible to appear for the Semester End Examination (SEE) of a semester and is unable to secure 40% internal marks in a particular theory subject due to genuine reasons, he/she maybe given an opportunity to appear for makeup test in any one subject of that semester. The makeup test will be conducted for 40 marks and the marks obtained in this test are final. However, the maximum mark awarded will be 16 only, irrespective of the marks obtained in the makeup test. Such students have to apply by paying a fee prescribed by the institution and submit the application along with a letter of request indicating the genuineness of his/her candidature to be eligible for the makeup test. Applications should be recommended by the HOD concerned and approved by the principal in accordance with the guidelines recommended by the Academic Council.

6.11 Course Repetition:The students secured less than 40% in the Continuous Internal Evaluation (CIE) and Semester End Examinations (SEE) may register for the course repetition. The students have to apply to the Principal through the respective HOD by paying prescribed fees. A student can take up a maximum of two courses in a semester immediately after the semester end examinations of that particular semester in accordance with the guidelines recommended by the Academic Council.

The HODs concerned have to allot a teacher related to that course to conduct class work. The minimum number of periods to be conducted should not be less than 50% of the total prescribed periods for that course. The classes will be conducted in the vacation period or in the weekends or in the afternoons as decided by the HODconcerned. Teacher has to evaluate the student for his performance in CIE as per the autonomous norms and students should appear for a semester end examination. The pass criteria in both CIE & SEE should be as per autonomous norms.

7.0 ATTENDANCE REGULATIONS:

7.1 Regular course of study means a minimum aggregate attendance of 75% in all the courses of study prescribed for a semester in the curriculum, computed by

considering total number of hours / periods conducted in all courses as the denominator and the total number of hours / periods actually attended by the student in all courses, as the numerator.

7.1.1 A maximum of 5 marks weightage in CIE in each theory/drawing course shall be given for those students who put in a minimum of 75% attendance in the respective theory/drawing course in a graded manner as indicated below:

Attendance of 75% and above but less than 80%	1 mark
Attendance of 80% and above but less than 85%	2 mark
Attendance of 85% and above but less than 90%	3 marks
Attendance of 90% and above	5 marks

7.2 Condonation of shortage in attendance may be recommended on genuine medical grounds, up to a maximum of 10%, provided the student puts in at least 65% attendance as calculated in *7.1* above and provided the principal is satisfied with the genuineness of the reasons.

7.3 A student, who could not satisfy the minimum attendance requirements, as given above, in any semester, is not eligible to appear for theSemester End examinations and shall have to repeat that semester.

8.0 DETENTION: A student is said to have been detained and not allowed to appear for Semester End Examination (SEE) at the end of the semester when

8.1 The student does not have a minimum aggregate attendance of75% attendance or 65% attendance with Condonation in all subjects put together in that semester or the student has not scored a minimum of 50% of marks in CIE in all the courses of that semester put together as per 6.3.

Such a student shall have to repeat the same semester subsequently and satisfy the above requirements afresh to become eligible to appear for the Semester End Examination (SEE), conducted at the end of the semester.

9.0 CONDITIONS FOR PROMOTION:

9.1 A student not detained in the first semester of a year of study shall be promoted to second semester of that year of study.

9.2 A student shall be eligible for promotion to II year of B.Tech. Programme, if he/she is not detained in the second semester of first year B.Tech. Programme irrespective of the number of backlog courses in I year B.Tech.

9.3 A student shall be eligible for promotion to III year of B.Tech. Programme, if he/she is not detained in the second semester of II year B.Tech. Programme and has passed all but three courses(Including laboratory courses) of I year B.Tech.

9.4 A student shall be eligible for promotion to IV year of B.Tech. Programme, if he/she is not detained in the second semester of III year B.Tech. Programme and has passed all but fourcourses(Including laboratory courses) of I & II year B.Tech.put together.

10.0 Registration: Every eligible student as mentioned below has to registerhimself/ herself and obtain roll number at the beginning of every semester indicating all the Courses taken up for pursuit by him/her during that Semester.

10.1 The students who are detained as defined in 8.0 should register for the same semester in the subsequent academic year at the beginning of the semester.

10.2 The students who are detained for not satisfying the condition for promotion as defined in 9.0should registerfor the next semester of the study at the beginning of the semester after getting the eligibility for promotion which is to be confirmed by the controller of the examination.

10.3 When a student is debarred for one or more semesters, his/her registration in the present semester is cancelled and the student is debarred from registering in future during the debarred period.

10.4 In any case, while re-registering in any semester, he or she will have to pay the requisite fee once again.

11.0 GRADING SYSTEM

11.1 Based on the student performance during a given semester, a final letter grade will be awarded at the end of the semester for each course. The letter grades and the corresponding grade points are as given in the Table.

Table: Grades & Grade Points

Grade	Grade Points	% of Marks
O	10	90% and above
A+	9	80% – 89%
A	8	70% – 79%
B+	7	60% – 69%
B	6	50% – 59%
C	5	40% – 49%
F	0 (Failed)	Less than 40%

11.2 A student who earns a minimum of 5 grade points (C grade) in a course is declared to have successfully completed the course, and is deemed to have earned the credits assigned to that course. However it should be noted that a pass in any course/term paper/Project shall be governed by the rules mentioned in 6.0.

12.0 GRADE POINT AVERAGE

12.1 The Grade Point Average (GPA) will be calculated according to the formula:

$$GPA = \frac{\sum C_i G_i}{\sum C_i}$$

Where C_i = number of credits for the course *i*,

G_i = grade points obtained by the student in the course, i.

12.2 Semester Grade Point Average (SGPA) is awarded to candidates considering all the courses of the semester. Zero grade points are also included in this computation.

12.3 To arrive at Cumulative Grade Point Average (CGPA), the formula is used considering the student's performance in all the courses taken in all the semesters completed up to the particular point of time.

12.4 Example

Semester	Course Code.	Credits	Grade	Grade Point	Credit Points	SGPA	CGPA
I	14MA101	4	C	5	20	7.73 (201/26)	7.73 (201/26)
I	14PH102	3	B	6	18		
I	14CY103	3	A	8	24		
I	14EE104	3	O	10	30		
I	14ES105	3	A+	9	27		
I	14EG106	4	B+	7	28		
I	14CYL101	2	O	10	20		
I	14HWL102	2	A	8	16		
I	14WSL103	2	A+	9	18		
Total		26			201		
II	14MA201	4	A	8	32	7.96 (207/26)	7.84 (408/52)
II	14PH202	3	B	6	18		
II	14CY203	3	A+	9	27		
II	14EL204	3	C	5	15		
II	14EM205	4	O	10	40		
II	14CP206	3	B+	7	21		
II	14PHL201	2	A+	9	18		
II	14ELL202	2	A	8	16		
II	14CPL203	2	O	10	20		
Total		26			207		

13.0 ELIGIBILITY FOR AWARD OF B.TECH. DEGREE: A student shall be eligible for award of the B.Tech degree if he/she fulfils all the following conditions:

1) Registered and successfully completed all the components prescribed in the Programme of study to which he/she is admitted,
2) Obtained CGPA greater than or equal to 5.0 (Minimum requirements for Pass),
3) Has no dues to the Institute, hostels, Libraries, NCC/NSS etc., and
4) No disciplinary action is pending against him/her.

14.0 AWARD OF CLASS: A candidate who becomes eligible for the award of B.Tech. Degree shall be placed in one of the following Classes based on CGPA.

Table: CGPA required for award of Degree

Distinction	≥ 8.0*
First Class	≥ 7.0&< 8.0
Second Class	≥ 6.0&< 7.0
Pass	≥ 5.0&< 6.0

* In addition to the required CGPA of 8.0, the student must have necessarily passed all the courses of every semester in the minimum stipulated period for the Programme.

14.1 Grade Sheet: A grade sheet (Memorandum) will be issued to each student indicating his performance in all courses taken in that semester and also indicating the Grades and SGPA.

14.2 Transcripts: After successful completion of the total Programme of study, a Transcript containing performance of all academic years will be issued as a final record. Duplicate transcripts will also be issued if required after the payment of requisite fee. Partial transcript will also be issued up to any point of study to any student on request and by paying the stipulated fee in force.

14.3 The Governing Body of B.E.C (Autonomous) has to approve and recommend the sameto Acharya Nagarjuna University. The list of students eligible for award of degree

15.0 IMPROVEMENT OF CLASS:

15.1 A candidate, after becoming eligible for the award of the Degree, may reappear for the Semester End Examination in any of the theory courses as and when conducted, for the purpose of improving the CGPA and the class. But this reappearance shall be within a period of two academic years after becoming eligible for the award of the Degree. However, this facility shall not be availed of by a candidate who has taken the Original Degree Certificate.
Candidates shall not be permitted to reappear either for CIE in any course or for Semester End Examination (SEE) in laboratory courses (including Project Viva-voce) for the purpose of improvement.

16.0 SUPPLEMENTARY EXAMINATIONS: In addition to the Regular Semester End Examinations held at the end of each semester, Supplementary Semester End Examinations will be conducted during the academic year. Candidates taking the Regular / Supplementary examinations as Supplementary candidates may have to take more than one Semester End Examination per day. A student can appear for any number of supplementary examinations till he/she clears all courses which he/she could not clear in the first attempt. However the maximum stipulated period for the courseshall not be relaxed under any circumstances.

17.0 INSTANT SUPPLEMENTARY EXAMINATIONS: Candidates who fail in one theory course of VIII Semester and has cleared all the subjects till VII semester can appear for Instant Supplementary Examination conducted after declaration of the revaluation results of the said exam.

18.0 MALPRACTICES:

The Principal shall refer the cases of malpractices in Continuous Internal Evaluation (CIE) and Semester End Examination (SEE) to an Enquiry Committee constituted by him / her. The Committee will submit a report on the malpractice allegedly committed by the student to the Principal. The Principal along with the members of the Committee is authorized to award a suitable punishment, if the student is found guilty.

19.0 ADDITIONAL ACADEMIC REGULATIONS:

19.1 Any attempt to impress upon the teachers, examiners, faculty and staff of Examinations, bribing for either marks or attendance will be treated as malpractice.

19.2 When a student is absent for final examination, he/she is treated as to have appeared and obtained zero marks in that component and Grade is awarded accordingly.

19.3 When a component of Continuous Internal Evaluation (CIE) or Semester End Examination (SEE) is cancelled as a penalty, he/she is awarded zero marks in that component.

20.0 AMENDMENTS TO REGULATIONS:

The Academic Council of Bapatla Engineering College (Autonomous) reserves the right to revise, amend, changeornullify the Regulations, Schemes of Examinations, and/ or Syllabi or any other matter pertained to the academics, society and industry without any notice and the decision is final.

BAPATLA ENGINEERING COLLEGE : BAPATLA

(Autonomous)

SCHEME OF INSTRUCTION & EXAMINATION (Semester System)

For

Civil Engineering

With Effective From 2014-2015 Academic Year

First Year B.Tech., (SEMESTER – I)

Code No.	Subject	Scheme of Instruction (Periods per week)					Scheme of Examination (Maximum marks)			No. of Credits
		L	T	P	S	Total	CIE	SEE	Total Marks	
14MA101	Engineering Mathematics – I	4	1	0	0	5	40	60	100	4
14PH102	Engineering Physics – I	4	0	0	0	4	40	60	100	3
14CH103	Engineering Chemistry – I	4	0	0	0	4	40	60	100	3
14EE104	Basic Electrical and Electronics Engineering	4	0	0	0	4	40	60	100	3
14EM105	Engineering Mechanics	4	1	0	0	5	40	60	100	4
14CP106	Computer Programming with C	4	0	0	1	5	40	60	100	3
14PHL101	Physics lab	0	0	3	0	3	40	60	100	2
14HWL102	Hardware Lab	0	0	3	0	3	40	60	100	2
14CPL103	Computer Programming Lab.	0	0	3	0	3	40	60	100	2
	TOTAL	24	2	9	1	36	360	540	900	26

CIE: Continuous Internal Evaluation SEE: Semester End Examination

L: Lecture S: Self Study T: Tutorial P: Practical

BAPATLA ENGINEERING COLLEGE : BAPATLA

(Autonomous)

SCHEME OF INSTRUCTION & EXAMINATION (Semester System)

For

Civil Engineering

With Effective From 2014-2015 Academic Year

First Year B.Tech., (SEMESTER – II)

Code No.	Subject	**Scheme of Instruction (Periods per week)**					Scheme of Examination (Maximum marks)			No. of Credits
		L	**T**	**P**	**S**	**Total**	CIE	SEE	Total Marks	
14MA201	Engineering Mathematics – II	4	1	0	0	5	40	60	100	4
14PH202	Engineering Physics – II	4	0	0	0	4	40	60	100	3
14CH203	Engineering Chemistry – II	4	0	0	0	4	40	60	100	3
14EL204	English Language and Communication	4	0	0	0	4	40	60	100	3
14ES205	Environmental Studies	4	0	0	0	4	40	60	100	3
14EG206	Engineering Graphics	4	1	0	1	6	40	60	100	4
14CHL201	Chemistry Lab	0	0	3	0	3	40	60	100	2
14ELL202	English Language Laboratory	0	0	3	0	3	40	60	100	2
14WSL203	Workshop	0	0	3	0	3	40	60	100	2
	TOTAL	24	2	9	1	36	360	540	900	26

CIE: Continuous Internal Evaluation SEE: Semester End Examination

L: Lecture S: Self Study T: Tutorial P: Practical

BAPATLA ENGINEERING COLLEGE : BAPATLA

(Autonomous)

SCHEME OF INSTRUCTION & EXAMINATION (Semester System)

For

Civil Engineering

With Effective From 2014-2015 Academic Year

Second Year B.Tech., (SEMESTER – III)

Code No.	Subject	Scheme of Instruction (Periods per week)					Scheme of Examination (Maximum marks)			No. of Credits
		L	T	P	S	Total	CIE	SEE	Total Marks	
14MA301	Engineering Mathematics - III	4	0	0	0	4	40	60	100	3
14CE302	Building Materials and concrete Technology	4	0	0	0	4	40	60	100	3
14CE303	Surveying-I	4	0	0	1	5	40	60	100	3
14CE304	Solid Mechanics - I	4	1	0	0	5	40	60	100	4
14CE305	Fluid Mechanics	4	1	0	0	5	40	60	100	4
14CE306	Engineering Geology	4	0	0	0	4	40	60	100	3
14CEL301	Engineering Geology Laboratory	0	0	3	0	3	40	60	100	2
14CEL302	Surveying Field Work – I	0	0	3	0	3	40	60	100	2
14CEL303	Building Planning and Drawing Laboratory	0	0	3	0	3	40	60	100	2
	TOTAL	24	2	9	1	36	360	540	900	26

CIE: Continuous Internal Evaluation SEE: Semester End Examination

L: Lecture S: Self Study T: Tutorial P: Practical

BAPATLA ENGINEERING COLLEGE : BAPATLA
(Autonomous)
SCHEME OF INSTRUCTION & EXAMINATION (Semester System)
For
Civil Engineering
With Effective From 2014-2015 Academic Year
Second Year B.Tech., (SEMESTER – IV)

Code No.	Subject	Scheme of Instruction (Periods per week)					Scheme of Examination (Maximum marks)			No. of Credits
		L	T	P	S	Total	CIE	SEE	Total Marks	
14MA401	Engineering Mathematics - IV	4	0	0	0	4	40	60	100	3
14CE402	Professional Ethics and Human values	4	0	0	0	4	40	60	100	3
14CE403	Surveying-II	4	0	0	1	5	40	60	100	3
14CE404	Solid Mechanics - II	4	1	0	0	5	40	60	100	4
14CE405	Hydraulics & Hydraulic Machines	4	1	0	0	5	40	60	100	4
14CE406	Environmental Engineering - I	4	0	0	0	4	40	60	100	3
14ELL401	Soft Skills Laboratory	0	0	3	0	3	40	60	100	2
14CEL402	Environmental Engineering Laboratory	0	0	3	0	3	40	60	100	2
14CEL403	Materials Testing Laboratory	0	0	3	0	3	40	60	100	2
	TOTAL	24	2	9	1	36	360	540	900	26

CIE: Continuous Internal Evaluation SEE: Semester End Examination
L: Lecture S: Self Study T: Tutorial P: Practical

BAPATLA ENGINEERING COLLEGE : BAPATLA

(Autonomous)

SCHEME OF INSTRUCTION & EXAMINATION (Semester System)

For

Civil Engineering

With Effective From 2014-2015 Academic Year

Third Year B.Tech., (SEMESTER – V)

Code No.	Subject	Scheme of Instruction (Periods per week)					Scheme of Examination (Maximum marks)			No. of Credits
		L	T	P	S	Total	CIE	SEE	Total Marks	
14CE501	Structural Analysis - I	4	1	0	0	5	40	60	100	4
14CE502	Water Resource Engineering-I	4	0	0	0	4	40	60	100	3
14CE503	Design of Concrete Structures-I	4	1	0	0	5	40	60	100	4
14CE504	Environmental Engineering - II	4	0	0	0	4	40	60	100	3
14CE505	Geo-Technical Engineering - I	4	0	0	1	5	40	60	100	3
14CE506	Elective-I	4	0	0	0	4	40	60	100	3
14CEL501	Hydraulics & Hydraulic Machines Laboratory	0	0	3	0	3	40	60	100	2
14CEL502	Geo-Technical Engineering Laboratory	0	0	3	0	3	40	60	100	2
14CEL503	Computer Applications in Civil Engineering Laboratory	0	0	3	0	3	40	60	100	2
	TOTAL	24	2	9	1	36	360	540	900	26

Elective-I

14CE506/A: Remote Sensing and GIS

14CE506/B: Rock Mechanics

14CE506/C: Low cost Housing Techniques

14CE506/D: Building Technology

BAPATLA ENGINEERING COLLEGE : BAPATLA

(Autonomous)

SCHEME OF INSTRUCTION & EXAMINATION (Semester System)

For

Civil Engineering

With Effective From 2014-2015 Academic Year

Third Year B.Tech., (SEMESTER – VI)

Code No.	Subject	Scheme of Instruction (Periods per week)					Scheme of Examination (Maximum marks)			No. of Credits
		L	T	P	S	Total	CIE	SEE	Total Marks	
14CE601	Structural Analysis - II	4	1	0	0	5	40	60	100	4
14CE602	Water Resource Engineering-II	4	0	0	0	4	40	60	100	3
14CE603	Design of Concrete Structures-II	4	0	0	1	5	40	60	100	3
14CE604	Design of Steel Structures-I	4	1	0	0	5	40	60	100	4
14CE605	Geotechnical Engineering - II	4	0	0	0	4	40	60	100	3
14CE606	Elective - II	4	0	0	0	4	40	60	100	3
14CEL601	Surveying Field Work - II	0	0	3	0	3	40	60	100	2
14CEL602	Computer Aided Analysis ,Design and Detailing of Structures-I Lab	0	0	3	0	3	40	60	100	2
14CEL603	Computer Aided Design and Detailing of Irrigation Structures Lab	0	0	3	0	3	40	60	100	2
	TOTAL	24	2	9	1	36	360	540	900	26

Elective – I I

14CE606/A: Advanced Surveying

14CE606/B: Repair and Rehabilitation of Structures

14CE606/C: Environmental Geotechnics

14CE606/D: Geosynthetics

BAPATLA ENGINEERING COLLEGE : BAPATLA

(Autonomous)

SCHEME OF INSTRUCTION & EXAMINATION (Semester System)

For

Civil Engineering

With Effective From 2014-2015 Academic Year

Final Year B.Tech., (SEMESTER – VII)

Code No.	Subject	Scheme of Instruction (Periods per week)					Scheme of Examination (Maximum marks)			No. of Credits
		L	T	P	S	Total	CIE	SEE	Total Marks	
14CE701	Transportation Engineering - I	4	0	0	0	4	40	60	100	3
14CE702	Design of Steel Structures-II	4	1	0	0	5	40	60	100	4
14CE703	Estimation & Quantity Surveying	4	0	0	0	4	40	60	100	3
14CE704	Pre-stressed Concrete	4	0	0	0	4	40	60	100	3
14CE705	Elective - III	4	1	0	0	5	40	60	100	4
14OE706	Open Elective	4	0	0	0	4	40	60	100	3
14ELL701	Business Communication and Presentation Skills Lab	0	0	2	0	2	20	30	50	1
14CEL702	Computer Aided Analysis ,Design and Detailing of Structures-II Lab	0	0	3	0	3	40	60	100	2
14CEL703	Transportation Engineering Laboratory	0	0	3	0	3	40	60	100	2
14CEL704	Term paper	0	0	2	0	2	20	30	50	1
	TOTAL	24	2	10	0	36	360	540	900	26

Elective – III:

14CE705/A: Advanced Structural Analysis

14CE705/B: Advanced Foundation Engineering

14CE705/C: Environmental Impact Assessment and Management

14CE705/D: Structural Dynamics

Open Elective:

The students of CE will choose an Inter department Elective offered by other Departments.

BAPATLA ENGINEERING COLLEGE : BAPATLA

(Autonomous)

SCHEME OF INSTRUCTION & EXAMINATION (Semester System)

For

Civil Engineering

With Effective From 2014-2015 Academic Year

Final Year B.Tech., (SEMESTER – VIII)

Code No.	Subject	Scheme of Instruction (Periods per week)					Scheme of Examination (Maximum marks)			No. of Credits
		L	T	P	S	Total	CIE	SEE	Total Marks	
14CE801	Transportation Engineering - II	4	0	0	0	4	40	60	100	3
14CE802	Construction Management	4	0	0	0	4	40	60	100	3
14CE803	Elective-IV	4	1	0	0	5	40	60	100	4
14CE804	Elective – V	4	0	0	1	5	40	60	100	3
14CEPR801	Project work	0	0	12	0	12	50	100	150	10
14CEL802	Quantity Estimation & Project Management	0	0	3	0	3	40	60	100	2
	TOTAL	16	1	15	1	33	250	400	650	25

Elective IV

14CE 803/A: Finite Element Analysis
14CE 803/B: Bridge Engineering
14CE 803/C: Advanced Environmental Engineering
14CE 803/D: Ground Improvement Techniques

Elective V

14CE 804/A: Advanced Design of Concrete Structures
14CE 804/B: Pavement Analysis and Design
14CE 804/C: Earthquake Resistant Design of Structures
14CE 804/D: Ground Water Development and Management

Engineering Mathematics – I
(Common for all branches)
I B.Tech – I Semester (Code: 14MA101)

Lectures	4	Tutorial	1	Practical	0	Self Study	0
Continuous Internal Assessment	:	40	Semester End Examination (3 Hours)	:	60		

UNIT - I

Matrix Algebra: Rank of a Matrix, Linear Independence, Vector Space, Solutions of Linear Systems, Inverse of a Matrix by Gauss-Jordan Elimination, Vector Spaces, Inner Product Spaces, Linear Transformations. Eigen Values, Eigen Vectors, Some applications of Eigen value problems. Symmetric, Skew-Symmetric and Orthogonal Matrices.

UNIT II

Matrix Algebra: Complex Matrices: Hermitian, Skew-Hermitian and Unitary, Similarity of Matrices, Basis of Eigen Vectors, Diagonalization.

Differential Calculus: Rolle's Theorem, Lagrange's Mean Value Theorem and Taylor's Theorem (without Proofs), Taylor's and, Maclaurin's Series for functions of one variable. Maxima and Minima of functions of Two Variables, Lagrange's method of Multipliers.

UNIT III

Fourier Series: Periodic Functions, Trigonometric Series, Fourier Series, Functions of Any Period P = 2L, Even and Odd Functions, Half Range Expansions, Complex Fourier Series.

UNIT IV

Integral Calculus: Evaluation of double integrals (Cartesian & Polar), Changing the order of integration, Evaluation of triple integrals, Applications of triple integrals to find area and volume.

TEXT BOOK:

1. Erwin Kreyszig, "Advanced Engineering Mathematics", 9th edition, John Wiley & Sons.

REFERENCE BOOKS:

1. "Advanced Engineering Mathematics", Peter V. O'Neil, Thomsons Brooks/Cole.
2. "Advanced Calculus", Murray R Spiegel, Schaum's outline series.

Engineering Physics – I
(Common for all branches)
I B.Tech – I Semester (Code: 14PH102)

Lectures	4	Tutorial	0	Practical	0	Self Study	0
Continuous Internal Assessment	:	40	Semester End Examination (3 Hours)	:	60		

UNIT – I

OPTICS:

INTERFERENCE: Coherence, spatial and temporal coherences, interference due to thin films(reflected system), cosine law, anti-reflection coating, Michelson interferometer and its applications, (determination of wavelengths of monochromatic light and resolution of two nearby wavelengths)., Newton's rings theory and applications(determination of wavelength of light, and refractive index of transparent liquid).

DIFFRACTION: Fresnel &Fraunhoffer diffraction, Fraunhoffer diffraction due to single slit, plane diffraction grating, dispersive and resolving powers of a grating.

POLARISATION: Introduction, double refraction,Nicol prism, quarter wave plate, half wave plate, production and detection of circularly and elliptically polarised lights and optical activity, Electro optic effect(Kerr effect),Magneto optic effect(Faraday effect).

UNIT II

LASERS & FIBER OPTICS:

LASERS: Properties of lasers**,** Spontaneous and stimulated emissions, Population inversion, Solid state (Ruby) laser, Gas(He-Ne) laser, semiconductor (Ga-As) laser, Applications.

HOLOGRAPHY: Principle, recording and reproduction of holography, Applications.

FIBER OPTICS: Structure and types of optical fibers, acceptance angle, Numerical aperture, losses in optical fibers, fiber optic communication and its advantages.

UNIT III

ELECTRICITY & MAGNETISM:

Gauss's law in static electricity (qualitative only), Gauss's law of magnetism, circulating charges, Cyclotron-construction, working and limitations, Hall effect and its applications, displacement current, Maxwell's equations (qualitative treatment), E M oscillations, velocity of EM waves, energy transport and the pointing vector, AC circuit containing series LCR circuit-resonance condition and quality factor.

UNIT IV

MODERN PHYSICS:

Dual nature of light, de-Broglie's concept of matter waves, Davisson-Germer electron diffraction experiment, Heisenberg's uncertainty principle and applications (non-existence of electron in a nucleus and finite width of spectral lines), one dimensional time- independent and dependent Schrödinger wave equations, physical significance of wave function, applications of time-independent Schrödinger wave equation to particle in a box(one dimensional), tunneling, the scanning tunneling microscope.

TEXT BOOK:

1. "A Text Book of Engineering Physics", M.N. Avadhanulu, P.G. Kshirasagar, S.Chand& Co.,(Edition – 2013).

REFERENCE BOOKS:

2. "Engineering physics"by R.K.Gour and S.L.Gupta. Dhanpatrai publications.
3. "Basic Engineering Physics" by P.Srinivasarao&K.Muralidhar,Himalaya publications.
4. "Engineering physics" by M.R.Sreenivasan. New age international publications
5. "Engineering physics" by Palaniswamy. Scitech publications

Engineering Chemistry – I
(Common for all branches)
I B.Tech – I Semester (Code: 14CY103)

Lectures	4	Tutorial	0	Practical	0	Self Study	0
Continuous Internal Assessment	:	40	Semester End Examination (3 Hours)	:	60		

UNIT I: Water Technology: (Industrial Purpose) 13 periods

Characteristics: **Alkalinity** – types of alkalinity and determination (Including simple problems); **Hardness** – types, units and estimation by EDTA method (Including simple problems)

Boiler feed water - Scales, Sludges, Caustic embrittlement, boiler corrosion, Priming and foaming;

Internal conditioning - phosphate, calgon and carbonate methods
External conditioning - Ion exchange process, Lime Soda process (Including simple problems)

UNIT II: 12 periods

Domestic water treatment – WHO Guidelines, Potable water, Sedimentation, Coagulation, Filtration (Slow sand filter) and disinfection methods: Chlorination - break point chlorination, ozonization, UV treatment.
Desalination: Electro Dialysis and Reverse Osmosis.

Phase rule
Statement and explanation of terms involved; One component system – water system; Condensed phase rule, Thermal analysis - Thermal behavior of pure and impure solids, Eutectic system, Eutectic mixture & Eutectic point, Construction of phase diagram for Bi-Cd system by thermal analysis, Simple eutectic systems (lead-silver system only).

UNIT III: Energy Sources (Fuels) 13 periods

Classification of fuels; Calorific value of fuels (lower, higher)

Solid fuels: determination of calorific value (Bomb Calorimeter), Coal ranking, Carbonization of coal (Otto-Hoffman by-product method); Proximate and ultimate analysis of coal.

Petroleum based: Petroleum processing and fractions; Cracking – catalytic cracking method (fixed bed); Synthetic petrol: Bergius process, Knocking and anti- knocking Agents, Octane number and Cetane number;
Gaseous fuels: CNG and LPG,
UNIT IV: Engineering Materials 12 Periods

Refractories: Classification – Acidic, Basic and Neutral refractories; Properties: refractoriness, refractoriness under load, dimensional stability, porosity, thermal spalling; Preparation, Properties and applications of alumina, magnesite and zirconia bricks,

Composites: Introduction Constituents of Composites, types- Fibre reinforced Particulate and Layered composites and their applications.

Lubricants: Mechanism of lubrication, Liquid lubricants - properties: viscosity index, flash and fire points, cloud and pour points, oiliness; Solid lubricants - graphite and molybdenum sulphide.

TOTAL: 50 PERIODS

TEXT BOOKS:

1. P.C. Jain and Monica Jain, "Engineering Chemistry" DhanpatRai Pub, Co., New Delhi 15th edition (2010).

REFERENCES:

1 Essential Of Physical Chemistry by ArunBahl, B.S. Bahl, G.D.Tuli, by ArunBahl, B.S. Bahl, G.D.Tuli, Published by S Chand Publishers

2 Text Book of Engineering Chemistry by C.P. Murthy, C.V. Agarwal, A. Naidu B.S. Publications, Hyderabad (2006).

3 Engineering Chemistry by K. Maheswaramma, Pearson publishers 2015.

Basic Electrical and Electronics Engineering

(Common for all branches)

I B.Tech – I Semester (Code: 14EE204 / 14EE104)

Lectures	4	Tutorial	0	Practical	0	Self Study	0
Continuous Internal Assessment	:	40		Semester End Examination (3 Hours)		:	60

UNIT – I

Basic Concepts of Electric Circuits: Introduction, Electric Current, Ohm's Law, Work, Power, and Energy, Dynamically Induced EMF and Statically Induced EMF, Self-induced EMF and Mutually Induced EMF, Self-inductance of a Coil, Mutual Inductance, Energy Stored in a Magnetic Field, Electrical Circuit Elements, Energy Stored in a Capacitor, Capacitor in Parallel and in Series.

DC Networks and Network Theorems: DC Network Terminologies, Voltage and Current Sources, Series Parallel Circuits, Voltage and Current Divider Rules, Kirchhoff's Laws, Maxwell's Mesh Current Method, Nodal Voltage Method (Nodal Analysis), Network Theorems (Superposition Theorem, Thevenin's Theorem, Norton's Theorem).

UNIT – II

AC Fundamentals: Introduction, Generation of Alternating Voltage in an Elementary Generator, Concept of Frequency, Cycle, Time Period, Instantaneous Value, Average Value, and Maximum Value, Sinusoidal and Non-sinusoidal Wave Forms, Concept of Average Value and Root Mean Square (RMS) Value of an Alternating Quantity, Analytical Method of Calculation of RMS Value, Average Value, and Form Factor, RMS and Average Values of Half-wave rectified Alternating Quantity, Concept of Phase and Phase Difference.

Transformers: Introduction, Basic Principle and Constructional Details, EMF Equation.

UNIT – III

Semiconductor Devices: Introduction, Review of Atomic Theory, Binding Forces Between Atoms in Semiconductor Materials, Extrinsic Semiconductors, Semiconductor Diodes; Volt-ampere Characteristic of a Diode, An Ideal Diode, Diode Parameters and Diode Ratings, Zener Diode; Zener Diode As Voltage Regulator, Zener Diode As a Reference Voltage, Bipolar Junction Transistors; Working of a n-p-n Transistor, Working of a p-n-p Transistor, Transistor Configurations, Transistor As an Amplifier, Transistor As a Switch, Rectifiers and Other Diode Circuits.

Rectifiers: Introduction, Half-Wave, Full wave Rectifiers and their analysis, Comparison of Half-Wave and Full-Wave Rectifiers.

UNIT – IV

Digital Electronics: Introduction, Number System, Octal Number System, Hexadecimal Number System, Application of Binary Numbers in Computers, Logic Gates, Boolean Algebra, De Morgan's Theorem, Combinational Circuits, Simplification of Boolean Expressions Using De Morgan's Theorem.

Integrated Circuits: Introduction, Fabrication of Monolithic ICs, Hybrid Integrated Circuits, Linear and Digital ICs.

TEXT BOOK: "Basic Electrical and Electronics Engineering", S.K. Bhattacharya, Pearson Publications

REFERENCE BOOKS:

1. "Basic Electrical, Electronics and Computer Engineering", Muthusubramanian R, Salivahanan S and Muraleedharan K A, Tata McGraw Hill, Second Edition, (2006).

2. "Basics of Electrical and Electronics Engineering", Nagsarkar T K and Sukhija M S, Oxford press University Press.

Environmental Studies
(Common for all branches)
I B.Tech – I Semester (Code: 14ES205 / 14ES105)

Lectures	4	Tutorial	0	Practical	0	Self Study	0
Continuous Internal Assessment	:	40		Semester End Examination (3 Hours)		:	60

UNIT – I

Introduction: Definition, Scope and Importance, Need for public awareness. Ecosystems: Definition, Structure and Functions of Ecosystems, types - Forest, Grassland, Desert, Aquatic (Marine, pond and estuaries).

Biodiversity: Definition and levels of Biodiversity; Values of Biodiversity - Consumptive, Productive, Social, Aesthetic, Ethical and Optional; Threats and Conservation of Biodiversity; Hot Spots of Biodiversity, Bio-geographical Classification of India, India as a mega diversity nation.

UNIT – II

Natural resources: Land: Land as a resource, Causes and effects of land degradation - Soil erosion, Desertification. Forest: Use of forests, Causes and effects of deforestation, Afforestation, Mining - benefits and problems. Water: Uses, floods and drought, Dams - benefits and problems. Energy: Importance of energy, Renewable and Non renewable energy resources.

Sustainability: Definition, Concept and Equitable use of resources for sustainable development; Rain water harvesting and Watershed management.

UNIT – III

Pollution: Definition; Causes, effects and control of air, water and nuclear pollution; Solid Waste: urban, Industrial and hazardous wastes; Integrated waste management - 3R approach, composting and vermicomposting.

Environmental issues: Green house effect & Global warming, Ozone layer depletion, Acid rains, Green Revolution, Population Growth and environmental quality, Environmental Impact Assessment.

UNIT – IV

Environmental acts: Water and air (Prevention and Control of pollution) acts, Environmental protection act, Forest Conservation act. Case Studies: Silent Valley Project, Chipko movement, Narmada BachaoAndolan, Bhopal Gas Tragedy, Mathura Refinery and TajMahal, Chernobyl Nuclear Disaster and Ralegan Siddhi (Anna Hazare).

Field work: Visit to a local area to document environmental assets – Pond/Forest/Grassland. Visit to a local polluted site- Urban and industry/ Rural and Agriculture.

TEXT BOOKS:

1. "Environmental Studies" by Benny Joseph, Tata McGraw-Hill Publishing Company Limited, New Delhi.
2. "Comprehensive environmental studies"- JP Sharma, Laxmi Publications.

REFERENCE BOOKS:

1. "Environmental studies", R.Rajagopalan, Oxford University Press.
2. "Introduction to Environmental Science", Anjaneyulu Y, B S Publications
3. "Environmental Science", 11th Edition – Thomson Series – By Jr. G. Tyler Miller.

Problem Solving with Programming
(Common for all branches)
I B.Tech – ISemester (Code: 14CP106 / 14CP206)

Lectures	4	Tutorial	0	Practical	0	Self Study	1
Continuous Internal Assessment	:	40	Semester End Examination (3 Hours)	:	60		

UNIT – I

Basics and Introduction to C, The C Declarations, Operators and Expressions,Input and Output in C,Decision Statements, **Programming Exercises for Unit I**:C-expressions for algebraic expressions, evaluation of arithmetic and Boolean expressions. Syntactic errors in a given program, output of a given program, values of variables at the end of execution of a program fragment, filling the blanks in a given program. Programs using Scientific and Engineering formulae. Finding the largest of the three given numbers. Computation of discount amount on different types of products with different discount percentages. Finding the class of an input character, finding the type of triangle formed with the given sides, computation of income-tax, computation of electricity bill and conversion of lower case character to its upper case.

UNIT – II

Loop Control, Data Structure: Array, **Programming Exercises for Unit – II:** To print the sum of the digits of a given number and to display the image of a given number. To find whether a given number is prime, printing Fibonacci sequence and to find prime factors of a given number. To print graphic patterns of symbols and numbers and computation of statistical parameters of a given list of numbers. To find the length of a string, compare strings, reverse a string, copy a string and to find whether the given string is palindrome or not. Transpose of a matrix, product and sum of matrices and sorting of names using arrays.

UNIT – III

Strings and Standard Functions,Pointers,Dynamic Memory Allocation and Linked List:Dynamic Memory Allocation, Memory Models, Memory Allocation Functions.

Functions, Storage Class,**Programming Exercises for Unit - III:** Functions - Insertion sort, Linear search. Recursive functions to find factorial & GCD (Greatest Common Divisor), string operations using pointers and pointer arithmetic and dynamic memory allocation. Swapping two variable values. Sorting a list of names using array of pointers.

UNIT – IV

Preprocessor Directives:Introduction, The #define Directive, Undefining a Macro, Token Pasting and Stringizing Operators, The #include Directive, Conditional Compilation, The #ifndef Directive.

Structure and Union, Files,**Programming Exercises for Unit - IV**:Operations on complex numbers, matrix operations with the matrix and the size of the matrix as a structure, sorting a list of student records on register number using array of pointers and to read an input file of marks and generate a result file, sorting a list of names using command line arguments.

TEXT BOOK:

1. Ashok N.Kamthane, "Programming in C", PEARSON 2nd Edition.

REFERENCE BOOKS:

1. Kernighan BW and Dennis Ritchie M, "C programming language", 2nded, Prentice Hall.
2. Yashavant P. Kanetkar, "Let us C", BPB Publications.
3. E.Balagurusamy, "Programming in ANSI C", 4thed, Tata Mcgraw-Hill.
4. Herbert Schildt, "C: The Complete Reference", 4th edition, Tata Mcgraw-Hill.

Physics Laboratory
(Common for all branches)
I B.Tech – I Semester (Code: 14PHL101 / 14PHL201)

Lectures	0	Tutorial	0	Practical	3	Self Study	0
Continuous Internal Assessment		:	40	Semester End Examination (3 Hours)		:	60

LIST OF EXPERIMENTS

1. Determination of acceleration due to gravity at a place using compound pendulum.
2. Study the variation of intensity of magnetic field along the axis of a circular coil using Stewart-Gee's apparatus.
3. Determination of thickness of thin wire using air wedge interference bands.
4. Determination of radius of curvature of a Plano convex lens by forming Newton's rings.
5. Determination of wavelengths of mercury spectrum using grating normal incidence method.
6. Determination of dispersive power of a given material of prism using prism minimum deviation method.
7. Draw the resonant characteristic curves of L.C.R. series circuit and calculate the resonant frequency.
8. Draw the characteristic curves of a photocell and calculate the maximum velocity of electron.
9. Verify the laws of transverse vibration of stretched string using sonometer.
10. Determine the rigidity modulus of the given material of the wire using Torsional pendulum.
11. Draw the load characteristic curves of a solar cell.
12. Determination of Hall coefficient of a semiconductor.
13. Determination of voltage and frequency of an A.C. signal using C.R.O.
14. Determination of Forbidden energy gap of Si &Ge.
15. Determination of wavelength of laser source using Diode laser.

TEXT BOOK:

1. "Engineering physics laboratory manual"P.Srinivasarao&K.Muralidhar,Himalaya publications.

Hardware Laboratory

(Common for all branches)

I B.Tech – I Semester (Code: 14HWL102 / 14HWL202)

Lectures	0	Tutorial	0	Practical	3	Self Study	0
Continuous Internal Assessment	:	40	Semester End Examination (3 Hours)	:	60		

LIST OF EXPERIMENTS

1. Identification and testing of various electronic components. (Resistors, Inductor, Capacitor, Transistor, ICs and Bread board)
2. Study of Oscilloscope, Function generator, Power supply and Multi meter.
3. KCL & KVL verification for simple circuits on Bread board.
4. Study of Ceiling fan.
5. Study of Florescent lamp.
6. Study of Single Phase Transformer.
7. Identifying all parts of computers.
8. Install and Uninstall system and application software.
9. Assembling a Computer.
10. Connecting computers in a network.

Problem Solving with Programming Laboratory

(Common for all branches)

I B.Tech – I Semester (Code: 14CPL103 / 14CPL203)

Lectures	0	Tutorial	0	Practical	3	Self Study	0
Continuous Internal Assessment	:	40	Semester End Examination (3 Hours)	:	60		

LIST OF EXPERIMENTS

1. A program for electricity bill taking different categories of users, different slabs in each category. (Using nested if else statement).

Domestic Customer:		
Consumption Units	**Rate of Charges(Rs.)**	
0 – 200	0.50 per unit	
201 – 400	100 plus	0.65 per unit
401 – 600	230 plus	0.80 per unit
601 and above	390 plus	1.00 per unit
Commercial Customer:		
Consumption Units	**Rate of Charges(Rs.)**	
0 – 50	0.50 per unit	
100 – 200	50 plus	0.6 per unit
201 – 300	100 plus	0.70 per unit
301 and above	200 plus	1.00 per unit

2. Write a C program to evaluate the following (using loops):
   a) $1 + x^2/2! + x^4 / 4!+$ …upto ten terms
   b) $x + x^3/3! + x^5/5!+$ … upto 7 digit accuracy
3. Write a C program to check whether the given number is
   a) Prime or not.
   b) Perfect or Abundant or Deficient.
4. Write a C program to display statistical parameters (using one – dimensional array).
   a) Mean
   b) Mode
   c) Median
   d) Variance.
5. Write a C program to read a list of numbers and perform the following operations
   a) Print the list.
   b) Delete duplicates from the list.
   c) Reverse the list.
6. Write a C program to read a list of numbers and search for a given number using Binary search algorithm and if found display its index otherwise display the message "Element not found in the List".
7. Write a C program to read two matrices and compute their sum and product.

8. A menu driven program with options (using array of character pointers).
    a) To insert a student name
    b) To delete astudent name
    c) To print the names of students
9. Write a C program to read list of student names and perform the following operations
    a) To print the list of names.
    b) To sort them in ascending order.
    c) To print the list after sorting.
10. Write a C program that consists of recursive functions to
    a) Find factorial of a given number
    b) Solve towers of Hanoi with three towers (A, B & C) and three disks initially on tower A.
11. A Bookshop maintains the inventory of books that are being sold at the shop. The list includes details such as author, title, price, publisher and stock position. Whenever a customer wants a book the sales person inputs the title and the author, and the system searches the list and displays whether it is available or not. If it is not, an appropriate message is displayed, if it is, then the system displays the book details and request for the number of copies required ,if the requested copies are available the total cost of the requested copies is displayed otherwise the message “required copies not in stock” is displayed. Write a program for the above in structures with suitable functions.

12. Write a C program to read a data file of students’ records with fields(Regno, Name, M1,M2,M3,M4,M5) and write the successful students data (percentage > 40%) to a data file.

Engineering Mathematics – II
(Common for all branches)
I B.Tech – II Semester (Code: 14MA201)

Lectures	4	Tutorial	1		Practical	0	Self Study	0	
Continuous Internal Assessment			:	40	Semester End Examination (3 Hours)			:	60

UNIT – I

First Order Differential Equations: Basic concepts, Geometrical meaning, Separable Differential Equations, Exact Differential Equations, Integrating Factors, Linear Differential Equations, Bernoulli's Equation, Orthogonal Trajectories of curves, Some Engineering Applications: Growth-Decay and Newton's Law of Cooling.

UNIT – II

Linear Differential Equations of Second Order: Homogeneous Linear Equations of Second Order, Second Order Homogeneous Equations with Constant Coefficients, Case of Complex Roots, Euler-Cauchy Equations, Non-Homogeneous Equations, Solution by Undetermined Coefficients, Solution by Variation of Parameters, Applications-Modeling of Electric Circuits.

UNIT – III

Laplace Transforms: Laplace Transform, Inverse Transform, Linearity, Shifting, Transforms of Derivatives and Integrals, Differential Equations, Unit Step Function, Second Shifting Theorem, Dirac's Delta Function, Convolution theorem (without proof).

UNIT – IV

Vector calculus: Scalar and vector point functions, Gradient of a scalar field, Directional derivative, Divergence of a vector field, curl of a vector field, Line integrals, Line integrals independent of path, Green's theorem in the plane (without proof), Surface integrals, Triple integrals, Divergence theorem of Gauss (without proof), Applications to Engineering problems, Stokes theorem(without proof).

TEXT BOOK:

1. "Advanced Engineering Mathematics", Erwin Kreyszig, 9th edition, John Wiley & Sons.

REFERENCE BOOK:

1. "Advanced Engineering Mathematics", Peter V. O'Neil, Thomsons Brooks/Cole.

Engineering Physics – II
(Common for all branches)
I B.Tech – II Semester (Code: 14PH202)

Lectures	4	Tutorial	0	Practical	0	Self Study	0
Continuous Internal Assessment	:	40	Semester End Examination (3 Hours)	:	60		

UNIT – I

Electron theory of solids & semiconductor physics:

Electron theory of solids: Failure of classical free electron theory, quantum free electron theory, Fermi-Dirac distribution and its temperature dependence, Kronig-Penny model (Qualitative), effective mass of electron, concepts of energy band gap and hole.

Semiconductor physics: Classification of semiconductors, density of states, carrier concentration in intrinsic and extrinsic semiconductors, law of mass action, conductivity in semiconductors (drift and diffusion), Equation of continuity, P-N junction diode and its V-I characteristics.

UNIT – II

Magnetic, Dielectric and Ferro-electric materials:

Origin of magnetic moment of an atom, Bohr magneton, Domain theory of Ferro magnetism, curie-weisslaw(Qualitative), Hysteresis curve, soft and hard magnetic materials, ferrites and its applications.

Dielectric materials: Types of polarizations, internal field (qualitative), Classius – Mossotti equation, Frequency dependence of polarization, Ferroelectrics and its applications, strength of dielectrics and dielectric breakdown.

UNIT – III

Advanced materials:

Nano-materials: Introduction to nano-materials, surface to volume ratio, quantum confinement, properties of nano materials, Fabrication of nano-materials(CVD and sol-gel methods) , carbon nano tubes and its properties, Applications of nano materials.

Superconductivity: Critical temperature, critical magnetic field and critical current. Meissner effect, type-I and type-II superconductors, attractive interactions, qualitative treatment of BCS theory and, Josephson's junction, Applications of superconductors.

Opto-electronic devices: Working and applications of solar cell, LED, LCD, Photo Diode.

UNIT – IV

Analytical techniques:

Nuclear techniques: Radio isotopes and its applications (Medical and Industrial), GM-counter, scintillation counter.

Ultrasonics: Properties of ultrasonics, General applications of ultrasonics.

Medical applications: Cardiology and Ultrasonic imaging.

Industral applications: NDT (Pulse echo technique) and cavitation effect. Time of flight diffraction technique.

Structure determination: Crystal lattices (Bravais), and planes, Miller indices, Bragg's law, structural analysis of crystals using X-Ray powder diffraction method.

TEXT BOOK:

1. "A Text Book of Engineering Physics", M.N.Avadhanulu& P. Krushisagar, S.Chand Publication., (Edition – 2013).

REFERENCE BOOKS:

2. "Engineering physics"by R.K.Gour and S.L.Gupta. Dhanpatrai publications.
3. "Basic Engineering Physics" by P.Srinivasarao&K.Muralidhar,Himalaya publications.
4. "Engineering physics" by M.R.Sreenivasan. New age international publications.
5. "Engineering physics" by Palaniswamy. Scitech publications.

Engineering Chemistry – II
(Common for all branches)
I B.Tech – II Semester (Code: 14CY203)

Lectures	4	Tutorial	0	Practical	0	Self Study	0
Continuous Internal Assessment	:	40		Semester End Examination (3 Hours)		:	60

UNIT I:

Polymers: **12 periods**

Introduction, polymerization: types – addition and condensation polymerization; Mechanism of free radical addition polymerization with suitable example; Polymer Tacticity and Ziegler Natta polymerization (mechanism).

Plastics: Classification (Thermoplastic and thermosetting); Preparation, properties and uses of PVC, Teflon, Bakelite, Nylon-6,6.

Rubbers: Natural rubber**,** drawbacks of raw rubber**,** Vulcanization of rubber; Synthetic rubbers: Buna-S, Buna-N and Poly urethane.

UNIT II

Electro Chemistry **13 periods**

Electrode potential, Determination of single electrode potential; Nernst equation (problems); Electrochemical series – significance; Electro chemical cells, Reversible and irreversible cells, Reference electrodes – Standard Hydrogen electrode, Calomel electrode, Ion selective electrode (glass electrode) – measurement of pH;

Solar cells: Introduction, Solar Panels, Applications;

Fuel Cells: Hydrogen – Oxygen Fuel Cell;

Batteries: Lead – acid, NiCad and Lithium Batteries.

UNIT III: Corrosion and Corrosion Control **13 periods**

Corrosion: Types of corrosion - Chemical or dry corrosion, Pilling – Bedworth rule; Electrochemical or wet corrosion; Galvanic corrosion, pitting, stress and differential aeration corrosion; factors influencing corrosion;

Corrosion control – sacrificial anodic method and impressed current cathodic methods, corrosion inhibitors; Protective coatings: Metallic coatings – electro plating (Au) and electroless plating (Ni). Paints – constituents and functions,

Green Chemistry: Principles and applications of green chemistry, Integrated Waste Management (IWM), Zero Waste Technologies (ZWT), green auditing, green solvents, green catalysts, green energies.

UNIT-IV: Analytical Techniques **12 periods**

Beer-Lambert's law; **Colorimetry**: principle, instrumentation (with block diagram) and Estimation of iron, **Flame photometry**: principle, instrumentation (with block diagram) and estimation of sodium; **A**tomic **A**bsorption **S**pectroscopy: principle, instrumentation (with block diagram) and estimation of nickel.

Conductometric titrations (Acid-Base) and Potentiometric titrations (Redox titrations – Fe^{2+}*vs*dichromate).

TOTAL: 50 PERIODS

TEXT BOOKS:

1. P.C. Jain and Monica Jain, "Engineering Chemistry" DhanpatRai Pub, Co., New Delhi 15th edition (2010).

REFERENCES:

1. S.S. Dara &Mukkanti K. "A text book of engineering chemistry" S. Chand & Co. Ltd., New Delhi (2006).
2. B. Sivasankar "Engineering Chemistry" Tata McGraw Hills co., New Delhi (2008).
3. Dr. B. K. Sharma, Instrumental methods of analysis, Krishna Prakashan Media, 2000.

Communicative English
(Common for all branches)
I B.Tech – II Semester (Code: 14EL204 / 14EL104)

Lectures	4	Tutorial	0	Practical	0	Self Study	0
Continuous Internal Assessment		:	40	Semester End Examination (3 Hours)		:	60

UNIT-I

a. **Text: Unit-I** Going Places: Travel
   Unit-II Reaching Out: Mass Media
b. **Grammar:** Review of Parts of Speech, Concord
c. **Writing:** Mind Mapping, Paragraph Writing : Structure, Development & Types
d. **Vocabulary** from the suggested units (Given List)

UNIT- II

a. **Text: Unit-III** Ushering in a New Era: Networking
   Unit-IV Inspiring Minds: Successful People
b. **Grammar:**Tenses, Conditionals
c. **Writing:**Essay Writing: Descriptive, Argumentative, Imaginative, Narrative
d. **Vocabulary** from the suggested units (Given List)

UNIT- III

a. **Text: Unit-V** Morphed Universe**:** Technology as a double Edged Sword
   Unit-VI The Indomitable Human Spirit: Facing Disasters
b. **Grammar:** Articles, Reported Speech, Voices
c. **Writing:** Letter Writing (Inquiry, Complaint & Request Letters) & Summarizing
d. **Vocabulary** from the suggested units (Given List)

UNIT- IV

a. **Text: Unit-VII** Getting Job Ready: Interview Skills
   Unit-VIII The World of Work: The Corporate Experience
b. **Grammar:** Common Errors
c. **Writing:** Note Making, Technical Report Writing
d. **Vocabulary** from the suggested unit (Given List)

Prescribed Text

DrElango, DrVeenaSelvam, DrPriyadarshiniSujatha (2013): Resonance: English for Engineers and Technologists, CUP.

References:

Michael Swan (2003): Practical English Usage, CUP.

Stephen, McLaren (2003): Easy Writer Student's Guide to Writing Essays and Reports, New Delhi, Viva Books Pvt.

Raymond Murphy (2012): English Grammar in Use (Fourth Edition), CUP.

Lina Mukhopadhyay (2013): English for Jobseekers, CUP.

R.C Sharma (2010): Business Correspondence and Report writing (Fourth Edition), Tata McGraw Hill.

Engineering Mechanics

(Common for all branches)

I B.Tech – II Semester (Code: 14EM105 / 14EM205)

Lectures	4	Tutorial	1	Practical	0	Self Study	0
Continuous Internal Assessment	:	40		Semester End Examination (3 Hours)	:	60	

UNIT – I

Concurrent Forces in a Plane: Principles of statics – Composition and resolution of forces – Equilibrium of concurrent forces in a plane –Method of moments.

Parallel Forces in a Plane: Two parallel forces – General case of parallel forces in a plane – Center of parallel forces – Centroids of composite plane figures and curves

UNIT – II

Moments of Inertia of Plane Figures: Moment of inertia of a plane figure with respect to an axis in its plane – Moment of Inertia with respect to an axis perpendicular to the plane of the figure – Parallel axis theorem

General Case of Forces in a Plane: Composition of forces in a plane – Equilibrium of forces in a plane – Plane trusses: method of joints.

UNIT – III

Friction: Characteristics of friction – problems involving dry friction

Rectilinear Translation: Kinematics of rectilinear motion – principles of dynamics – Differential equations of rectilinear motion D'Alemberts principle – momentum and impulse – work and energy – ideal systems: conservation of energy

UNIT – IV

Curvilinear Translation: Kinematics of curvilinear motion – Differential equations of curvilinear motion – D'Alembert's principle – Work and Energy.

Moments of Inertia of Material Bodies: Moment of inertia of a rigid body – Moment of inertia of a lamina – Moments of inertia of three – dimensional bodies.

Rotation of a Rigid Body about a Fixed Axis: Kinematics of rotation – Equation of motion for a rigid body rotating about a fixed axis – D'Alembert's principle

TEXT BOOK

1. Engineering Mechanics by S. Timoshenko and D. H. Young – McGraw-Hill International Edition (For concepts and symbolic problems)
2. Engineering mechanics statics and dynamics by A. K. Tayal – Umesh publication, Delhi (For numerical problems using S.I. system of units

REFERENCE BOOKS

1. Vector mechanics for Engineers-Statics and Dynamics by Beer and Johnston, Tata McGraw-Hill publishing company, New Delhi
2. Engineering Mechanics-Statics and Dynamics by R. C. Hibbeler and Ashok Gupta - Pearson (For numerical problems using S.I. system of units)

Engineering Graphics

(Common for all branches)

I B.Tech – II Semester (Code: 14EG206 / 14EG106)

Lectures	4	Tutorial	1		Practical	0	Self Study	1	
Continuous Internal Assessment			:	40	Semester End Examination (3 Hours)			:	60

UNIT – I

INTRODUCTION: Introduction to Drawing instruments and their uses, geometrical construction procedures.

CURVES: Conic sections – general construction methods for ellipse, parabola and hyperbola. Other methods to construct ellipse only, cycloid, involute of a circle.

UNIT – II

METHOD OF PROJECTIONS: Principles of projection - First angle and third angle projection of points. Projection of straight lines. Traces of lines.

UNIT – III

PROJECTIONS OF PLANES: Projections of plane figures: circle, square, rhombus, rectangle, triangle, pentagon and hexagon.

UNIT – IV

PROJECTIONS OF SOLIDS: Projections of Cubes, Prisms, Pyramids, Cylinders and Cones with varying positions.

UNIT – V

ISOMETRIC PROJECTIONS: Isometric Projection and conversion of Orthographic views into isometric views. (Treatment is limited to simple objects only).

ORTHOGRAPHIC PROJECTIONS: Conversion of pictorial views into Orthographic views. (Treatment is limited to simple castings).

TEXT BOOK:

1. "Engineering Drawing" by N.D. Bhatt & V.M. Panchal. (Charotar Publishing House, Anand). (First angle projection)

REFERENCE BOOKS:

2. "Engineering Drawing" by Dhananjay A Jolhe, Tata McGraw hill publishers
3. "Engineering Drawing" by Prof.K.L.Narayana& Prof. R.K.Kannaiah.

Chemistry Laboratory
(Common for all branches)
I B.Tech – II Semester (Code: 14CYL201 / 14CYL101)

Lectures	0	Tutorial	0	Practical	3	Self Study	0
Continuous Internal Assessment		:	40	Semester End Examination (3 Hours)		:	60

LIST OF EXPERIMENTS

1. **Introduction to Chemistry Lab** (the teachers are expected to teach fundamentals likeCalibration of Volumetric Apparatus, Primary, Secondary Solutions, Normality, Molarity, Molality etc. and error, accuracy, precision, theory of indicators, use of volumetric titrations).

2. **Volumetric Analysis:**
   a. Estimation of Washing Soda.
   b. Estimation of Active Chlorine Content in Bleaching Powder
   c. Estimation of Mohr's salt by permanganometry.
   d. Estimation of Magnesium by EDTA method
3. **Analysis of Water:**
   a. Determination of Alkalinity of Tap water.
   b. Determination of Total Hardness of ground water sample by EDTA method
   c. Determination of Salinity of water sample
4. **Estimation of properties of oil**:
   a. Estimation of Acid Number
   b. Estimation of Saponification value
5. **Preparations:**
   a. Preparation of Soap
   b. Preparation of Urea-formaldehyde resin
   c. Preparation of Phenyl benzoate
6. **Demonstration Experiments (Any two of the following):**
   5.1 Determination of p^H of given sample by different methods.
   5.2 Determination of conductivity of given sample by conductometer.

TEXT BOOKS (for Chemistry 1 and 2):

1. Practical Engineering Chemistry by K.Mukkanti, Etal, B.S. Publicaitons, Hyderabad.
2. Inorganic quantitative analysis, Vogel.

REFERENCE BOOKS:

1. Text Book of engineering chemistry by R.n. Goyal and HarrmendraGoel.
2. A text book on experiments and calculations- Engineering Chemistry. S.S. Dara.
3. Instrumental methods of chemical analysis, Chatwal, Anand, Himalaya Publications.

English Communication Skills Laboratory
(Common for all branches)
I B.Tech – II Semester (Code: 14ELL202 / 14ELL102)

Lectures	0	Tutorial	0	Practical	3	Self Study	0
Continuous Internal Assessment	:	40		Semester End Examination (3 Hours)		:	60

UNIT-I: Functional English

Introducing Yourself & Others-Greeting & Parting-Congratulating-Giving Suggestions & Advices-Expressing Opinions-Inviting People-Requesting-Seeking Permission-Giving Information- Giving Directions- Sympathizing-Convincing People-Complaining-Apologizing-Thanking Others- Shopping-Travelling- Conversational Gambits.

UNIT-II

Phonetics (Oral drills) - Stress- Rhythm & Intonation.

UNIT-III Vocabulary Development & Oratory Skills

Classified Vocabulary- Idioms - Phrasal verbs - Words often confused- Analogous words- Corporate Words - JAM- Elocution- Debate.

UNIT-IV Manners and Etiquette

Giving & Receiving Feedback -Telephone Etiquette - Gender Sensitive Language.

Reference Books:

J.D. O' Connor (1984): Better English pronunciation Cambridge University Press

Jack C Richards (2015)**:** New Interchange (4rth Edition) , CUP.

Grant Taylor (2001: English Conversation Practice, McGraw Hill.

MichealMcCarthy, Felicity O Dell (1994)**:** English Vocabulary in Use, CUP.

Software:

Buzzers for conversations, New Interchange series

English in Mind series, telephoning in English

Speech Solutions, A course in Listening and Speaking

Face to Face series

Workshop

(Common for all branches)

I B.Tech – II Semester (Code: 14WSL203 / 14WSL103)

Lectures	0	Tutorial	0	Practical	3	Self Study	0
Continuous Internal Assessment	:	40	Semester End Examination (3 Hours)	:	60		

LIST OF EXPERIMENTS

1. **Carpentry**
   a. Half Lap joint
   b. Dovetail joint
   c. Mortise &Tenon joint
2. **Welding using electric arc welding process/gas welding**
   a. Lap joint
   b. Tee joint
   c. Butt joint
3. **Sheet metal operations with hand tools**
   a. Trapezoidal tray
   b. Funnel
   c. T-joint
4. **House wiring**
   a. To control one lamp by a single switch
   b. To control two lamps by a single switch
   c. Stair-case wiring

CODE: 14 MA 301

ENGINEERING MATHEMATICS – III

(Common for all branches)

(4Th, 3 credits)

II B.Tech - I Semester

Lectures	4	Tutorial	0		Practical	0	Self Study	0
Continuous Internal Assessment			:	40	Semester End Examination (3 Hours)			60

UNIT – I

Fourier integrals: From Fourier series to the Fourier integral, Application of the Fourier integral, Fourier Cosine and Sine integral, Evaluation of integrals, Fourier cosine and sine Transforms: Fourier Cosine Transforms, Fourier Sine Transforms, Linearity, Transforms of Derivatives, Fourier Transform: Complex form of the Fourier integral, Fourier Transform and its inverse, Linearity. Fourier Transform of Derivatives, Convolution.

UNIT – II

Partial differential equations: Basic concepts, Modeling-Vibrating string, Wave Equation Separation of Variables Use of Fourier series, D'Alembert's Solution of the Wave Equation, Heat Equation-Solution Fourier series, Steady-State Two-Dimensional Heat Flow

UNIT – III

Numerical Methods in general: Introduction, Solution of Equations by Iteration, newton's Method for Solving Equations f(x) = 0, Convergence of Newton's method, Interpolation: Lagrange interpolation, Newton's divided difference interpolation, Equal spacing: Newton's forward Difference formula, Newton's Backward Difference formula, Inverse interpolation, Numerical integration and Differentiation: Trapezoidal Rule, Error Bounds and Estimate for the Trapezoidal Rule, Simpson's Rule of integration, Error of Simpson's rule.

UNIT – IV

Numerical methods in linear algebra: Linear Systems: Gauss Elimination, LU Factorization, Gauss-Seidel iteration Method, Method of least Squares, Methods of First order Differential Equations: Euler's method, Runge-Kutta methods, Methods for Elliptic Partial Differential Equations: Laplace equation, Poisson equation

NOTE

Two questions of 12 marks each will be given from each unit out of which one is to be answered.
Twelve questions of one mark each will be given from entire syllabus which is a compulsory question.

TEXT BOOK:

1. "Advanced Engineering Mathematics", Erwin Kreyszig, 9th edition, John Wiley & Sons.

REFERENCE BOOKS:

1. "Advanced Engineering Mathematics", Peter V. O'Neil, Thomsons Brooks/Cole.

CODE: 14 CE 302

BUILDING MATERIALS AND CONCRETE TECHNOLOGY

Lectures	4	Tutorial	0	Practical	0	Self Study	0
Continuous Internal Assessment		:	40	Semester End Examination (3 Hours)			60

UNIT- I

1. Stones

Qualities of a good building stone, Common building stones of India.

2. Bricks

General; Composition of good brick earth; Harmful ingredients in brick earth; Manufacture of bricks by clamp burning and kiln (only Hoffmans kiln) burning, Qualities of good bricks; Tests for bricks; Classification of bricks; Size and weight of bricks

3. Lime

General; Some definitions; Sources of lime; Constituents of limestones; Classification of limes; Properties of fat lime and hydraulic lime;

4. Timber

Definition; Structure of a tree; Qualities of good timber; Decay of timber; Preservation of timber; Advantages of timber construction; Uses of timber;

UNIT- II

5. Stone & Brick Masonry

Technical terms; Types of bonds in brickwork and their suitability. Classification of stone Masonry

6. Floors and Roofs

Technical terms; Types of ground floors; Classification of roofs

7. Dampness And Damp Proofing

Causes of dampness; Methods of preventing dampness; Damp proofing materials and their classification; Methods of providing DPC under different situations.

8. Scaffolding, Shoring, Under Pinning And Form Work

Types of scaffolding; Types of shoring; Methods of underpinning; Types of formwork; Centering.

UNIT- III

9. Cement

General, Manufacture of Portland cement by dry process, Approximate oxide composition limits of OPC, Bogue's compounds, heat liberation from a setting cement, structure of hydrated cement, water requirements for hydration.

10. Types Of Cements

Ordinary Portland cement, Rapid hardening cement, Sulphate resisting cement, Quick setting cement, Super sulphated cement, Portland pozzolana cement, expansive cement, High alumina cement.

11. Testing Of Cement and Aggregates

Fineness of cement using sieve test and air-permeability method, Normal consistency and setting times using vicat apparatus, Grades of cement as
per IS specifications, physical and chemical requirements of OPC for different grades of cement, bulking of fine aggregate, grading of aggregates, standard grading curve

12. Admixtures

General, plasticizers and super plasticizers, Retardors, accelerators, fly ash

UNIT- IV

13. Fresh Concrete

Workability, factors affecting workability, slump test, compaction factor test, segregation, bleeding, compaction of concrete, hand compaction, compaction by vibration

14. Hardened Concrete

General; water-cement ratio; gel/space ratio; gain of strength with age; maturity concept of concrete; non-destructive testing methods, creep, factors affecting creep, shrinkage, factors affecting shrinkage

15. Types of Concretes

Fibre Reinforced concrete- Fibres used, workability, mixing, applications
Ferro cement- Casting techniques, applications
High performance concrete

16. Proportioning Of Concrete Mixes

Concept of mix design, variables in proportioning , different methods of mix design, nominal mix and design mix, Indian standard – IS:10262- 2009 method of mix design.

NOTE

Two questions of 12 marks each will be given from each unit out of which one is to be answered.
Twelve questions of one mark each will be given from entire syllabus which is a compulsory question.

TEXT BOOKS

1. Engineering Materials by S. C. Rangwala; Charotar Publishing House, Anad.
2. Building construction by B. C. Punmia et all; Laxmi Publications, New Delhi.
3. Concrete technology by M.S.Shetty, S.Chand & Company Pvt. Ltd., New Delhi

REFERENCE BOOKS

1. Properties of concrete by A.M.Neville, Longman Publishers
2. Concrete technology by M.L.Gambhir, Tata McGraw-Hill Publishing company Ltd., New Delhi.

CODE: 14 CE 303

SURVEYING – I

Lectures	4	Tutorial	0		Practical	0	Self Study	1
Continuous Internal Assessment			:	40	Semester End Examination (3 Hours)			60

UNIT – I

1. Basic measurements of surveying

Definitions; Classification; Principles of Surveying; Plan and map; Basic Measurements; Instruments and Basic methods; Scales used for Maps and plans. Phases of survey work and Duties of a surveyor; Precision in surveying work;

2. Errors in surveying

Reliability of measurements – Accuracy, Precision, Significant figures, Rounding of numbers; Sources and types of errors; Probability in Survey measurements; Normal distribution; Measures of precision.

UNIT – II

3. Measurement of distances (Chain surveying)

Methods of distance measurements; Equipment for distance measurement; Procedures for distance measurement – Ranging, Chaining/taping a line; Errors in chaining and taping, and their corrections; obstacles in chaining.

4. Measurement of Directions (Compass Surveying)

Introduction to compass survey Definitions of Bearing. True bearing, True meridian, Magnetic Meridian, Magnetic bearing – Arbitrary Meridian, R.B & B.B of lines, Designation of bearing – W.C.B. & R.B. – Conversion of bearings – from one systems to the other Related problems – Calculation of angles for bearings, Calculation of bearings for angles, Related problems – Theory of Magnetic compasses (i.e. Survey & Prismatic compass) Magnetic dip-. Temporary adjustments of compass-Magnetic Declination – Local attraction-Related problems –Errors in compass survey.

UNIT – III

5. Theodolite Surveying

Types of Theodolites - Vernier Theodolite; Basic definitions; Fundamental lines and desired relations; Temporary and permanent adjustments; Field operations - Measurement of a horizontal angle: Repetition and Reiteration methods, a vertical angle, bearings; Lining-in, Balancing-in, Double sight, Random line method of running a line, Prolonging a straight line and location of intersection of two straight lines, Sources of errors in Theodolite survey.

6. Theodolite Traversing

Types of traverses – Open and closed traverse, based on method of horizontal angles measurement and instruments employed; Traverse procedure - Selection of traverse stations; Marking of stations, linear and angular (both bearings and angles) measurements; Compatibility of linear and angular measurements; Sources of errors in traversing; Checks in traversing; Traverse Computations – Gale's traverse table; Methods of adjustments; Omitted measurements

UNIT – IV

7. Levelling

Levelling: Definitions of terms-Methods of levelling-Uses and adjustments of dumpy level-Temporary and permanent adjustments of dumpy level levelling staves-Differential levelling, Profile levelling-Cross sections-Reciprocal levelling. Precise levelling-Definition of BS, IS, FS, HI, TP-Booking and reduction of levels, H.I. methods-Rise and fall method-Checks-Related problems-Curvature and refraction Related Problems-Correction-Reciprocal levelling-Related problems-L.S & C.S Leveling-Problems in levelling-Errors in levelling.

8. Contouring

Methods of representing Relief; Contouring; contour interval; Characteristics of contours; Methods of locating contours - Direct and indirect methods; Interpolation and sketching of contours; Location of a contour gradient; Uses of contour maps;

NOTE

Two questions of 12 marks each will be given from each unit out of which one is to be answered.
Twelve questions of one mark each will be given from entire syllabus which is a compulsory question.

TEXT BOOK:

1. Surveying Vol. 1 & II by Dr. K. R. Arora; Standard Book House;

REFERENCES

1. Plane Surveying by AM Chandra, New Age International (P) Ltd.

2. Fundamentals of Surveying by S K Roy, Prentice- Hall of India Private Ltd.

3. Surveying Vol-I&II by B.C. Punmia, Laxmi Publications.

CODE: 14 CE 304

SOLID MECHANICS – I

Lectures	4	Tutorial	1		Practical	0	Self Study	0
Continuous Internal Assessment			:	40	Semester End Examination (3 Hours)			60

UNIT-I

1. STRESS

Introduction; Method of sections; Definition of stress; Normal stresses in axially loaded bars; Stresses on inclined sections in axially loaded bars; Shear stresses ; Analysis for normal and shear stresses; allowable stress and factor of safety.

2. STRAIN-HOOKE'S LAW-AXIAL LOAD PROBLEMS

Introduction; Normal strain; Stress-strain relationships; Hooke's law; deflection of axially loaded rods and composite bars; statically indeterminate members under axial loads; Poisson's ratio shearing stresses on mutually perpendicular planes; Hooke's law for shearing stress and strains; Bulk modulus; Relation between elastic constants; temperature stresses.

UNIT-II

3. INTERNAL FORCES IN BEAMS

Introduction; Diagrammatic conventions for supports and loads; Calculation of beam reactions; Application of method of sections; Shear force in beams; Bending moment in beams; Shear force and bending moment diagrams; Differential equations of equilibrium for a beam element.

UNIT-III

4. BENDING STRESSES IN BEAMS

Introduction; Basic assumptions; the elastic flexure formula; application of flexure formula;

5. SHEAR STRESSES IN BEAMS

Introduction; Shear flow; The shear stress formula for beams; Shear stress in beam flanges; Shear centre.

UNIT-IV

6. TORSION

Introduction; Application of the method of sections; Torsion of circular elastic bars – Basic assumptions, the torsion formula, Design of circular bars in torsion for strength, Angle of twist of circular bars.

7. SPRINGS

Types of springs, stresses in closely coiled helical springs; Deflection of closely coiled helical springs.

NOTE

Two questions of 12 marks each will be given from each unit out of which one is to be answered. Twelve questions of one mark each will be given from entire syllabus which is a compulsory question.

TEXT BOOKS

1. Engineering mechanics of solids by E.P.Popov, Prentice Hall of India, 2005.

REFERENCE

1. Elements of strength of materials by S.P.Timoshenko and D.H.Young, Affiliated East-West Press Pvt.Ltd., 2005.
2. Strength of materials by S. S. Bhavikatti, Vikas Publishing House Pvt. Ltd., 1998.
3. Strength of materials by R. K. Bansal, Lakshmi Publications (P) Ltd., 2007

CODE: 14 CE 305

FLUID MECHANICS

Lectures	4	Tutorial	1		Practical	0	Self Study	0
Continuous Internal Assessment			:	40	Semester End Examination (3 Hours)			60

UNIT – I

1. **Properties of Fluids**

Properties of fluids: specific gravity, viscosity, surface tension, vapour pressure and capillarity.

2. Fluid Statics

Variation of static pressure; Absolute and gauge pressure; Measuring of pressure by using manometers; Pressure on plane surfaces and curved surfaces.

3. Buoyancy

Buoyancy; Stability of submerged bodies and floating bodies; Metacentre and metacentric height.

UNIT – II

4. Fluid Kinematics

Methods of describing fluid motion; Classification of flows; Steady, unsteady, uniform and non-uniform flows; Laminar and turbulent flows; Three, two and one dimensional flows; Irrotational and rotational flows; Streamline; Pathline; Streakline; Equation for acceleration; Convective accelaration; Local acceleration; Continuity equation; Velocity potential and stream function; Flownet; Vortex flow – free vortex and forced vortex flow.

5. Fluid Dynamics

Euler's equation of motion; Bernoulli's equation; Momentum principle; Applications of momentum equation- Force exerted on a pipe bend.

6. Flow Measurement In Pipes

Discharge through venturi meter; Discharge through orifice meter; Measurement of velocity by Pitot tube.

UNIT – III

7. Flow Through Orifices And Mouthpieces

Flow through orifices; Determination of coefficients for an orifice; Flow through large rectangular orifice; Flow through submerged orifice; Classification of mouthpieces; Flow through external and internal cylindrical mouthpiece.

8. Flow Over Notches & Weirs

Flow through rectangular, triangular and trapezoidal notches and weirs; End contractions; Velocity of approach; Broad crested weir.

9. Boundary Layer Theory

Boundary layer – concepts, Prandtl's contribution, Characteristics of boundary layer along a thin flat plate, separation of BL.

UNIT – IV

10. Analysis Of Pipe Flow

Laws of Fluid friction – Darcy's equation, Minor losses – pipes in series – pipes in parallel – Total energy line and hydraulic gradient line, Hydraulic power transmission through a pipe; Siphon; Water hammer.

11. Laminar Flow

Reynold's experiment; Characteristics of laminar flow; Steady laminar flow through a circular pipe (Hazen poiseuille equation).

12. Turbulent Flow In Pipes

Characteristics of turbulent flow, Prandtl's mixing length theory, Hydro dynamically smooth and rough boundaries, Velocity distribution, Friction factor for pipe flow, Moody's chart.

NOTE

Two questions of 12 marks each will be given from each unit out of which one is to be answered. Twelve questions of one mark each will be given from entire syllabus which is a compulsory question.

TEXT BOOK

1. Hydraulics and Fluid Mechanics by P. N. Modi & S. N. Seth; Standard book house; New Delhi.

REFERENCE BOOKS

1. Fluid Mechanics by A. K Jain, Khanna Publishers
2. Fluid Mechanics and Hydraulic Machines by R. K. Bansal; Laxmi Publications; New Delhi.
3. Fluid Mechanics by Streeter and wyile, Mcgrawhill Publications
4. Fluid Mechanics by S K Som & G Biswas (TMH)
5. Fluid Mechanics by John F. Douglas, Janusz M Gasiorek, John A. Swaffield, Pearson Education Publishers
6. Fluid Mechanics, Hydraulics& Hydraulic Machines by K R Arora, Standard Publishers

CODE: 14 CE 306

ENGINEERING GEOLOGY

Lectures	4	Tutorial	0		Practical	0	Self Study	0
Continuous Internal Assessment			:	40	Semester End Examination (3 Hours)			60

UNIT – I

1. **Introduction:**
   Branches of Geology; Importance of Geology in Civil Engineering.

2. **Physical geology:** Geological Processes; Weathering – Process, Types. Landforms.
   Mass wasting: Classification; Causes and effects; Preventive measures.

UNIT – II

3. **Mineralogy:**
   Definition of Mineral; Significance of different Physical Properties in Mineral Identification; Study of Physical Properties, Crystal system and Chemical Composition the following Rock Forming Minerals and Ore Minerals: Orthoclase, Quartz, Augite, Hornblende, Olivine, Muscovite, Biotite, Asbestos, Apatite, Kyanite, Garnet, Beryl, Talc, Calcite, Dolomite, Pyrite, Hematite, Magnetite, Galena, Graphite, Magnesite, Bauxite and Clay minerals.

4. **Petrology:**
   Introduction; Civil Engineering Importance of Petrology; Rock-cycle. Geological Classification of Rocks.

   Igneous rocks: Formation; Structures and Textures; Megascopic description and Civil Engineering Uses of Granite, Basalt, Dolerite, Pegmatite, Syenite, Gabbro, and Diorite.

   Sedimentary rocks: Formation; Structures and Textures of Sedimentary Rocks.; Megascopic description and Civil Engineering Uses of Laterite, Conglomerate, Sandstone, Limestone, Shale, and Breccia.

   Metamorphic rocks: Formation; Structures and textures of Metamorphic Rocks. Megascopic description and Civil Engineering Uses of Gneiss, Schist, Quartzite, Marble, Slate, Charnockite, and Khondalite

5. **Engineering Properties of Rocks:**
   Different Engineering Property Tests for Rocks – Tests for Rocks Used for Foundation Site and Building Stones.

UNIT – III

6. **Structural Geology:**
   Introduction; Causes for development of Structures; Outcrop, Strike and Dip; Folds; Faults; Joints; Unconformities.

   Importance of Geological Structures:

   Effects of Folds, Faults and Joints; and their Civil Engineering Importance.

7. Earthquakes:

Classification and Causes; Intensity and Magnitude and their Measuring Scales; Effects of Earthquakes; Seismic Belts; Civil Engineering considerations in seismic areas; Seismic zones of India.

8. Improvement in Properties of Rock Mass:

Materials and Methods of Grouting, Guniting, and Rock Bolting.

UNIT – IV

9. Geophysical Investigations:

Geophysical methods of investigation -Civil engineering importance of geophysical methods; Electrical Resistivity method; Seismic Refraction method, Gravity method, GeoRadar.

10. Geological Applications to Civil Engineering Structures.

Role of Engineering Geologist in Planning, Design and Construction Stages in Civil Engineering Works.

Geological investigations for: Dams, Tunnels, Bridges, Multi- storied structures,

Highways, Air fields, Railway lines, and Coastal Civil Engineering Works - Seawalls, Groins, Bulkheads, etc.

TEXT BOOK:

A Text Book of Engineering Geology by N. Chennakesavulu, McMillan India Ltd., Delhi.2005

Reference Books:

Principles of Engineering Geology by KVGK Gokhale. B.S.Publications-2005

Principles of Engineering Geology, Chapman and Hall 1976. P.B.Attewell and I.W.Farmer,
Engineering Geology an Environmental Approach by P H Rahn, PHI

Engineering Geology Case Histories Miscilleaneous Officers of the Geological Survey of India, Publication No. 29, 1975.

Additional Reading:

Shore protection manual, Vols. I, II and III, 1977, U.S. Army Coastal Engineering Research Center.

NOTE: *Two questions of 12 marks each will be given from each unit out of which one is to be answered. Twelve questions of one mark each will be given from entire syllabus which is a compulsory question.*

CODE: 14 CEL 301 **LABORATORY**

ENGINEERING GEOLOGY LABORATORY

Lectures	0	Tutorial	0		Practical	3	Self Study	0
Continuous Internal Assessment			:	40	Semester End Examination (3 Hours)			60

LIST OF EXPERIMENTS

Note: A minimum of twelve (12No) shall be done and recorded

01. Study of Survey of India Topographical Maps
02. Interpretation of Contour maps
03. Study of Satellite Imageries
04. Megascopic study of Minerals
    - Rock Forming Minerals
    - Ore Minerals
05. Identification and description of geotechnical characteristics of rocks;

    IS:1123- 1975.
    - Igneous Rocks
    - Metamorphic Rocks
    - Sedimentary Rocks
06. Determination of apparent specific gravity, porosity and water absorption

    of different rocks; IS:1124 - 1974.
07. Determination of Slake and Durability of Rocks
08. Determination of Compressive Strength Test of a given Rock Sample
09. Elementary Problems of Strike and Dip
10. Preparation of Geological Section and Interpretation of the Subsurface
11. Joint Data Analysis
12. Determination of Rock Quality Designation Index
13. Study of Folds through Models
14. Study of Faults through Models
15. Study of Tunnel Models

Demo & Calculation only:

16. Seismic Hammer Sounding Method
17. Electrical Resistivity Method (Vertical Electrical Sounding)

CODE: 14 CEL 302 **LABORATORY**

SURVEYING FIELD WORK – I

Lectures	0	Tutorial	0		Practical	3	Self Study	0
Continuous Internal Assessment			:	40	Semester End Examination (3 Hours)			60

I) Chain & Compass Survey

1. Measurement of area – cross staff survey.
2. Traversing by compass and graphical adjustment.
3. Distance b/w two inaccessible points using prismatic compass.

II) Theodolite survey

4. Measurement of horizontal angle by repetition and reiteration methods.
5. Measurement of vertical angle
6. Distance b/w two inaccessible points using theodolite.

III) Leveling

7. Simple leveling – elevation diff b/w two points.
8. Differential leveling.
9. Measurement of elevation diff b/w two points using any leveling instrument (Fly leveling).
10. Elevation diff b/w two points by reciprocal levelling.
11. Profile Levelling – Plotting of profile.

IV) Plane Table Survey

12. Plotting of a building by plane table surveying.
13. Determination of the distance between two inaccessible points.

CODE: 14 CEL 303 **LABORATORY**

BUILDING PLANNING AND DRAWING LABORATORY

Lectures	0	Tutorial	0		Practical	3	Self Study	0
Continuous Internal Assessment			:	40	Semester End Examination (3 Hours)			60

1. Building planning:

Introduction to building drawing, Space requirement–Establishing areas for different units, Furniture requirements, Roominess, Flexibility, Sanitation, Lighting, Ventilation etc.; Flow diagram and line plan–Grouping, Circulation, Orientation, Aspect and prospect, Privacy, Elegance and economy; Climatic considerations; provisions of national building code, building Bye-Laws, planning of residential building.

2. Using drawing tools:

(1) Drawing conventional signs
(2) Drawing and guidelines for door, window, staircase and foundation
(3) Plan, sections and Elevation of a single storied residential building

PART - B

(Using CAD software)

1. Learning basic commands of CAD software

2. Drawing conventional signs

3. Drawing basic building components like door, windows, staircase and foundation.

4. Drawing plan of single storey residential building.

5. Drawing plan of two storied residential building.

CODE: 14 CE 401

ENGINEERING MATHEMATICS – IV

(Common for all branches)

(4Th, 3 credits)

II B.Tech - II Semester

Lectures	4	Tutorial	1		Practical	0	Self Study	0
Continuous Internal Assessment			:	40	Semester End Examination (3 Hours)			60

UNIT – I

Complex numbers and functions:

Introduction to Complex Numbers, Complex Plane, Polar form of Complex numbers, Powers and roots, Derivative, Analytic Function, Cauchy - Riemann Equations, Laplace's equation.

Complex Integration: Cauchy's Integral Theorem, Cauchy's Integral Formula.

UNIT – II

Taylor, Laurent series and Residue Integration:

Taylor Series (without proof) and Maclaurin series, Laurent Series(without proof), singularities and zeros, infinity, Residue Integration method, Evaluation of real integrals.

UNIT – III

Probability Densities: Continuous Random Variables, Normal Distribution, Normal Approximation to the Binomial Distribution, Uniform Distribution, Joint Distributions, Discrete and Continuous.

Sampling Distribution: Populations and Samples, Sampling Distribution of the Mean (σ known), Sampling Distribution of the Mean (σ Unknown), Sampling Distribution of the Variance.

UNIT – IV

Inferences Concerning Means: Point Estimation, Interval Estimation, Tests of Hypotheses, Null Hypotheses and significance of tests, Hypotheses Concerning one Mean, Inferences Concerning Two Means.

Inferences Concerning Variances: Estimation of Variances, Hypotheses Concerning One Variance, Hypotheses Concerning Two Variances.

Inferences Concerning Proportions: Estimation of Proportions, Hypotheses Concerning One Proportion

NOTE

Two questions of 12 marks each will be given from each unit out of which one is to be answered. Twelve questions of one mark each will be given from entire syllabus which is a compulsory question.

TEXT BOOK:

1. "Advanced Engineering Mathematics", Erwin Kreyszig, 9th Edition, John Wiley, 2000.
2. Miller & Freund's "Probability and Statistics for Engineers", Richard A. Johnson, 8th Edition, PHI.

REFERENCE BOOK:

1. "Theory and Problems of Complex Variables", Murray R Spiegel, Schaum's outline series.

CODE: 14 CE 402

PROFESSIONAL ETHICS AND HUMAN VALUES

Lectures	4	Tutorial	0	Practical	0	Self Study	0
Continuous Internal Assessment		:	40	Semester End Examination (3 Hours)			60

UNIT – I

1. Human Values

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

2. Engineering Ethics

Senses of Engineering Ethics – Variety of Moral Issued – Types of Inquiry – Moral Dilemmas – Moral Autonomy – Kohlberg's Theory – Gilligan's Theory – Consensus and Controversy – Professions and Professionalism- Professional Ideals And Virtues - Theories About Right Action – Self-Interest – Customs And Religion – Uses Of Ethical Theories.

UNIT – III

3. Engineering as Social Experimentation

Engineering as Experimentation – Engineers as Responsible Experimenters – Codes of Ethics – Balanced Outlook on Law .

4. Safety, Responsibilities and Rights

Safety and Risk – Assessment of Safety and Risk – Risk Benefit Analysis and Reducing Risk.

Collegiality and Loyalty – Respect for Authority – Collective Bargaining – Confidentiality – Conflicts of Interest – Occupational Crime – Professional Rights – Employee Rights – Intellectual Property Rights (IPR) – Discrimination.

UNIT – IV

5. Global Issues

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.,

NOTE

Two questions of 12 marks each will be given from each unit out of which one is to be answered. Twelve questions of one mark each will be given from entire syllabus which is a compulsory question.

TEXT BOOK

1. Mike martin and Ronald Schinzinger, “Ethics in Engineering” McGraw-Hill, New York 1996
2. Govindarajan M, Natarajan S, Senthil Kumar V.S., “Engineering Ethics”, PHI, New Delhi, 2004

REFERENCE BOOKS

1. Charles D,Fleddermann, “Engineering Ethics”, Pearson / PHI, 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, New Delhi, 2003.
4. Edmund G.Seebauer and Robert L Barry, “Fundamentals of Ethics for Scientists and Engineers” Oxford University Press, Oxford, 2001.

CODE: 14 CE 403

SURVEYING-II

Lectures	4	Tutorial	0	Practical	0	Self Study	1
Continuous Internal Assessment		:	40	Semester End Examination (3 Hours)			60

UNIT – I

1. Areas

Introduction; Simpson's rule; Boundaries with offsets at irregular intervals; Meridian methods; Coordinate method; Theory of Planimeter, precautions, Area of zero circle.

2. Volumes

Area of cross sections- two level section only; Trapezoidal rule; Prismoidal formula; Volume from spot levels (barrow pits); volume from contour plan; Capacity of a reservoir.

UNIT – II

3. Trigonometric Leveling

Introduction; Plane trigonometric leveling methods - When base of the vertical or inclined object accessible and when base of the object is not accessible; Axis signal correction; Difference in elevation by single observation and reciprocal observations.

4. Tacheometric Surveying

Advantages of tachometric surveying; Basic systems of tachometric measurements; Principle of stadia measurements, Determination of constants K and C; Inclined sight with staff vertical; Inclined sight with staff normal to the line of sight.

UNIT – III

5. Triangulation

Principles of triangulation; Uses of triangulation survey; Classification of triangulation; Signals and towers, Satellite station; Base line & Extension of the base line.

6. Construction Surveying

Horizontal Control - Reference grid; Vertical Control; Control stations; Positioning of a structure; setting out a building – reference pillars and Batter boards; setting out a culvert; Grade stakes; Boning rods or travelers; Sight rails; Slope rails; Profile boards or batter boards; Setting out grades for sewers and pipe lines; setting out slopes in embankment and cutting;

UNIT – IV

7. Curves Ranging

Circular curves - Basic definitions; Designation of a curve; Relationship between radius and degree of curve; Elements of a simple circular curve; Location of the tangent points; selection of peg interval; Methods of setting out; Problems in setting out curves;

8. Modern Systems in Surveying

Electronic theodolite; Electronic Total Station; Digital Level; Global Positioning System; Geographical Information System; Electronic Distance Measurements - Basic concepts, Basic Principle of Electronic Distance Measurement, Computing the distance from the phase differences, Instrumental errors in EDM.

NOTE

Two questions of 12 marks each will be given from each unit out of which one is to be answered. Twelve questions of one mark each will be given from entire syllabus which is a compulsory question.

TEXT BOOKS

1. Surveying Vol I & II by K R Arora, Standard Book house.

REFERENCE TEXT BOOKS

1. Fundamentals of Surveying by S K Roy, Prentice- Hall of India Private Ltd.

2. Surveying Vol-I&II by B.C. Punmia ,Laxmi Publications.

3. Higher Surveying by AM Chandra, New Age International (P) Ltd.

CODE: 14 CE 404

SOLID MECHANICS – II

Lectures	4	Tutorial	1	Practical	0	Self Study	0
Continuous Internal Assessment	:	40	Semester End Examination (3 Hours)				60

UNIT-I

1. **ANALYSIS OF PLANE-STRESS**

Introduction; The basic problem; Equations for transformation of plane-stress; Principal planes and Principal stresses ; Maximum shear stresses ; Mohr's circle of stress ; Construction of Mohr's circle.

2. **STRAIN ENERGY**

Introduction; Elastic strain energy for uni-axial stress; elastic strain energy in pure bending; Strain energy of beams in shear; Strain energy of circular shafts in torsion; strain energy for multiaxial state of stress.

UNIT –II

3. **COMPOUND STRESSES**

Introduction; principal of Superposition and its limitation; Superposition of normal stresses; Eccentrically loaded short columns; Core or kernel of a section; Superposition of shear stresses.

4. **THIN WALLED PRESSURE VESSELS**

Thin cylinders; circumferential and longitudinal stresses; spherical pressure vessels;

UNIT-III

5. **FAILURE THEORIES**

Introduction; maximum normal stress theory; maximum shearing stress theory; maximum strain energy theory; maximum distortion energy theory; comparison of theories.

6. **BUCKLING OF COLUMNS**

Introduction; Examples of instability; Criteria for stable equilibrium; Euler load for column with pinned ends; Euler loads for columns with different end restraints; Limitations of the Euler's formulae; Generalized Euler buckling load formulae; Eccentric loads and the secant formula

UNIT –IV

7. **DEFLECTION OF STATICALLY DETERMINATE BEAMS**

Introduction; strain-curvature and Moment-Curvature relation; Governing differential equation for deflection of elastic beams; Alternative differential equations of elastic beams; solution of beam deflection problem by Direct integration; Introduction to moment area method; Derivation of Moment area theorems; conjugate-beam method; slope and deflection of beams using moment area method and conjugate-beam method.

NOTE

Two questions of 12 marks each will be given from each unit out of which one is to be answered. Twelve questions of one mark each will be given from entire syllabus which is a compulsory question.

TEXT BOOK

1. Engineering mechanics of solids by E.P.Popov, Prentice Hall of India, 2005.

REFERENCES

1. Elements of strength of materials by S.P.Timoshenko and D.H.Young, Affiliated East-West Press Pvt.Ltd., 2005.
2. Strength of materials by S. S. Bhavikatti, Vikas Publishing House Pvt. Ltd., 1998.
3. Strength of materials by R. K. Bansal, Lakshmi Publications (P) Ltd., 2007

CODE: 14 CE 405

HYDRAULICS & HYDRAULIC MACHINES

Lectures	4	Tutorial	1		Practical	0	Self Study	0
Continuous Internal Assessment			:	40	Semester End Examination (3 Hours)			60

UNIT – 1

1. Open Channel Flow-Uniform Flow

Introduction, Classification of flows, Types of channels; Chezy, Manning's, Bazin, Kutter's Equations; Hydraulically efficient channel sections - Rectangular, Trapezoidal and Circular channels; Velocity distribution; Energy and momentum correction factors.

2. Open Channel Flow- Non – Uniform Flow

Concept of specific energy; Specific energy curves; Critical flow; Critical flow in a rectangular channel; Critical slope; Different slope conditions; Channel transitions- Reduction in width of channels, hump; Momentum principle applied to open channel flow; Specific force; Specific force curve. Surges in open channels.

UNIT – II

3. Open Channel Flow- Gradually Varied Flow

Dynamic equation; Surface Profiles; Computation of surface profiles by single step & multi step methods; Back water Curves and Draw down curves; Examples of various types of water surface profiles; Control section.

4. Open Channel Flow- Rapidly Varied Flow

Hydraulic jump; Elements and characteristics of hydraulic jump; Types of hydraulic jumps; Location and applications of hydraulic jump; Energy loss in a hydraulic jump.

UNIT – III

5. Momentum Principles

Action of jets on stationary and moving flat plates and curved vanes; Angular momentum principle; Torque and head transferred in rotodynamic machines.

6. Hydraulic Turbines

Classification; Impulse; Reaction; Radial, Axial, mixed and tangential flow turbines; Pelton, Francis and Kaplan turbines; Runner profiles; Velocity triangles; Head and efficiency; Draft tube theory; Similarity laws; Concept of specific speed and unit quantities; Selection of Turbines; Operational characteristics; Governing of turbines.

UNIT – IV

7. Centrifugal Pumps

Manometric head; Losses and efficiencies; Work done; Working Principle; Priming; Velocity triangles; Performance and characteristic curves; Multistage and double suction pumps; Cavitation effects; Similarity Considerations.

8. Dimensional Analysis And Similitude

Dimensional homogenity; Rayleigh's method; Buckingham – π theorem; Geometric, Kinematic and dynamic similarities; Reynold's, Froude, Euler, Mach and Weber numbers; Model laws Partially submerged objects; Scale effect; Distorted models.

NOTE

Two questions of 12 marks each will be given from each unit out of which one is to be answered. Twelve questions of one mark each will be given from entire syllabus which is a compulsory question.

TEXT BOOKS

1. Hydraulics & Fluid Mechanics by P. N. Modi & S. N. Seth; Standard Book house, New Delhi

REFERENCE BOOKS

1. Fluid Mechanics by A. K. Jain; Khanna Publishers, Delhi
2. Open channel flow by K. Subramanya, TMH Publishers
3. Fluid Mechanics & Hydraulic Machines by Dr. R. K. Bansal; Laxmi Publications, New Delhi.

CODE: 14 CE 406

ENVIRONMENTAL ENGINEERING – I

Lectures	4	Tutorial	0	Practical	0	Self Study	0
Continuous Internal Assessment	:	40	Semester End Examination (3 Hours)				60

UNIT – I

1. Introduction To Water Supply Engineering

Need for protected water supplies; Objectives of water supply systems; Water borne diseases; Role of Environmental Engineers.

2. Quantity Of Water

Estimating requirements; Design period; Per capita consumption; Factors affecting per capita consumption; Fire demand; Fluctuations in demand; Prediction of population.

3. Sources & Intake Works

Classification of sources of water supply; Choice of source; Suitability with regard to quality and quantity; Lake, river, reservoir and canal intakes.

UNIT – II

4. Transportation And Pumping Of Water

Types of conduits; Capacity and design; Materials for pipes, Laying and Jointing of pipes; Leakages; Classification of pumps; Efficiency and choice of pumps.

5. Quality Of Water

Impurities in water; Routine water analysis - physical, chemical and bacteriological tests; BIS Standards for drinking water.

6. **Purification Of Water**

Methods of purification of water; Sequence of treatment.

7. Plain Sedimentation And Coagulation

Theory of sedimentation; Stoke's law; Sedimentation tanks; Design aspects; Principle of coagulation; Chemicals used for coagulation; Units of coagulation plant; Optimum dose of coagulant.

UNIT - III

9. **Filtration of Water**

Theory of filtration; Filter materials; Slow sand and rapid sand filters; Construction operation and design; Under drainage system design in rapid sand filters; Troubles in rapid sand filters; Pressure filters.

10. Disinfection Of Water

Different methods of disinfection; Chlorination; Types of chlorination

10. Miscellaneous Treatment Methods

Water softening; Methods of removing temporary hardness; Methods of removing permanent hardness; Removal of colour, odour and taste from water; Defluoridation.

UNIT – IV

11. Distribution System

General requirements; Classification; Methods of supply; Available pressure in the distribution system; Layouts of distribution networks; Capacity of balancing tank; Hardy cross method.

11. Pipe Appurtenances

Appurtenances in the distribution system; Service connection, Sluice valves; Check valve; Air valve; Drain valve; Hydrants; Meters.

*Field visit to water treatment facility covering all treatment units

NOTE

Two questions of 12 marks each will be given from each unit out of which one is to be answered. Twelve questions of one mark each will be given from entire syllabus which is a compulsory question.

TEXT BOOKS

1. Elements of public health engineering by K. N. Duggal; S. Chand & Company Ltd., New Delhi.
2. Environmental Engineering Vol. I - Water supply engineering by S. K. Garg; Khanna Publishers, Delhi.

REFERENCE BOOKS

1. Water Supply and Sanitary Engineering Vol. 1 by Gurucharan Singh; Standard Publishers Distributors, Delhi.
2. Water Supply and Sanitary Engineering by G.S. Birde; Dhanpat rai and sons, Delhi.
3. Manual on Water Supply & Treatment; CPH and EEO, Ministry of Urban Development; Govt. of India, New Delhi.

CODE : 14 ELL 401 **LABORATORY**

SOFT SKILLS LABORATORY

Lectures	0	Tutorial	0		Practical	3	Self Study	0
Continuous Internal Assessment			:	40	Semester End Examination (3 Hours)			60

(Common to All Branches)

1. **BODY LANGUAGE**
   a. Facial Expressions.
   b. Kinesics.
   c. Oculesics.
   d. Haptics.
   e. Proxemics.
   f. Para Linguistics.

2. **LIFE SKILLS**
   a. Positive Attitude
   b. Social Behaviour &Social Norms.
   c. Ethics, Values and Positive Work Ethics.
   d. Time Management
   e.Goal Setting, Vision, Mission.

3. **EMOTIONAL INTELLIGENCE**
   a. Self Awareness through Johari Window and SWOT analysis.
   b. Self Control.
   c. Self Motivation.
   d. Empathy.
   e. Social Skills.
   f. Self Esteem.
   g. Managing stress.
   h. Assertiveness.

4. **PROBLEM SOLVING SKILLS**
   a. Critical Thinking and Brain Storming
   b. Lateral Thinking and Six Thinking Hats.
   c. Creative Thinking.
   d. Conflict Management.

5. **EMPLOYABILITY SKILLS**
   a. Group Discussion.
   b. Team Building and Leadership Qualities
   c. Interview Skills.

RFFERENCE BOOKS:

1. "The Definitive Book Of Body Language", Allan & Barbara Pease
2. "You Can Win", Shiv Khera.
3. ""Lateral Thinking", Edward De Bono.
4. "How To Prepare For Group Discussions And Interview", Hari Mohan Prasad, Rajnish Mohan, 2nd Edition, TMH.
5. "Emotional Intelligence", Daniel Goleman.
6. " The 7 Habits Of Highly Effective People", Stephen R. Covey
7. "Working in Teams", Sandy Pokras.

CODE : 14 CEL 402 **LABORATORY**

ENVIRONMENTAL ENGINEERING LABORATORY

Lectures	0	Tutorial	0	Practical	3	Self Study	0
Continuous Internal Assessment		:	40	Semester End Examination (3 Hours)			60

Note: A minimum of twelve (12No) shall be done and recorded

1. Determination of total, suspended and dissolved solids in water / sewage sample.
2. Determination of fixed and volatile solids in water / sewage sample.
3. Determination of Settleable Solids.
4. Determination of turbidity of water / sewage sample.
5. Determination of pH value of water / sewage sample.
6. Determination of optimum dose of coagulant.
7. Determination of residual chlorine.
8. Determination of temporary and permanent hardness of water sample.
9. Determination of chloride concentration of water / sewage sample.
10. Determination of acidity of water sample.
11. Determination of alkalinity of water sample.
12. Determination of fluorides in water sample.
13. Determination of Dissolved Oxygen of water / sewage sample.
14. Determination of Biochemical Oxygen Demand (BOD) of waste water.

CODE : 14 CEL 403 **LABORATORY**

MATERIAL TESTING LABORATORY

Lectures	0	Tutorial	0	Practical	3	Self Study	0
Continuous Internal Assessment		:	40	Semester End Examination (3 Hours)			60

Note: A minimum of twelve (12No) shall be done and recorded

1. To study the stress-strain characteristics of HYSD bars by UTM.
2. To find young's modulus of the given material (steel or wood) by conducting bending test on simply supported beam.
3. To find modulus of rigidity by conducting torsion test on solid circular shaft.
4. To find the hardness of the given material by Brinnel's or Vickers hardness tester.
5. To find impact resistance of the given material by conducting Charpy test on Impact testing machine.
6. To determine the ultimate shear strength of steel rod in single and double shear.
7. To determine the modulus of rigidity of the spring.
8. Normal consistency and fineness of cement.
9. Initial setting and final setting time of cement.
10. Specific gravity of cement.
11. Compressive strength of Cement.
12. Slump cone test to determine workability of concrete.
13. Compaction factor test to determine the workability of concrete.
14. To determine the compressive strength and split tensile strength of concrete and young's modulus of concrete.
15. Specific gravity of fine and coarse aggregates.
16. Bulking of fine aggregate.
17. To determine the fineness modulus of fine aggregate and coarse aggregate.
18. Non-destructive testing on concrete (for demonstration) and concrete mix design (IS method-For demonstration – as per IS:10269 - 2009).

CODE: 14CE501

STRUCTURAL ANALYSIS – I

Lectures	4	Tutorial	1		Practical	0	Self Study	0
Continuous Internal Assessment			:	40	Semester End Examination (3 Hours)			60

UNIT – I

1. Displacements of Determinate Structures Using Energy Methods

Maxwell's reciprocal theorem; Maxwell – Betti's generalised reciprocal theorem; Castigliano's theorems; Application of Castigliano's theorem for calculating deflection of beams, frames and trusses; Virtual work method for deflections.

UNIT – II

2. Influence Lines For Statically Determinate Structures

Moving loads and influence lines; Influence lines for beam reactions; Influence lines for shearing force; Influence lines for bending moment; Calculation of maximum shear force and bending moment at a section for rolling loads; Calculation of absolute maximum bending moment; Influence lines for simple trusses.

UNIT – III

3. Propped Cantilevers

Analysis of propped cantilever by method of consistent deformations.

4. Fixed Beams

Fixed moments for a fixed beam of uniform section for different types of loading; Effect of sinking of support; Effect of rotation of a support; Bending moment diagram for fixed beams.

5. Clapeyron's Theorem of Three Moments

Analysis of continuous beams (Two span continuous beams).

UNIT – IV

6. Strain Energy Method

Strain energy method for analysis of continuous beams and rigid joined plane frames up to second degree redundancy.

7. Redundant Pin Jointed Frames

Analysis of pin jointed frames (one degree redundancy); Forces in indeterminate pin jointed frames due to temperature variation and lack of fit; Composite structure.

NOTE

Two questions of 12 marks each will be given from each unit out of which one is to be answered. Twelve questions of one mark each will be given from entire syllabus which is a compulsory question.

TEXT BOOK

1. Analysis of Structures vols. 1 & 2 by Vazirani & Ratwani; Khanna Publishers; Delhi.

REFERENCES

1. Indeterminate structural analysis by C. K. Wang, McGraw-Hill Publications
2. Mechanics of structures – II by Junnarkar & Shah, Charotar Publishing House
3. Structural analysis by R. C. Hibbeler, Pearson Education.
4. Basic Structural Analysis by C. S. Reddy, Tata McGraw-Hill

CODE: 14CE502

WATER RESOURCES ENGINEERING-I

Lectures	4	Tutorial	0	Practical	0	Self Study	0
Continuous Internal Assessment	:	40	Semester End Examination (3 Hours)				60

UNIT – I

1. Hydrology

Hydrologic cycle; Precipitation types; Rain gauges; Computation of average rain fall over a basin; Losses or abstractions from precipitation, factors affecting evaporation, estimation of evaporation from surfaces of water bodies, Infiltration, factors affecting infiltration, measurement of infiltration, infiltration indices; Run off; Factors affecting run off; Computation of run-off; Design Flood, Estimation of maximum rate of run-off, Flood frequency analysis by Gumbel's method

2. Hydrographs

Hydrograph analysis; Unit hydrograph; Construction of Unit hydrograph for an isolated storm, Application of Unit hydrograph to the construction of a flood hydrograph resulting from rainfall of unit duration; Application of Unit hydrograph to construction of a flood hydrograph resulting from two or more periods of rainfall; Construction of unit hydrograph of different unit duration from a unit hydrograph of some given unit duration by superposition method and S-curve method.

UNIT – II

3. Ground Water – Well Irrigation

Introduction; Aquifer; Aquiclude; Aquifuge; Specific yield; Specific retention; Divisions of sub–surface water; Water table; Types of aquifers; Well hydraulics; Steady radial flow to a well–Dupuit's theory for confined and unconfined aquifers; Tube wells - Open wells; Yield of an open well–Constant level pumping test, Recuperation test.

4. Irrigation Channels – Silt Theories & Design Procedure

Classification; Canal alignment; Inundation canals; Cross section of an irrigation channel; Balancing depth; Borrow pit; Spoil bank; Land width; Silt theories–Kennedy's theory, Lacey's regime theory; Kennedy's method of channel design; Use of Garret's diagram in channel design; Lacey's theory applied to channel design; Use of Lacey's regime diagrams; Drawbacks in Kennedy's theory; Defects in Lacey's theory; Comparison of Kennedy's theory and Lacey's theory

UNIT – III

5. Reservoir Planning

Introduction; Investigations for reservoir planning; Selection of site for a reservoir; Zones of storage in a reservoir; Storage capacity and yield; Mass inflow curve and demand curve; Calculation of reservoir capacity for a specified yield from the mass inflow curve; Determination of safe yield from a reservoir of a given capacity; Sediment flow in streams; Reservoir sedimentation; Life of reservoir; Reservoir sediment control; Multipurpose reservoir, flood routing; Methods of flood routing-Graphical Method (Inflow – storage discharge curves method), Trial and error method.

6. Diversion Head Works

Component parts of a Diversion Head work; Weirs and barrages- Types of weirs; Causes of failure of weirs and their remedies; Design of weirs on permeable foundations–Bligh's creep theory, Khosla's theory; Silt control at head works;

UNIT - IV

7. Stream Gauging

Necessity; Selection of gauging sites; Discharge measurement- Area-Velocity method; Slope-Area method; Tracer method, Electromagnetic induction method, ultrasonic method; Measurement of depth – Sounding rod, Echo-sounder; Measurement of velocity; Floats – Surface floats, Sub–surface float or Double float, Velocity rod or Rod float; Pitot tube; Current meter; Measurement of stage-Staff gauge, wire gauge, water stage recorder, bubble gauge recorder; stage-discharge curve.

8. Water Logging And Canal Lining

Water logging; Effects of water logging; Causes of water logging; Remedial measures; Losses in canal; Lining of irrigation channels – necessity, advantages and disadvantages; Types of lining; Design of lined canal.

NOTE

Two questions of 12 marks each will be given from each unit out of which one is to be answered. Twelve questions of one mark each will be given from entire syllabus which is a compulsory question.

TEXT BOOKS:

1. Irrigation and water power Engineering by Dr. B.C. Punmia & Dr. Pande B.B. Lal; Laxmi Publications Pvt. Ltd., New Delhi.

2. Irrigation Engineering and Hydraulic structures by S. K. Garg; Khanna Publishers, Delhi.

REFERENCE BOOKS:

1. Irrigation, Water Resources & Water Power Engineering by Dr. P.N. Modi; Standard Book House, New Delhi.
2. Irrigation, water power and water resources Engineering by K R Arora, Standard Publishers, New Delhi
3. Engineering Hydrology by K. Subramanya, TMH Publishers
4. Engineering Hydrology by P. Jayarami Reddy, Laxmi Publications

CODE: 14CE503

DESIGN OF CONCRETE STRUCTURES-I

Lectures	4	Tutorial	1		Practical	0	Self Study	0
Continuous Internal Assessment			:	40	Semester End Examination (3 Hours)			60

UNIT – I

1. **Introduction**

Objectives of structural design – stability, strength and serviceability; Design codes and handbooks; Design philosophies – working stress method, ultimate load method and limit states method.

2. **Design For Flexure (Working State Method)**

Assumptions; Permissible stresses in concrete and steel; Balanced design; Transformed area method; Analysis and design for flexure of singly reinforced, doubly reinforced and flanged sections.

UNIT-II

3. **Design For Flexure (Limit State Method)**

Assumptions; Limit states; Partial safety factors; Modes of failure; Maximum depth of neutral axis; Analysis and design for flexure of singly reinforced, doubly reinforced and flanged sections; Comparison of limit state method with working stress method.

UNIT-III

4. **Shear And Development Length**

Shear in a homogeneous beam; Shear in R.C. beams; Diagonal tension and diagonal compression; Design for shear by working stress method and limit state method; Development length; Pull out test; Anchorage bond; Flexural bond, Check for development length by working stress method and limit state method

5. **Deflection And Cracking**

Span/Effective depth ratio; Calculation of short-term deflection and long term deflection; Cracking; Bar spacing controls.

UNIT-IV

6. **Design By Limit State Method**

Singly reinforced, doubly reinforced and flanged beams; simply supported One-way slab, Dog – legged staircase.

UNIT-V

7. **Design By Working Stress Method**

Rectangular Water Tanks: Introduction, under ground rectangular water tanks, rectangular water tanks resting on ground.

NOTE

Two questions of 12 marks each will be given from each unit, out of which one is to be answered.

TEXT BOOKS

1. For Working Stress Method: Reinforced concrete by H. J. Shah, charotar publishing house
2. For Limit State Method: Reinforced Concrete (limit state design) by Ashok K. Jain; Nem Chand & Bros., Roorkee

REFERENCES

1. Reinforced concrete design by Pillai and Menon, Tata Mc Graw- Hill
2. Limit state theory & Design of reinforced concrete by Dr. S. R. Karve and Dr.V.L.Shah; Pune Vidyarthi Griha Prakashan, Pune.

CODE: 14CE504

ENVIRONMENTAL ENGINEERING – II

Lectures	4	Tutorial	0		Practical	0	Self Study	0
Continuous Internal Assessment			:	40	Semester End Examination (3 Hours)			60

UNIT – 1

1. **Introduction To Sanitary Engineering**

Sanitation; Conservancy and water carriage system; Sewerage systems; Relative merits.

2. **Sanitary Sewage And Storm Sewage**

Quantity of sanitary sewage; Factors affecting sanitary sewage; Determination of quantity of sanitary sewage; Factors affecting storm water sewage; Determination of quantity of storm water sewage.

3. **Sewers, Sewer Appurtenances, Sewage Pumping**

Types of sewers; Design of sewers; Construction; Testing; Maintenance of sewers; Sewer appurtenances – Man holes, Drop man holes, Lamp holes, Flushing tanks, Inverted syphons; Street inlets; Catch basins; Storm water regulators; Sewage pumping; Types of pumps.

UNIT – II

4. **Quality And Characteristics Of Sewage**

Characteristics of sewage; Decomposition of sewage; Carbon, nitrogen and sulphur cycles of decomposition; BOD; COD; Physical and chemical analysis of sewage.

5. **Primary Treatment Of Sewage**

Screens; Grit chamber; Grease traps; Skimming tanks; Sedimentation tanks.

6. **Septic Tank**

Septic tank design; Septic tank effluent disposal, soak pits, leaching cess pools;

7. House Plumbing

House drainage - Sanitary fittings, Traps; Plumbing system of drainage – Single stack, One pipe and Two pipe systems; Principles governing design of building drainage.

UNIT – III

8**. Secondary Treatment Of Sewage:**

Trickling filters; Principles of action; Filter types; Recirculation; Fina settling tanks; Operational problems and remedies;

9. Activated sludge process

Principle of action; Activated sludge process vs Trickling filter process;

Features of operation; Organic loading parameters; Methods of aeration; Diffused air system; Mechanical aeration; Combined system; Sludge bulking; Sludge volume index.

UNIT – IV

10. Sludge Treatment And Disposal

Characteristics of sewage sludge; Anaerobic sludge digestion process; Stages of sludge digestion; Factors affecting sludge digestion; Sludge digestion tank; High rate digestion; Sludge thickening; Sludge conditioning; Methods of dewatering the sludge; Methods of sludge disposal.

11. Sewage Disposal

Objects; Methods; Disposal by dilution; Disposal by irrigation; Sewage sickness; Reuse of treated sewage; Ground water recharge.

NOTE

Two questions of 12 marks each will be given from each unit out of which one is to be answered. Twelve questions of one mark each will be given from entire syllabus which is a compulsory question.

TEXT BOOKS

1. Elements of public health engineering by K. N. Duggal; S. Chand & Company Ltd., New Delhi.
2. Environmental Engineering vol. II – Sewage disposal and air pollution engineering by S. K. Garg; Khanna Publishers, Delhi.
3. Environmental pollution control engineering by C. S. Rao; Wiley Eastern Limited, New Delhi.

REFERENCE BOOKS

1. Wastewater Engineering Treatment, Disposal & Reuse by Met Calf & Eddy; Tata Mc. Graw – Hill publishing Co. Ltd., New Delhi.
2. Water & Wastewater Technology by Mark J. Hammer; John Wiley & Sons.
3. Manual on Sewerage & Sewage treatment; CPH and EEO, Ministry of Works and Housing; Govt. of India; New Delhi.

CODE: 14CE505

GEOTECHNICAL ENGINEERING – I

Lectures	4	Tutorial	0		Practical	0	Self Study	1
Continuous Internal Assessment			:	40	Semester End Examination (3 Hours)			60

UNIT – 1

1. Introduction

Soil formation and soil types; Regional soil deposits of India

2. Basic Definitions And Relations

Phase diagrams; Simple definitions; some important relationships;

Index Properties; Grain size distribution; Atterberg Limits; Significance of other Soil Aggregate properties

UNIT – II

3. Soil Classification

Clay Mineralogy: Introduction to soil classification; Particle size classification as per IS-code; Unified soil classification system; Indian standard soil classification system

4. Permeability

Capillary rise; Darcy's law and its Validity; Determination of coefficient of permeability - constant and Variable head methods, indirect methods, Factors affecting permeability; Permeability of stratified soil deposits. ;

UNIT – III

5. Seepage through Soils

Principle of effective stress; physical meaning of effective stress; Types of head, seepage forces and quicksand condition

6. Compaction of Soils

Introduction; Laboratory tests; Factors affecting compaction; Structure and engineering behavior of Compacted cohesive soils; Compaction in the field; Compaction specifications and field control.

UNIT – IV

7. Compressibility of Soil And Consolidation

Introduction; Compressibility; Time-rate of consolidation; Consolidation test; Computation of Settlement; extrapolation of field consolidation curve; Settlement analysis.

8. Shear Strength Of Soils

Introduction; Stress at a point- Mohr Circle of stress; Mohr–coulomb Failure Criterion; Measurement of Shear Strength; Shear strength of Clayey soils; Shear Strength of Sands; Drainage conditions and Strength parameters.

NOTE

Two questions of 12 marks each will be given from each unit out of which one is to be answered. Twelve questions of one mark each will be given from entire syllabus which is a compulsory question.

TEXT BOOK

1. Basic and Applied Soil Mechanics – Gopal Ranjan and A.S.R.Rao, New Age International Publishers

REFERENCES

1. Foundation Analysis & Design by Bowles, J.E., McGraw- Hill Book Co.
2. A Text book of Soil Mechanics and Foundation Engineering – B.C.Punmia Laxmi Publications
3. A Text book of Soil Mechanics and Foundation Engineering – K.R.Arora, Standard Publishers & Distributors, New Delhi
4. A Text book of Soil Mechanics and Foundation Engineering – P.Purushotthama Raj, Pearson Education
5. Introduction to Soil Mechanics- Braja M Das

CODE: 14CE506/A **ELECTIVE – I**

REMOTE SENSING AND GIS

Lectures	4	Tutorial	0		Practical	0	Self Study	0
Continuous Internal Assessment			:	40	Semester End Examination (3 Hours)			60

UNIT – I

1. Introduction to remote sensing (R.S):

Importance of remote sensing , overview of Indian Remote sensing satellites and sensors, satellite definition and types, characteristics of satellite, characteristics of satellite orbit, characteristics of Indian satellites -IRS1A, IRS1B, IRS1C, IRS1D, CARTOSAT satellites.

2. Basic concepts and fundamentals of remote sensing:

Elements involved in remote sensing, electromagnetic spectrum, sensor systems, platforms

UNIT – II

3. Detailed study of remote sensing:

Energy resources, energy interactions with earth surface features and atmosphere, resolution, visual interpretation techniques, digital data analysis and pre processing methods.

4. Introduction of Geographic Information System (GIS):

GIS definition and terminology, GIS categories, hardware and software components of GIS, fundamental operations of GIS, workflow process of GIS.

UNIT – III

5. GIS spatial data representation:

Concept of spatial data, data input and output devices, raster GIS model- advantages and dis advantages, vector GIS model – advantages and disadvantages.

6. GIS Spatial data Analysis:

Concept of overlay, vector overlay, raster overlay, network analysis- concept and types
Data storage-vector data storage, attribute data storage, overview of the data manipulation and analysis.

UNIT – IV

7. Applications: Applications of remote sensing, application areas and user segments of GIS; Guide lines for preparation of GIS.

8. Urban planning applications: Applications of GIS for land use and housing management; Assessment of physical transformation in an urban area, GIS for urban applications and urban growth analysis.

9. Water Resources Applications: Land use/Land cover in water resources, Watershed management for sustainable development, Reservoir sedimentation, Ground Water Targeting, Identification of sites for artificial Recharge structures.

10. Navigational applications (GPS): GPS definition, components of GPS, Advantages and dis advantages of GPS, Limitations and applications of GPS, GPS receivers.

NOTE

Two questions of 12 marks each will be given from each unit out of which one is to be answered. Twelve questions of one mark each will be given from entire syllabus which is a compulsory question.

TEXT BOOKS:

1. Remote Sensing and its applications by LRA Narayana University Press 1999.
2. Principals of Geo physical Information Systems – Peter A Burragh and Rachael
A. Mc Donnell, Oxford Publishers 2004.
3. Remote Sensing and image interpretation by Thomos M . Lillesand, Ralph.W.Keifer and Jonathan.W.Chipman

.**CODE: 14CE506/B** **ELECTIVE – I**

ROCK MECHANICS

Lectures	4	Tutorial	0		Practical	0	Self Study	0
Continuous Internal Assessment			:	40	Semester End Examination (3 Hours)			60

UNIT-I

Introduction: Importance and application of rock mechanics to engineering problems; composition of rocks.

Classification: Lithological classification of rocks, Engineering classification of intact and fissured rocks; Classification of fissures, joints and faults; classification of rocks for engineering purposes; R.Q.D. method of classification of rocks.

Theories of Brittle failure;

Engineering properties of rocks;

Laboratory Testing of Rocks: Various methods of obtaining rock cores, methods of sample preparation, and methods of removing end friction of the rock samples. Compression testing machine, Uniaxial compression strength of rock samples, methods of finding tensile strength-direct and indirect methods, Brazilian test, shear box test, triaxial shear test, punch shear test.

UNIT-II

In-situ Testing of Rocks: Field direct shear test on rock blocks, field triaxial strength, use of flat jacks, chamber test, plate load test, cable jacking test.

Stress and its Evaluation in Field: Definition of stress in rock, Simple methods of determining in-situ stresses, Borehole over covering technique, Bore hole deformation gauges, Evaluation of rock stresses and deformation around tunnels; Stress-relief technique (over coring), use of strain gauges, bore hole, deformation cell, photo-elastic stress meter, stress measurement with flat jack.

Hydraulics Fracturing Techniques.

UNIT-III

Stability of rock slope, Modes of failure in rock mass, Analysis by simple field Bishop's method and use of Hoek's chart;

Stabilization of Rocks: Rock bolting, principle of rock bolting, various types of rocks bolts, application of rock bolting.

Field testing of rock bolts and cable anchors;

Elastic and Dynamic Properties of Rocks: Stress-strain behavior dynamic properties, resonance method and ultra-sonic pulse method.

UNIT-IV

Foundations on rocks, Limit equilibrium methods, Plastic equilibrium of foundations, Elastic solutions for loading and excavation of foundations, Consideration of uplift pressures; Methods of improving the properties of rock masses.

Pressure on Roof of Tunnels: Trap door experiment, Terzaghi's theory, Bieraumer, kommerel, Protodyakanov theory.

Stress around the Tunnels: Basic design and Principles of tunnels in rocks, design of pressure tunnels in rocks.

Suggested Books:

1. Goodman, R.E. (1989), 'Introduction to Rock Mechanics', John Wiley, Chichester.
2. Hudson, J.A. and Harrison, J.P. (2000), ' Engineering Rock Mechanics', Pergamon Press, Amsterdam.
3. Roberts, A. (1977)., 'Geotechnology', Pergamon Press, England.
4. Stagg, K.G. and Zienkiewicz (1968)., 'Rock Mechanics in Engineering Practice', John Wiley and Sons, London.
5. Rock Mechanics, Vol. I, II, III, IV by Lama, et.al.
6. Fundamentals of Rock Mechanics by Jaeger and Cook
7. Rock Mechanics & Design of Structures in Rocks by Obert & Duvell
8. Rock Mechanics & Engineering by Jaeger
9. Art of Tunneling by Schzy.

CODE: 14CE506/C **ELECTIVE – I**

LOW COST HOUSING TECHNIQUES

Lectures	4	Tutorial	0	Practical	0	Self Study	0
Continuous Internal Assessment		:	40	Semester End Examination (3 Hours)			60

UNIT-I

1. Housing Scenario Introducing- Status of urban housing- Status of Rural Housing-

2. Housing Finance: Introducing- Existing finance system in India- Government role as facilitator- Status at Rural Housing Finance- Impedimental in housing finance and related issues

UNIT-II

3. Land use and physical planning for housing: Introduction- Planning of urban land- Urban land ceiling and regulation act- Effectincey of building bye laws- Residential Densities

4. Housing the urban poor: Introduction- Living conditions in slums- Approaches and strategies for housing urban poor

UNIT-III

5. Development and adopt on of low cost housing technology: Introduction- Adoption of innovative cost effective construction techniques- Adoption of precast elements in partial prefabrication- Adopting of total prefabrication of mass housing in India- General remarks on pre cast rooting/flooring systems- Economical wall system- Single Brick thick loading bearing wall- 19cm thick load bearing masonry walls- Half brick thick load bearing wall- Flyash grypsym thick for masonry- Stone Block masonry- Adoption of precast R.C. plank and join system for roof/floor in the building.

UNIT-IV

6. Alternative building materials for low cost housing: Introduction- Substitute for scarce materials- Ferro cement- Gypsum boards- Timber substitutions- Industrial wastes- Agricultural wastes

7. Low cost Infrastructure services: Introducing- Present status- Technological options- Low cost sanitation's- Domestic wall- Water supply- energy

UNIT-V

8. Rural Housing: Introduction- traditional practice of rural housing continuous- Mud Housing technology- Mud roofs- Characteristics of mud- Fire resistant treatment for That ched roof- Soil stabilization- Rural Housing programs

9. Housing in Disaster Prone areas: Introduction- Earthquake- Damages to houses- Traditional Houses in disaster prone areas Type of Damages and Railways of non-engineered buildings- Repair and restore action of earthquake Damaged non-engineered
buildings recommendations for future constructions- Requirement's of structural safety of thin precast roofing units against - Earthquake forces- Status of R& D in earthquake strengthening measures- Floods- cyclone- future safety

TEXT / REFERENCE BOOKS:

1. Building materials for low –income houses – International council for building research studies and documentation's.
2. Hand book of low cost housing by A.K.Lal – Newage international publishers.
3. Properties of Concrete – Neville A.M. Pitman publishing Limited- London.
4. Light weight concrete- Academic kiado- Rudhai .G – Publishing home of Hungarian Academy of Sciences 1963.

CODE: 14CE506/D **ELECTIVE – I**

BUILDING TECHNOLOGY

Lectures	4	Tutorial	0		Practical	0	Self Study	0
Continuous Internal Assessment			:	40	Semester End Examination (3 Hours)			60

UNIT-I

1. Load Bearing Walls

Types of walls, design considerations, lateral support, effective height of wall, effective length of wall, effective thickness, slenderness ratio

2. Cavity Walls

Introduction, general features of cavity walls, position of cavity at foundation level, position of cavity at eaves or parapet wall, cavity wall at openings, wall ties, construction of cavity wall, cavity masonry wall

UNIT-II

3. Partition Walls

Introduction, brick partitions, clay block partition walls, concrete partitions, glass partitions, metal lath partitions, asbestos sheet or GI sheet partitions, plaster slab partitions, timber partitions

4. Upper Floors

Introduction, steel joist and stone or precast concrete slab floors, jack arch floors, reinforced cement concrete floors, ribbed or hollow tiled flooring, precast concrete floors, timber floors

UNIT-III

5. Lintels and Arches

Introduction, classification of lintels, timber lintels, stone lintels, brick lintels, steel lintels, reinforced cement concrete lintels, loading on lintels, classification of arches, stone arches, brick arches, concrete arches, construction of arches

6. Stairs

Introduction, technical terms, requirements of a good stair, dimensions of a step, classification of stairs, stairs of different materials

7. Doors and Windows

Introduction, location of doors and windows, definition of technical terms, size of doors, door frames, types of doors, windows, types of windows

UNIT-IV

8. Plastering and Pointing

Plastering, types of mortars for plastering, terminology used in plastering work, tools for plastering, number of coats of plaster, methods of plastering, plaster on lath, types of plaster finishes, special materials used in plastering, defects in plastering, pointing

9. Painting, Distempering and White Washing

Paints and painting, characteristics of an ideal paint, constituents of a paint, classification and types of paints, painting on different surfaces, defects in painting, varnishing, distempering, white washing and colour washing

10. Fire Protection

Introduction, fire hazards, fire load, grading of structural elements, grading of buildings according to fire resistance, characteristics of fire resisting materials, fire resisting properties of common building materials, general fire safety requirements for buildings, fire resistant construction, fire alarms, fire extinguishing equipment

NOTE

Two questions of 12 marks each will be given from each unit out of which one is to be answered

Twelve questions of one mark each will be given from entire syllabus which is a compulsory question

TEXT BOOKS

Building construction by B. C. Punmia et al, Laxmi Publications, New Delhi

CODE : 14CEL501 **LABORATORY**

HYDRAULICS & HYDRAULIC MACHINES LABORATORY

Lectures	0	Tutorial	0		Practical	3	Self Study	0
Continuous Internal Assessment			:	40	Semester End Examination (3 Hours)			60

Note: A minimum of twelve (12No) shall be done and recorded

1. Verification of Bernoulli's theorem.
2. Venturimeter : Determination of Coefficient of discharge.
3. Orificemeter : Determination of Coefficient of discharge.
4. Orifices : Determination of Coefficient of discharge by steady and unsteady flow methods.
5. Mouthpieces : Determination of Coefficient of discharge by steady and unsteady flow methods.
6. Characterization of laminar and turbulent flows by Reynold's apparatus.
7. Determination of friction factor of Pipes.
8. Determination of loss of head in pipes due to bends, sudden contractions and sudden expansion.
9. Determination of Coefficient of discharge for rectangular and V – notches.
10. Determination of Manning's and Chezy's coefficients in open channel.
11. Measurement of force due to impact of jets on vanes of different types.
12. Performance studies on Pelton turbine.
13. Performance studies on Francis turbine/Kaplan turbine.
14. Performance studies on single stage centrifugal pump.
15. Performance studies on Reciprocating pump.

CODE :14CEL502 **LABORATORY**

GEOTECHNICAL ENGINEERING LABORATORY

Lectures	0	Tutorial	0	Practical	3	Self Study	0
Continuous Internal Assessment		:	40	Semester End Examination (3 Hours)			60

Note: A minimum of twelve (12No) shall be done and recorded

1. Determination of water content by oven drying method.
2. Determination of specific gravity by
   (a) Density bottle method
   (b) Pycnometer method.
3. Gradation analysis
   a) Mechanical Sieve analysis
   b) Hydrometer analysis.
4. Determination of Atterberg limits
5. Determination of free swell index
6. Determination of field unit weight by
   a) Core cutter method.
   b) Sand replacement method.
7. Determination of permeability by
   a) Constant head permeameter.
   b) Variable head permeameter.
8. Direct shear test.
9. Vane shear test.
10. Unconfined compression test
11. IS - Light compaction test
12. IS - Heavy compaction test
13. Triaxial shear test (Demonstration only)
14. Consolidation test.

CODE : 14CEL503 **LABORATORY**

COMPUTER APPLICATIONS IN CIVIL ENGINEERING LABORATORY

Lectures	0	Tutorial	0	Practical	3	Self Study	0
Continuous Internal Assessment		:	40	Semester End Examination (3 Hours)			60

Note: A minimum of twelve (12No) shall be done and recorded

Students are required to write and execute programmes to solve the following problems. Programmes shall be in C or C^{++} language or MATLAB/JAVA. *or* MS-Office Softwares

1. Determination of the height of the building when base is accessible.
2. Determination of included angles from the given bearing and check for local attraction.
3. Determination of distance between to inaccessible points by using prismatic compass.
4. Determine of level difference between to two points
5. Analysis of water distribution networks (Hardy cross method).
6. Classification of surface profile.
7. Design an irrigation channel by using Lacey's and Kennedy's theory.
8. Design the flow through a lined channel.
9. Classification of soil by Indian standard classification system.
10. Determination of index properties of soil.
11. Determination of permeability coefficient by constant head and falling permeability tests.
12. Stresses due to applied loads both Boussinesq and Westerguard analysis
    a) Concentrated loadb) circular loaded area c) Rectangular loaded area
13. Design of Reinforced Beam for flexure by working stress method.
14. Design of T- Beam for flexure by limit state method.
15. Design of Reinforced beam for Shear by limit state method.
16. Design of simply supported one-way slab.

CODE: 14CE601

STRUCTURAL ANALYSIS – II

Lectures	4	Tutorial	1		Practical	0	Self Study	0
Continuous Internal Assessment			:	40	Semester End Examination (3 Hours)			60

UNIT – I

1. Slope Deflection Method

Slope - deflection equations; Principles of the method; Applications of the method to the analysis of continuous beams and portal frames (Single bay, single storey with vertical legs only) without and with sidesway.

UNIT – II

2. Moment Distribution Method

Principles of the method; Application of the method to analysis of continuous beams and portal frames (Single bay, single storey with vertical legs only) without and with side sway.

UNIT – III

3. Multi Storey Frames (Approximate Methods)

Substitute frame method for gravity loads; Portal method and cantilever method for lateral loads.

4. Kani's Method

Principles of the method; Application to continuous beams and portal frames (single bay, single storey with vertical legs only) without and with side-sway.

UNIT – IV

5. Arches

Eddy's Theorem; Analysis of three hinged and two hinged Parabolic and Circular arches for Static and moving loads.

6. Cables

Analysis of cables under uniformly distributed and concentrated loads; Shape of the cable under self weight; Effect of temperature changes in suspension cables; Anchor cables.

NOTE

Two questions of 12 marks each will be given from each unit out of which one is to be answered. Twelve questions of one mark each will be given from entire syllabus which is a compulsory question.

TEXT BOOK

1. Analysis of Structures vols. 1 & 2 by Vazirani & Ratwani; Khanna Publishers; Delhi.

REFERENCES

1. Indeterminate structural analysis by C. K. Wang, McGraw-Hill Publications
2. Mechanics of structures – II by Junnarkar & Shah, Charotar Publishing House
3. Structural analysis by R. C. Hibbeler, Pearson Education.
4. Basic Structural Analysis by C. S. Reddy, Tata McGraw-Hill

CODE: 14CE602

WATER RESOURCES ENGINEERING-II

Lectures	4	Tutorial	0		Practical	0	Self Study	0
Continuous Internal Assessment			:	40	Semester End Examination (3 Hours)			60

UNIT - I

1**. Introduction to Irrigation**

Definition; Necessity; Scope of irrigation science; Benefits of irrigation; Ill-effects of irrigation; Types of irrigation.

2. **Methods Of Irrigation**

Methods of applying water to crops; Uncontrolled or wild flooding; Free flooding; Contour laterals; Border strip method; Check flooding; Basin flooding; Zig zag method; Furrow method; Contour Farming; Sub-surface irrigation; Sprinkler irrigation; Drip irrigation.

3**. Water Requirement Of Crops**

Functions of irrigation water; Classes and availability of soil water; Saturation capacity; Field capacity; Wilting point; Available moisture and readily available moisture; Moisture equivalent; Soil moisture deficiency; Limiting soil moisture conditions; Depth and frequency of irrigation; Duty and Delta; Base period; Relation between Duty and Delta; Factors affecting duty; Methods of improving duty; Gross command area; Culturable command area; Culturable cultivated and uncultivated area; Kore depth and Kore period; Consumptive use of water (Evapo transpiration); Direct measurement of consumptive use; Irrigation efficiencies – Water conveyance efficiency, Water application efficiency, Water distribution efficiency and Consumptive use efficiency; Determination of irrigation requirements of crops; crop rotation, Assessment of Irrigation water

UNIT – II

4**. Canal outlets and regulation works**

Types of outlets; Non–modular outlets; Semi-module outlets; Rigid modules; Canal falls; Necessity and location of falls; Development of falls; Classification of falls; Canal regulators; Off-take alignment; Head regulators and cross-regulators; Canal escape (Designs not included).

5**. Cross Drainage Works**

Introduction; Types of cross drainage works; Selection of suitable type of cross - drainage work; Classification of Aqueducts and Syphon Aqueducts; Selection of a suitable type.

6**. Dams In General**

Introduction; Classification; Gravity dams, Arch dams, Buttress dams, Steel dams, Timber dams, Earth dams and rock fill dams; Physical factors governing selection of type of dam and selection of site for a dam.

UNIT – III

7. Gravity Dams

Introduction; Forces acting on a gravity dam; Combination of loading for design; Modes of failure and criteria for stability requirements; Stability analysis; Elementary Profile of a gravity dam; Practical profile of a gravity dam; Limiting height of a gravity dam; High and low gravity dams; Design of gravity dams–single step method, multistep method; Galleries; Joints; Keys and water seals.

UNIT – IV

8**. Earth Dams**

Introduction; Types of earth dams; Causes of failure of earth dams; Criteria for safe design of earth dams; Section of an earth dam; Design to suit available materials; Seepage control measures; Slope protection.

9**.Spillways**

Introduction; Types of spillways; Profile of ogee spillway; Energy dissipation below spillways for relative positions of jump height curve and tail water curve; Stilling basins; Indian standards on criteria for design of hydraulic jump type stilling basins with horizontal and sloping aprons; Spillway crest gates-Types and description only.

10**. Water Power Engineering**

Introduction; Hydropower - Advantages & disadvantages; Estimation of hydro-power; Flow duration curve; Power duration curve; Load curve; Load factor; Capacity factor; Utilization factor; Diversity factor; Load duration curve; Firm Power; Secondary power; Types of hydel schemes; Forebay; Intake structures; Penstocks; Surge tank; Tail race; Turbines; Selection of suitable type of turbine.

NOTE

Two questions of 12 marks each will be given from each unit out of which one is to be answered.
Twelve questions of one mark each will be given from entire syllabus which is a compulsory question

TEXT BOOKS:

1. Irrigation and water power Engineering by Dr. B.C. Punmia & Dr. Pande B.B. Lal; Laxmi Publications Pvt. Ltd., New Delhi.
2. Irrigation Engineering and Hydraulic structures by S. K. Garg; Khanna Publishers, Delhi.

REFERENCE BOOKS:

1. Irrigation, Water Resources & Water Power Engineering by Dr. P.N. Modi; Standard Book House, New Delhi.
2. Irrigation, water power and water resources Engineering by K R Arora, Standard Publishers, New Delhi

CODE: 14CE603

DESIGN OF CONCRETE STRUCTURES-II

Lectures	4	Tutorial	0		Practical	0	Self Study	1
Continuous Internal Assessment			:	40	Semester End Examination (3 Hours)			60

UNIT – I

1**. Columns (Working Stress Method)**

General requirements; Short columns; Long columns; Design of axially loaded Columns; Design of axially loaded circular columns with helical reinforcement; Eccentrically loaded columns; Uncracked section; Cracked section for uniaxial Bending.

2**. Continuous Slab (Limit State Method)**

Design of continuous one-way slab

3. **Continuous Beam (Limit State Method)**

Design of continuous beam

UNIT-II

4. **Two Way Slabs (Limit State Method)**

Design and detailing of two way slabs

5. **Flat Slabs (Limit State Method)**

Introduction and design of flat slabs by direct design method.

UNIT-III

6**. COLUMNS (LIMIT STATE METHOD)**

Assumptions; Design of axially loaded columns; Design of axially loaded Circular columns with helical reinforcement; Interaction diagrams; Design of short Columns and slender columns of rectangular section in the following cases

(a) Axial compression and uni-axial bending.
(b) Axial compression and bi-axial bending (Using SP-16 Charts)

UNIT-IV

7**. Retaining Walls (Limit State Method)**

Types of retaining walls, Forces on retaining walls; Stability requirements;

Design and detailing of cantilever type retaining wall.

UNIT-V

8**. Foundations (Limit State Method)**

Design and detailing of

(a) Isolated column footings,
(b) Combined footings
(c) Pile and pile cap design

NOTE

Two questions of 12 marks each will be given from each unit, out of which one is to be answered.

TEXT BOOKS

A. For Working Stress Method: Reinforced concrete by H. J. Shah, charotar publishing house
B. For Limit State Method: Reinforced Concrete (limit state design) by Ashok K. Jain; Nem Chand & Bros., Roorkee

REFERENCES

1. Reinforced concrete design by Pillai and Menon, Tata Mc Graw- Hill
2. Limit state theory & Design of reinforced concrete by Dr. S. R. Karve and Dr.V.L.Shah; Pune Vidyarthi Griha Prakashan, Pune.

CODE: 14CE604

DESIGN OF STEEL STRUCTURES – I
(Using Limit State Method)

Lectures	4	Tutorial	1		Practical	0	Self Study	0
Continuous Internal Assessment			:	40	Semester End Examination (3 Hours)			60

UNIT – I

1. Introduction

Types of steels; Constructional steels; Mechanical properties; Design concepts; Fatigue behavior; Brittle fracture; Corrosion; Hot rolled sections; Cold-formed or light gauge sections;

2. Simple Connections

Advantages of welding; Welds; Types of welded joints; Weld specifications; Allowable stresses; Bolts; Black bolts; Failure modes of a joint; Pitch requirements of bolts; Allowable stresses; Efficiency of joint; High strength bolts; Riveting; Rivet value; Allowable stresses for rivets; Lap and butt joints, Truss joint connections;

UNIT – II

3. Tension Members

Introduction; Types of sections; Net area; Net effective area for angles and Tees; Design of tension members;

4. Compression Members

Introduction; Angle Struts; Effective length of a column; Allowable stresses; Types of sections; Built-up columns(using welding); Column splice (using welding) ,

UNIT – III

5. Beams

Introduction; Laterally supported beams; Built-up beams (using welding); lateral buckling of beams; Design of laterally supported beams; Secondary design considerations; Grillage beams;

UNIT – IV

6. Laterally unsupported Beams

Design of laterally unsupported beams; Encased beams; composite beam design; shear connectors;

UNIT – V

7. Eccentric Connections

Simple beam end connections – Framed connection, Seat connections; Bracket connections; Moment connections;

NOTE

Two questions of 12 marks each will be given from each unit, out of which one is to be answered.

TEXT BOOKS

9. Limit state design of steel structures by S.K.Duggal, Tata McGrawhill,Publishing company Ltd.

10. Design of Steel structures by N.Subramanian, Oxford University press,2009

REFERENCES:

11. Design of Steel Structures by Limit state method as per IS800-2007 by S.S.Bhavakatti, IK International Publishing Housing Pvt.Ltd.

12. Design of Steel Structures by Limit state method as per IS800-2007 by K.LSairam, Pearson Education India

13. Structural steel design by M.L.Gambhir , Tata McGraw-Hill Education

Codes

1. IS 800-2007

CODE: 14CE605

GEOTECHNICAL ENGINEERING – II

Lectures	4	Tutorial	0		Practical	0	Self Study	0
Continuous Internal Assessment			:	40	Semester End Examination (3 Hours)			60

UNIT – I

1. Sub–Soil Investigation And Sampling

Introduction; Methods of exploration; Methods of Boring; Soil Samples; Soil samplers and Sampling; Number and disposition of trial pits and borings; Depth of exploration; Ground water observations; Field tests vis-à-vis Laboratory tests; Plate load test; Penetrometer tests; Geophysical methods; Borehole logs; Site investigation report;

2. Lateral Earth Pressure & Retaining Walls

Introduction; Effect of wall movement on Earth Pressure; Earth Pressure at rest; Rankine's theory of Earth pressure; Coulomb's theory of earth pressure; Culmann's graphical method for active earth pressure; Design considerations for retaining walls;

UNIT - II

3. Stability Of Slopes

Introduction; Infinite slopes and translational slides; Definitions of factor of safety; Finite slopes - forms of slip surface; Total stress and Effective stress methods of analysis; $\phi u=0$ Analysis (Total Stress Analysis) ; c-ϕ Analysis- Method of slices; Location of most Critical Circle; Stability of Earth Dam Slopes; Friction Circle Method; Taylor's Stability Number;

4. Vertical Stresses below Applied Loads

Introduction; Boussinesq's equation; vertical stress distribution diagrams; vertical stress beneath loaded areas; Newark's influence chart; Approximate stress distribution methods for loaded areas; Westergaard's equation

UNIT -III

5. Bearing Capacity Of Shallow Foundation

Concept of foundations; Types of foundations and their applicability; General requirements of foundations; Location and Depth of foundation. Terminology relating to bearing capacity; Bearing Capacity of Shallow Foundations – Terzaghi's Bearing Capacity theory; Skempton's Bearing Capacity Analysis for Clay soils; IS-Code Recommendations for Bearing Capacity; Influence of water table on bearing capacity;

6. Settlement Analysis

Settlement of Shallow foundation – types; Methods to reduce differential settlements; Allowable Bearing Pressure; Immediate settlemtent –Terzaghi's Method; Allowable Bearing pressure of Granular Soils based on Standard Penetration Test Value – Terzaghi and IS methods;

UNIT – IV

7. Pile Foundations

Introduction; Uses of Piles; Types of Piles;Cast- in-situ Pile construction; Selection of Pile type; Pile driving; Pile load carrying capacity in compression – Static Pile Load formula, Load tests, Dynamic Pile formulae; Correlations with Penetration test data; Group action of Piles – load carrying capacity and settlement; Negative skin friction;

8. Well Foundations

Types of wells; Components of well foundation; Shapes of wells; Forces acting on well foundation; Construction and Sinking of wells;

9. Foundations In Expansive Soils

Identification of expansive soil; Field conditions that favour swelling; consequences of swelling; Different alternative foundation practices in swelling soils; Construction practice of UR piles in swelling soils

NOTE

Two questions of 12 marks each will be given from each unit out of which one is to be answered. Twelve questions of one mark each will be given from entire syllabus which is a compulsory question.

TEXT BOOK

1. Basic and Applied Soil Mechanics – Gopal Ranjan and A.S.R.Rao, New Age International Publishers

REFERENCES

1. Foundation Engineering by B. J. Kasmalkar; Pune Vidyarthi Griha Prakashan, Pune
2. Foundation Analysis & Design by Bowles, J.E., McGraw- Hill Book Company.
3. Foundations of Expansive Soils, F.H. Chen. Elsevier Publications.
4. Geotechnical Engineering by SK Gulati & Manoj Datta, Tata McGraw- Hill Publishing Company Limited.
5. Principles of Foundation Engineering(1999), B.M. Das., PWS Publishing Company, 4th edition, Singapore
6. Geotechnical Engineering, - Codutu, Pearson Education

CODE: 14CE606/A **ELECTIVE – II**

ADVANCED SURVEYING

Lectures	4	Tutorial	0		Practical	0	Self Study	0
Continuous Internal Assessment			:	40	Semester End Examination (3 Hours)			60

UNIT – I

Astronomy:

Definitions of astronomical terms, star at elongation, star at prime vertical star at horizon, star at culmination, celestial coordinate systems, Napier's rule of circular parts, various time systems: sidereal, apparent, solar and mean solar time, equation of time-its cause.

UNIT – II

Elements of Photogrammetry

Introduction: types of photographs, types of aerial photographs, aerial camera and height displacements in vertical photographs, stereoscopic vision and stereoscopies, height determination from parallax measurement, flight planning.

UNIT – III

Remote Sensing

Introduction, Principles of energy interaction in atmosphere and earth surface features, Image interpretation techniques, visual interpretation, Digital image processing

GPS Surveying

Basic Concepts - Different segments - space, control and user segments - satellite configuration - signal structure - Orbit determination and representation - Anti Spoofing and Selective Availability - Task of control segment - Hand Held and Geodetic receivers -data processing - Traversing and triangulation.

UNIT – IV

Geographical Information System

Definition of GIS, Key Components of GIS, Functions of GIS, Spatial data, Geospatial analysis, Integration of Remote sensing and GIS and Applications in Civil Engineering.

Map Projections

Introduction; Scale Factor; Geometry of the sphere and cone; Areas; Surface areas of solids; Types of Map Projections; Map projection to a plane; Gnomonic Projection; Stereographic Projection; Orthographic Projection; Conical Projection; Albers Equal -area Projection; Polyconic Projection; Conformal Projection; Lambert Projection; Mercator Projection; Transverse Mercator Projection; Universal Transverse Mercator Projection; The choice of projection.

NOTE

Two questions of 12 marks each will be given from each unit out of which one is to be answered.

Twelve questions of one mark each will be given from entire syllabus which is a compulsory question.

TEXT BOOKS

1. Surveying Vol.2 by B.C.Punmia
2. Surveying Vol.3 by B.C.Punmia
3. Surveying Vol 2 by T.P.Kanitkar
4. Higher Surveying by A M Chandra

CODE: 14CE606/B **ELECTIVE – II**

REPAIR AND REHABILITATION OF STRUCTURES

Lectures	4	Tutorial	0		Practical	0	Self Study	0
Continuous Internal Assessment			:	40	Semester End Examination (3 Hours)			60

UNIT-I

Introduction

Maintenance, rehabilitation, repair, retrofit and strengthening, need for rehabilitation of structures.

Cracks in R.C. buildings

Various cracks in R.C. buildings, causes and effects

Maintenance

Maintenance importance of maintenance, routine and preventive maintenance.

Damages to masonry structures

Various damages to masonry structures and causes

UNIT-II

Repair materials

Various repair materials, Criteria for material selection, Methodology of selection, Health and safety precautions for handling and applications of repair materials

Special mortars and concretes

Polymer Concrete and Mortar, Quick setting compounds

Grouting materials

Gas forming grouts, Salfoalumate grouts, Polymer grouts, Acrylate and Urethane grouts.

Bonding agents

Latex emulsions, Epoxy bonding agents.

Protective coatings

Protective coatings for Concrete and Steel

FRP sheets

UNIT-III

Damage diagnosis and assessment

Visual inspection, Non Destructive Testing using Rebound hammer, Ultra sonic pulse velocity, Semi destructive testing, Probe test, Pull out test

Chloride penetration test, Carbonation, Carbonation depth testing, Corrosion activity measurement

Substrate preparation

Importance of substrate/surface preparation, General surface preparation methods and procedure, Reinforcing steel cleaning

UNIT-IV

Crack repair

Various methods of crack repair, Grouting, Routing and sealing, Stitching, Dry packing, Autogenous healing, Overlays, Repair to active cracks, Repair to dormant cracks.

Corrosion of embedded steel in concrete

Corrosion of embedded steel in concrete, Mechanism, Stages of corrosion damage, Repair of various corrosion damaged of structural elements (slab, beam and columns)

Jacketing

Jacketing, Column jacketing, Beam jacketing, Beam Column joint jacketing, Reinforced concrete jacketing, Steel jacketing, FRP jacketing.

Strengthening

Strengthening, Beam shear strengthening, Flexural strengthening

NOTE

Two questions of 12 marks each will be given from each unit out of which one is to be answered. Twelve questions of one mark each will be given from entire syllabus which is a compulsory question.

TEXT BOOKS

1. "Repair and protection of concrete structures" by Noel P.Mailvaganam, CRC press London.
2. "Concrete repair and maintenance Illustrated" by Peter.H.Emmons, Galgotia publishers.
3. "Earthquake resistant design of structures" by Pankaj agarwal, Manish shrikande, PHI.

REFERANCES

1. "Failures and repair of concrete structures" by S.Champion, John wiley and sons.
2. "Diagnosis and treatment of structures in distress" by R.N.Raikar Published by R & D centre of structural designers and consultants pvt.ltd, Mumbai.
3. "Handbook on repair and rehabilitation of RCC buildings", CPWD, Government of India.
4. "Handbook on seismic retrofit of buildings", CPWD, Indian buildings congress, IIT Madras, Narosa Publishing House.

CODE: 14CE606/C **ELECTIVE – II**

ENVIRONMENTAL GEOTECHNICS

Lectures	4	Tutorial	0		Practical	0	Self Study	0
Continuous Internal Assessment			:	40	Semester End Examination (3 Hours)			60

UNIT-I

CLAY MINERALOGY AND SOIL STRUCTURE

Clay mineralogy and soil structure: Gravitational and surface forces-inter sheet and inter layer bonding in the clay minerals- Basic structural units of clay minerals- isomorphous substitution – kaolinite mineral- montmorillonite mineral- illite mineral- electric charges on clay minerals – base exchange capacity- diffused double layer- adsorbed water- soil structure- methods for the identification of minerals (introduction only).

UNIT-II

CHARACTERISTICS AND CLASSIFICATION OF WASTES

Wastes and Contaminants (introduction only): sources of wastes-types of wastes-composition of different wastes- characteristics and classification of hazardous wastes- generation rates- Soil water environment interaction relating to geotechnical problems-Effect of pollution on soil water behaviour-Case studies of foundation failures by ground contamination.

UNIT-III

HYDROLOGY OF CONTAMINANTS

Transport phenomena in saturated and partially saturated porous media-contaminant migration and contaminant hydrology- Ground water-pollution downstream for landfills due to Leachate migration-Passive containment systems – Containment control systems- liners and covers for waste disposal- rigid liners- flexible liners.

UNIT-IV

METHODS OF DISPOSAL AND SITE REMEADIATION

Criteria for selection of sites for waste disposal – Surface and subsurface waste disposal techniques-Ground modification techniques in waste management – Physical modification-Thermal modification-chemical modification-Bioremediation-Geotechnical properties of wastes-Bearing capacity of landfill sites-foundation for waste fill ground.

NOTE

Two questions of 12 marks each will be given from each unit out of which one is to be answered. Twelve questions of one mark each will be given from entire syllabus which is a compulsory question.

TEXT BOOKS

1.Mitchell, J (1976), " Fundamentals of soil behaviour", John Wiley and sons, New York

2. Daniel,B.E., " Geotechnical Practice for Waste disposal ", Chapman and Hall, London, 1993.

3. Iqbal,H.Khan "Text book of Geotechnical Engineering" Second Edition

REFERENCES

1. Lambe, T. W & Whitman, R. V (1979), " Soil Mechanics ", John Wiley and Sons, New York.

2. Gopal Ranjan & A.S.R Rao (1991), " Basic and Applied Soil Mechanics, Wiley Eastern Ltd., New Delhi.

3. Wilson, M. J (1987), " A Hand book of Determinative methods in Clay Mineralogy", Chapman and Hall, New York.

4. Robert M. Koerner (1984), "Construction and Geotechnical methods in Foundation Engineering", McGraw Hill Book Co., New York.

5. Yong R. N. (1992), " Principles of contaminant Transport in Soils, "Elsevier, New York. Ramanatha Iyer T. S (2000), "Soil Engineering Related to Environment", LBS centre.

6.Lagrega, M.D., Buckingham, P.L. and Evans, J.B., " Hazardous Waste Management McGraw Hill, Inc., Singapore, 1994.

CODE: 14CE606/D **ELECTIVE – II**

GEOSYNTHETICS ENGINEERING

Lectures	4	Tutorial	0		Practical	0	Self Study	0
Continuous Internal Assessment			:	40	Semester End Examination (3 Hours)			60

UNIT – I

Introduction:
Historical background of reinforced soil, Principles of reinforced soil through Mohr circle analysis.
Different types of geosynthetics:
Types of geosynthetics like geotextiles, geogrids, geonets, geocells, geo-composites, their manufacturing methods

UNIT – II

Testing methods for geosynthetics:
Techniques for testing of different index properties,strength properties, Apparent Opening Size, In-plane and cross-plane permeability tests, assessment of construction induced damage, extrapolation of long term strength properties from short term tests.
Various properties of Geosynthetics:
physical properties, mechanical properties, hydraulic properties & endurance properties, Nano material.

UNIT – III

Role of geosynthetics in geotechnical engineering I:
Reinforced Soil retaining walls:
Different types of walls: wrap-around walls, full-height panel walls, discrete-facing panel walls, modular block walls Design methods as per BS-8006 and FHWA methods Construction methods for reinforced soil retaining walls.
Reinforced soil slopes:
Basal reinforcement for construction on soft clay soils, construction of steep slopes with reinforcement layers on comptenet soils, Different slope stability analysis methods like planar wedge method, bi-linear wedge method, circular slip methods.
Erosion control on slopes using geosynthetics.

UNIT – IV

Role of geosynthetics in geotechnical engineering II:
Applications in foundations:
Binquet and Lee's approach for analysis of foundations with reinforcement layers.
Drainage and filtration applications of geosynthetics:
Different filtration requirements, filtration in different types of soils and criteria for selection of geotextiles, estimation of flow of water in retaining walls, pavements, etc. and selection of geosynthetics.

NOTE

Two questions of 12 marks each will be given from each unit out of which one is to be answered. Twelve questions of one mark each will be given from entire syllabus which is a compulsory question.

TEXT BOOKS:

1. Koerner, R.M. "Designing with Geosynthetics", Prentice Hall, New Jersey, USA, 4th edition, 1999.
2. Jewell, R.A., "Soil Reinforcement with Geotextiles", Special Publication No. 123, CIRIA, Thomas Telford. London, UK, 1996.
3. Geosynthetics - New Horizons, Eds. G.V. Rao, PK Banerjee, J.T. Shahu, G.V. Ramana, Asian Books Private Ltd., New Delhi, 2004.

REFERENCES:

1. Koerner, R. M. (2012). Designing with Geosynthetics, 6th Edition, Vol. 1 and 2, Xlibris corp.
2.Giroud, J. P. (1984). "Geotextiles and Geomembranes. Definitions, Properties and Design," Selected Papers, Revisions and Comments, 4th ed., IFAI Publishers
3.Holtz, R. D., Christopher, B. R. and Berg, R. R. (1997) Geosynthetic engineering, Bitech publishers Ltd.
4.Hausmann, M. R. (1990). Engineering Principles of Ground Modification, McGraw-Hill Publishing Company, New York
5.Ingold, T. S. (1982). Reinforced Earth, Thomas Telford Ltd., London

CODE : 14CEL601 **LABORATORY**

SURVEYING FIELD WORK – II

Lectures	0	Tutorial	0		Practical	3	Self Study	0
Continuous Internal Assessment			:	40	Semester End Examination (3 Hours)			60

Note: A minimum of ten (10 No) shall be done and recorded

1. **Theodolite**
   1. Traversing and adjustment of traverse
   2. Determination of Horizontal and Vertical distances by stadia methods
   3. Determination of Elevations and Heights
2. **Total Station**
   4. Study of Instrument – Determination of Distances, Directions and Elevations
   5. Determination of Boundaries of a Field and computation of area.
   6. Determination of Heights of objects.
3. **Setting Out**
   7. Setting of simple circular curve using tape and chain.
   8. Setting of simple circular curve using tape or/and theodolite
   9. Setting of a simple circular curve using Total Station.
   10. Setting out for Building.

Survey Camp is to be conducted for a minimum period of seven days to train in one of the following areas:

i. Preparation of a contour Plan/ Map.

ii. Earth work Computations for a high way / canal projects

iii. Marking of a Sewer line/ Water supply line.

iv. Any type of Execution works.

NOTE

50% Weight- age of total marks of this laboratory is to be given for total survey camp work including for Report submission by each batch.

CODE: 14CEL602 **LABORATORY**

COMPUTER AIDED ANALYSIS, DESIGN AND DETAILING OF STRUCTURES-I LAB

Lectures	0	Tutorial	0		Practical	3	Self Study	0
Continuous Internal Assessment			:	40	Semester End Examination (3 Hours)			60

Note: A minimum of twelve (12No) shall be done and recorded

Students are required to analyze and design the following structures using software package like STAAD Pro/STRUDS/GTSTRUDL/STRAP etc. and detailing of structures using Auto CADD.

(At least SIX of the following) *6 x 2 = 12 lab classes*

1. Simply supported continuous beam.
2. Fixed end supported continuous beam.
3. Plane frame subjected to gravity loading.
4. plane frame subjected to gravity loads and lateral load (wind load)
5. One-way slab.
6. One way Continuous slab.
7. Plane roof truss
8. Beam to column moment resistant connection (using bolts)

CODE: 14CEL603 **LABORATORY**

COMPUTER AIDED DESIGN AND DETAILING OF IRRIGATION STRUCTURES LAB

Lectures	0	Tutorial	0	Practical	3	Self Study	0
Continuous Internal Assessment		:	40	Semester End Examination (3 Hours)			60

Students are required to design the following Irrigation structures using Excel Spread sheets software and detailing using software packages like Auto CAD/Micro station etc.,

Note: A minimum of FIVE (5 No) shall be done and recorded

1. Irrigation canal.
2. Canal drop – Notch type.
3. Canal regulator.
4. Vertical drop weir on permeable foundations.
5. Direct sluice.
6. Surplus weir of a tank.
7. Syphon Aqueduct (Type – III Aqueduct).
8. Profile of a Ogee spillway.

TEXT BOOKS

1. Design of Minor Irrigation and Canal Structures by C. Satyanarayana Murthy; Wiley Eastern Ltd., New Delhi.
2. Irrigation and Water Power Engineering by Dr. B.C.Punmia & Dr.Pande B.B. Lal; Laxmi Publications pvt. Ltd., New Delhi.

CODE: 14CE701

TRANSPORTATION ENGINEERING – I

Lectures	4	Tutorial	0		Practical	0	Self Study	0
Continuous Internal Assessment			:	40	Semester End Examination (3 Hours)			60

UNIT-I

1. HIGHWAY NETWORK PLANNING AND ALIGNMENT

Different Modes of Transportation, Road Classification, Road Patterns, 20 Year Road Development plans. Highway Alignment: Requirements, factors controlling, Engineering Surveys.

2. HIGHWAY GEOMETRIC DESIGN

Geometric Design: Highway Cross Section Elements- Friction, Unevenness, Camber, Carriageway Width, Kerbs, road margins, formation width, right of way, Sight Distance-Stopping Sight Distance, Overtaking Sight Distance, Intermediate Sight Distance, Design of Horizontal Alignment- Super elevation, transition curves, extra widening, set back distance, Design of Vertical Alignment-Grades and Grade Compensation, Types of Vertical curves and design.

UNIT-II

3. PAVEMENT MATERIALS

Sub grade Soil Properties, CBR Test, Plate Bearing Test, Stone Aggregates- Desirable Properties, tests- Aggregate Crushing Value Test, Aggregate Impact Value Test, Aggregate Abrasion Value Test, Shape Tests, Soundness Test, Bitumen- Desirable Properties, Tests, Marshal Method of Bituminous Mix Design.

4. DESIGN OF PAVEMENTS

Types of Pavement Structures, Design Factors, Design of Flexible Pavements- IRC Method, Design of Rigid Pavement- Wheel Load stresses, Temperature Stresses, Frictional Stresses, Design of Joints, IRC method of rigid pavement design.

UNIT-III

5. HIGHWAY CONSTRUCTION AND MAINTENANCE

Construction Steps of Embankment, Sub Grade, Granular Sub Base (GSB), Wet Mix Macadam (WMM), Dense Bituminous Macadam (DBM), Bituminous Concrete (BC), Pavement Quality Concrete (PQC), Pavement failures, causes, failures in flexible pavement, failures in rigid pavements, maintenance of Bituminous pavements and concrete pavements,

6. HIGHWAY DRAINAGE

Importance of Highway Drainage, Requirements, Surface Drainage and Sub Surface Drainage, Road construction in water logged areas.

UNIT-IV

7. TRAFFIC STUDIES

Introduction, RoadUser Characteristics, Vehicle Characteristics, Traffic Volume Studies, Speed Studies, Origin and Destination Studies, Traffic Flow Characteristics, Traffic Capacity and Level of Service.

8. DESIGN OF TRAFFIC CONTROL DEVICES

Traffic Operations-Traffic Regulation, Traffic Control Devices- Signs, Signals, Rotary Intersection.

NOTE
Two questions of 12 marks each will be given from each unit out of which one is to be answered. Twelve questions of one mark each will be given from entire syllabus which is a compulsory question.

Text Books

1. Khanna, S. K., C. E. G. Justo, A.Veeraragavan"Text book on Highway Engineering." Nem Chand Bros, Roorkee (2014).10th Edition
2. Kadiyali, L. R., and N. B. Lal. Principles and Practices of Highway Engineering: (Including Expressways and Airport Engineering). Khanna Publishers, 2005.

Reference Books

1.Principles of Transportation Engineering by Partha Chakroborthy&Animesh Das; Prentice Hall of India, New Delhi
2.Ministry of Road Transport and Highways- Specifications for Roads and Bridge Works, Fifth Revision, IRC, New Delhi, India-2013
3.IRC 37:2012- Guidelines For The Design of Flexible Pavements(Third Revision)
4. IRC58-2015 Guidelines for the Design of Plain Jointed Rigid Pavements for Highways

E-resources and other digital material:

NPTEL :
http://nptel.ac.in/courses/105101087/
http://nptel.ac.in/courses/105105107/

CODE: 14CE702

DESIGN OF STEEL STRUCTURES – II
(Using Limit State Method)

Lectures	4	Tutorial	1		Practical	0	Self Study	0
Continuous Internal Assessment			:	40	Semester End Examination (3 Hours)			60

UNIT – I

1. Gantry Girder

Introduction; Loads on Gantry girders; Fatigue effects; Design of gantry girder;

UNIT – II

2. Plate Girders

Introduction; Design of flanges and web; Stiffeners and their connections; Splices

UNIT – III

3. Roof Trusses

Type of trusses for different spans; Components of a roof trusses; Live loads and wind loads on trusses as per I.S Codes; Design of Purlins including tubular sections.

UNIT – IV

4. Steel Water Tank

IS Code specifications; Design of rectangular tank using pressed steel plates; Design of staging for a rectangular tank;

UNIT – V

5. Beam – Columns

Behavior of beam columns; interaction formulae; design of beam – columns;

6. Column bases

Slab base; Gusseted base; Eccentric bases;

NOTE:

Two questions of 12 marks each will be given from each unit, out of which one is to be answered.

TEXT BOOKS

1. Design of Steel structures by N.Subramanian, Oxford University press,2009
2. Limit state design of steel structures by S.K.Duggal, Tata McGrawhill,Publishing company Ltd.

REFERENCE BOOKS

1. Structural steel design by M.L GAMBIR, Tata McGrawhill,Publishing
2. Design of Steel structures by SS BAVIKATTI, IK International Publishing.

CODES

1. IS 800-2007, IS 875 (PART-3), STEEL TABLES

CODE: 14CE703

ESTIMATION AND QUANTITY SURVEYING

Lectures	4	Tutorial	0		Practical	0	Self Study	0
Continuous Internal Assessment			:	40	Semester End Examination (3 Hours)			60

UNIT – I

1. Procedure Of Estimating

Methods of estimating; Main items of work; Deduction for openings; Degree of accuracy; Units of measurement.

2. Methods of building estimates

Individual wall method; Centre line method; Arch masonry calculation; Estimate of steps.

3. Estimate Of Buildings

Estimate of residential building; Estimate of a building from line plan.

UNIT – II

4. Estimate of RCC works

Standard hooks and cranks; Estimate of RCC slab; RCC beam; RCC T–beam slab and RCC column with foundation.

5. Road Estimating

Estimate of earthwork; Estimate of pitching of slopes; Estimate of earthwork of road from longitudinal sections; Estimate of earthwork in hill roads.

6. Canal estimate

Earthwork in canals–different cases; Estimate of earthwork in irrigation channels.

UNIT – III

7. Specifications

Purpose and method of writing specifications; General specifications. Detailed Specifications for Brick work; R.C.C; Plastering; Mosaic Flooring, R.R.Stone Masonry.

8. Analysis Of Rates

Task or out – turn work; Labour and materials required for different works; Rates of materials and labour; Preparing analysis of rates for the following items of work:

i) Concrete ii) RCC Works iii) Brick work in foundation and super structure

iv) Plastering v) CC flooring vi) White washing.

UNIT – IV

9. PWD Accounts And Procedure Of Works

Organization of Engineering department; Work charged establishment; Contract; Tender; Tender notice; Tender Schedule; Earnest money; Security money; Measurement book; Administrative approval; Technical sanction; Plinth area; Floor Area; Carpet area; Approximate Estimate; Plinth area estimate; Revised Estimate; Supplementary estimate.

10. Valuation

Cost; Price & value; Methods of valuation; Out goings; Depreciation; Methods for estimating cost depreciation; Valuation of building.

11. Miscellaneous Topics

Gross income; Net income; Scrap value; Salvage value; Obsolescence; Annuity; Capitalized value; Years purchase; Life of structures; Sinking fund; Standard rent; Process of fixing standard rent; Mortgage.

NOTE

Two questions of 12 marks each will be given from each unit out of which one is to be answered. Twelve questions of one mark each will be given from entire syllabus which is a compulsory question.

TEXT BOOKS

1. Estimating & Costing in Civil Engineering by B.N. Dutta; U. B. S. Publishers & Distributors, New Delhi.
2. Valuation of Real properties by S. C. Rangwala; Charotar Publishing House, Anand.

CODE: 14CE704

PRESTRESSED CONCRETE

Lectures	4	Tutorial	0		Practical	0	Self Study	0
Continuous Internal Assessment			:	40	Semester End Examination (3 Hours)			60

UNIT – I

1. Introduction

Basic concepts of prestressing; Historical development; Need for High strength steel and High strength concrete; Advantages of prestressed concrete.

2. Materials For Prestressed Concrete

High strength concrete; High tensile steel.

3. Prestressing Systems

Tensioning devices; Hoyer's long line system of pretensioning; Post tensioning systems; Detailed study of Freyssinet system , Lee-McCall System and Gifford – Udall system;

4. Analysis Of Prestress And Bending Stresses

Basic assumptions; Analysis of prestress; Resultant stresses at a section; Pressure (Thrust) line and internal resisting couple; Concept of Load balancing; Stresses in tendons; Cracking moment.

UNIT – II

5. Losses Of Prestress

Nature of losses of prestress; Loss due to elastic deformation of concrete, shrinkage of concrete, creep of concrete, relaxation of stress in steel, friction and anchorage slip; Total losses allowed for in design.

6. Deflections Of Prestressed Concrete Members

Importance of control of deflections; Factors influencing deflections; Short term deflections of uncracked members

UNIT – III

7. Elastic Design Of Prestressed Concrete Sections For Flexure

Permissible compressive stresses in concrete as per IS 1343; Design of rectangular and I – sections of TYPE 1, TYPE 2 (Elastic Design only).

UNIT – IV

8. Shear Resistance

Shear and Principal Stresses; Ultimate shear resistance of prestressed concrete members; Design of shear reinforcement.

9. Transfer Of Prestress In Pre–Tensioned Members & Flexural Bond Stresses

Transmission of prestressing force by bond; Transmission length; Bond stresses; Transverse tensile stresses; End zone reinforcement; Flexural bond stresses in pre –tensioned and post – tensioned grouted beams.

10. Anchorage Zone Stresses In Post-Tensioned Members

Stress distribution in end block; Investigations on anchorage zone stresses by Guyons method (forces evenly distributed case) and IS code method; Anchorage zone reinforcements; Design of anchorage and end block.

NOTE

Two questions of 12 marks each will be given from each unit out of which one is to be answered. Twelve questions of one mark each will be given from entire syllabus which is a compulsory question.

TEXT BOOKS

Prestressed Concrete by N. Krishna Raju; Tata Mc Graw - Hill Publishing Company Limited, NewDelhi.

REFERENCE BOOKS

1. Design of Prestressed Concrete Structures by T.Y. Lin & Ned H. Burns; John Wiley & Sons.

2. Prestressed Concrete by P.Dayaratnam. Oxford & IBH

3. Prestressed Concrete by N.Raja Gopalan. PHI

CODE: 14CE705/A **ELECTIVE – III**

ADVANCED STRUCTURAL ANALYSIS

Lectures	4	Tutorial	1		Practical	0	Self Study	0
Continuous Internal Assessment			:	40	Semester End Examination (3 Hours)			60

UNIT – I

1. Curved Beams

Analysis for internal forces – circular beams supported on equally spaced columns – semicircular beams on three equally spaced supports.

2. Influence Lines For Indeterminate Structures

Muller - Breslau Principle with applications to continuous beams and framed structures to obtain the general shape of the influence lines; Influence lines for reactions, shear force at a point and bending moment at a section of a)Beam with fixed ends b) 2 - span continuous beam.

UNIT – II

3. Plastic Behavior of Structures

Idealized stress - strain curve for mild steel; Ultimate load carrying capacity of members carrying axial forces; Moment - Curvature relationship for flexural members; Evaluation of fully plastic moment; Shape factor; Collapse load factor; Upper and lower bound theorems; Collapse load analysis of indeterminate beams and single bay, single storied portal frames.

UNIT – III

4. Flexibility And Stiffness Matrices

Flexibility and stiffness; Flexibility matrix; Stiffness matrix; Relationship between flexibility matrix and stiffness matrix.

5. Flexibility Method (Matrix Approach)

Analysis of continuous beams and rigid jointed plane frames (Single bay, single storey with vertical legs only) by flexibility method with matrix approach.

UNIT – IV

6. Stiffness Method (Matrix Approach)

Analysis of continuous beams, rigid jointed plane frames (Single bay, single storey with vertical legs only) and pin jointed plane frames by stiffness method with matrix approach.

NOTE

Two questions of 12 marks each will be given from each unit out of which one is to be answered. Twelve questions of one mark each will be given from entire syllabus which is a compulsory question.

TEXT BOOKS

1. For units 1 & 2: Structural Analysis, Vol. II by V. N. Vazirani & M. M. Ratwani; Khanna Publishers, Delhi.
2. For units 3 & 4 : Structural Analysis – A matrix approach by G. S. Pandit & S. P. Gupta; Tata Mc. Graw – Hill Publishing Co. Ltd., New Delhi.
3. For Unit 2: Limit Analysis of Structures by Manicka & Selvam

REFERENCE

1. Matrix analysis of framed structures by Weaver & Gere
2. Structural Analysis by Negi & Jangid

CODE: 14CE705/B **ELECTIVE – III**

ADVANCED FOUNDATION ENGINEERING

Lectures	4	Tutorial	1	Practical	0	Self Study	0
Continuous Internal Assessment		:	40	Semester End Examination (3 Hours)			60

UNIT-I

1. Bearing Capacity of Shallow Foundations Subjected to Special Loading And Ground Conditions:

Effect of eccentric loading, inclined load, inclination of base of foundation, sloping ground; Bearing Capacity of stratified soils; Meyerhof analysis, Vesic's analysis and Hansen's analysis.

2. Settlement Analysis:

Contact pressure, sources of settlement, uniform settlement, differential settlement, construction practices to avoid differential settlement, immediate settlement in sands and clays- Terzaghi and Janbu's methods for clays , Schmertmann and Hartman method for cohesionless soils; consolidation settlement.

UNIT-II

3. Three Dimensional Consolidation

3D Consolidation equation; Solution; Vertical sand drain analysis and design

4. Cantilever Sheet Piles And Anchored Bulkheads & Braced Cuts And Coffer Dams

Earth pressure diagram, determination of depth of embedment in sands and clays; Types of bracing system, types of coffer dams

UNIT-III

5. Machine Foundations

Introduction; Terminology, Design criteria for machine foundation; single degree freedom system, free and forced vibration; Methods of analysis of block foundation; Dynamic subsoil investigation; Damping; Design and construction of foundation for reciprocating and impact type machines; Active and Passive isolation

6 . Caissons And Well Foundations

Types of caissons, different shapes of well, components of well, functions of wells, sinking of wells, lateral stability by Terzaghi analysis

UNIT-IV

7. Foundations in Expansive Soils

Problems associated with expansive soils, Swelling potential, percent swell, swell pressure-factors affecting, methods of measurement of swell pressure ; Prediction of heave, factors affecting heave, methods of prediction of heave; IS Classification of expansive soils, Under- reamed pile foundations, Sand cushion method, CNS layer method, granular pile-anchor technique, lime

stabilization of expansive soils, Moisture control in expansive clays - Horizontal and vertical moisture barriers, sub-surface drainage and surface drainage, pre-wetting and ponding.

NOTE

Two questions of 14 marks each will be given from each unit out of which one is to be answered. Fourteen questions of one mark each will be given from entire syllabus which is a compulsory question.

TEXT BOOK

1. Principles of Foundation Engineering(1999), B.M. Das., PWS Publishing Company, 4th edition, Singapore

2. Hand book of Machine foundations – Srnivasulu and Vaidyanathan.

REFERENCES

1. Foundation Analysis & Design by Bowles, J.E., McGraw- Hill Book Company.
2. Basic and Applied Soil Mechanics by Gopal Ranjan and ASR Rao, Wiley Eastern Limited, New Delhi.
3. Foundations of Expansive Soils, F.H. Chen. Elsevier Publications.
4. Geotechnical Engineering by SK Gulati & Manoj Datta, Tata McGraw- Hill Publishing Company Limited.
5. Soil dynamics and machine foundations – Swami Saran

CODE: 14CE705/C **ELECTIVE – III**

ENVIRONMENTAL IMPACT ASSESSMENT AND MANAGEMENT

Lectures	4	Tutorial	1	Practical	0	Self Study	0
Continuous Internal Assessment		:	40	Semester End Examination (3 Hours)			60

UNIT – I

Chapter 1

Basic concepts of EIA: Initial Environmental Examination; Elements of EIA; Factors affecting EIA; Impact evaluation and analysis; Preparation of Environmental Base map; Classification of Environmental parameters.

Chapter 2

EIA Methodologies; Introduction; criteria for the selection of EIA Methodology; EIA Methods: Ad-hoc methods, Matrix methods, Network method, Environmental media quality index method; Overlay methods; Cost/benefit Analysis.

UNIT – II

Chapter 3

Impact of Developmental Activities and Land Use: Introduction and Methodology for the assessment of soil and ground water; Delineation of study area; Identification of activities.

Chapter 4

Procurement of relevant soil quality; Impact prediction; Assessment of Impact significance; Identification and Incorporation of mitigation measures.

Chapter 5

EIA in surface water, Air and Biological Environment: Methodology for the assessment of Impacts on surface water environment; Air pollution sources; Generalized approach for assessment of Air pollution Impact.

UNIT – III

Chapter 6

Assessment of Impact of Development activities on vegetation and wildlife; Environmental Impact of Deforestation; Causes and effects of deforestation.

Chapter 7

Environmental Audit and Environmental legislation: Objectives of Environmental Audit; Types of Environmental Audit; audit protocol; stages of Environmental Audit; On-site activities; Evaluation of Audit data and preparation of Audit report.

UNIT – IV

Chapter 8

Post Audit activities; The Environmental Pollution Act, The Water Act; The Air (Prevention and Control of Pollution) Act; Mota Act; Wild life Act.

Chapter 9

Case Studies and preparation of Environmental Impact Assessment statement for various industries.

NOTE

Two questions of 14 marks each will be given from each unit out of which one is to be answered. Fourteen questions of one mark each will be given from entire syllabus which is a compulsory question.

TEXT BOOKS

1. Environmental Impact Assessment Methodologies by Y. Anjaneyulu; B.S. Publication, Sultan Bazar, Hyderabad.

2. Environmental Science and Engineering by J. Glynn and Gary W. Hein Ke, Prentice Hall Publishers.

REFERENCE BOOKS

1. Environmental Science and Engineering by Suresh K. Dhameja, S.K. Kataria & Sons Publications, New Delhi.

1. Environmental Pollution and Control by Dr. H.S. Bhatia, Galgotia Publications Pvt. Ltd. Delhi

CODE: 14CE705/D **ELECTIVE – III**

STRUCTURAL DYNAMICS

Lectures	4	Tutorial	1	Practical	0	Self Study	0
Continuous Internal Assessment		:	40	Semester End Examination (3 Hours)			60

UNIT -1

1. INTRODUCTION:

Comparison between static and dynamic analysis, Introduction to vibrating system. Degrees of freedom; Damped and Un-damped system; Newton's law of motion; 'D' Alembert's principle; spring-mass system, Solution of the differential equation of motion.

2. FREE VIBATION OF SINGLE DEGREE - OF - FREEDOM SYSTEM:

Equation of motion for single degree - of - freedom system; Free un damped vibration of the SDOF system; Damped single degree - of - freedom system -Viscous damping, Equation of motion, Critically damped system, Over damped system. Under damped system and Logarithmic decrement.

UNIT – II

3. RESPONSE OF SDOF SYSTEM TO HARMONIC LOADING:

Undamped harmonic excitation; Damped harmonic excitation; Evaluation of damping at resonance; Response to support motion; Force transmitted to the foundation.

4. RESPONSE OF' SDOF SYSTEM TO GENERAL DYNAMIC LOADING:

Impulsive loading and Duhamel's integral; Numerical evaluation of Duhamel's integral - undamped system; Numerical evaluation of Duhamel's integral -Damped system.

UNIT-III

5. GENERALIZED CO-ORDINATES AND RAYLEIGH'S METHOD:

Principle of virtual work; Generalized SDOF system - Rigid body; Generalized SDOF system - Distributed elasticity; Rayleigh's method; Improved Rayleigh's method.

UNIT-IV

6. MULTI-DEGREE-OF-FREEDOM SYSTEMS

Undamped free vibrations – Analysis of vibration frequencies, analysis of vibration mode shapes, orthogonality conditions

Analysis of dynamic response – Normal coordinates uncoupled equations of motion (Undamped and viscously damped), Mode (displacement) superposition analysis – Viscously damped

NOTE:

Two questions of 12 marks each will be given from each unit out of which one is to be answered. Twelve questions of one mark each will be given from entire syllabus which is a compulsory question.

TEXT BOOK:

Structural Dynamics by Mario Paz.; CBS Publishers & Distributors, Delhi.

REFERKINCE BOOK:

Dynamic of Structures by Rav W.Clough & Joseph Penzien; McGraw-Hill,

Dynamics of structures by A.K.Chopra

CODE:14CE706 **OPEN ELECTIVE**

AIR POLLUTION AND CONTROL

CE 100

Lectures	4	Tutorial	0		Practical	0	Self Study	0
Continuous Internal Assessment			:	40	Semester End Examination (3 Hours)			60

UNIT –I

Air Pollution –Definitions, Air Pollutants–Classifications –Natural and Artificial– Primary and Secondary, point and Non-Point, Line and Areal Sources of air pollution-stationary and mobile sources.

Effects of Airpollutantsonman, material land vegetation: Global effects of air pollution – Green House effect ,Heat Islands, Acid Rains, Ozone Holes etc.

UNIT –II

Meteorology and plume Dispersion; properties of atmosphere; Heat, Pressure, Wind forces, Moisture and relative Humidity, Influence of Meteorological phenomenaon Air Quality-wind rose diagrams.

UNIT – III

Lapse Rates, Pressure Systems, Winds and moisture plume behavior and plume Rise Models; Gaussian Model for Plume Dispersion.

Control of particulates –Control at Sources, Process Changes, Equipment modifications, Design and operation of control. Equipment's–Settling Chambers, Centrifugal separators, filters Dry and Wetscrubbers, Electrostatic precipitators.

UNIT – IV

General Methods of Control of NOxandSox emissions–In-plant Control Measures, process changes, dry and wet methods of removal and recycling.

Air Quality Management–Monitoring of SPM, SO;NO and CO Emission Standards.

NOTE:

Two questions of 12 marks each will be given from each unit out of which one is to be answered. Twelve questions of one mark each will be given from entire syllabus which is a compulsory question.

TEXTBOOKS:

1.Air pollutionByM.N.Raoand H.V.N.Rao –Tata Mc.GrawHillCompany.

2.Air pollutionbyWarkand Warner.-Harper&Row,NewYork.

REFERENCE BOOK:

1.An introduction to Air pollution by R.K.Trivedy and P.K.Goel,B.S.Publications

CODE:14CE706 **OPEN ELECTIVE**

REMOTE SENSING AND GIS

CE 200

Lectures	4	Tutorial	0		Practical	0	Self Study	0
Continuous Internal Assessment			:	40	Semester End Examination (3 Hours)			60

UNIT – I

Concepts and Foundations of Remote Sensing: Introduction, Energy sources and radiation principles, Energy interactions in the atmosphere, Energy interactions with Earth surface features, an ideal remote sensing system, characteristics of remote sensing systems, application of remote sensing .

UNIT – II

Visual Image Interpretation: Introduction, Fundamentals of visual image interpretation, basic visual image interpretation equipment, land use and land cover mapping, geologic and soil mapping, agricultural applications, forestry applications, water resources applications, urban and regional planning applications.

UNIT – III

Digital Image Processing: Introduction, Image rectification and restoration, Image enhancement, contrast manipulation, spatial feature manipulation, Image Classification, Supervised classification, the classification stage, the training stage, Un-supervised classification, Classification accuracy assessment.

UNIT – IV

Geo-graphical Information Systems (GIS):Introduction, spatial information system: an overview, conceptual model of spatial information, concept of databases, digitizing, editing, and structuring map data, data quality and sources of errors in GIS, spatial data analysis (vector based), spatial data analysis (raster based), Fundamental concepts of GPS, Types of GPS, GPS satellite, Application of GPS in resource surveys, mapping and navigation.

TEXT BOOKS:

1. Lillisand.T.M, Keifer.R.W, and Chipman.J.WRemotesensind Image interpretation, 2004, John Wlley and Sons.
2. Chrisman, N.R. (1997), Exploring Geographic Information systems, John Willey and sons
3. Remote Sensing and its applications by LRA Narayana University Press 1999.
4. Principals of Geo physical Information Systems - Peter ABurragh and Rachael A. Me Donnell, Oxford Publishers 2004.

REFERENCE BOOKS:

1. Concepts & Techniques of GIS by C.P.Lo Albert, K.W. Yonng, Prentice Hall (India) Publications.
2. Remote Sensing and Geographical Information systems by M.Anji Reddy JNTU Hyderabad 2001,
3. B.S.Publications.GIS by Kang - tsungchang, TMH Publications & Co.
4. Basics of Remote sensing & GIS by S.Kumar, Laxmi Publications.
5. Fundamental of GIS by Mechanical designs John Wiley & Sons.

CODE:14CEL701 **LABORATORY**

BUSINESS COMMUNICATION and PRESENTATION SKILLS Lab
14ELL701

Lectures	0	Tutorial	0		Practical	3	Self Study	0
Continuous Internal Assessment			:	40	Semester End Examination (3 Hours)			60

UNIT-I

Identity Management Communication: – Face to Face Impression Management & Mediated Communication (Self Introduction & Self Promoting– Over Stating and Under Stating – Strategies to Overcome Communicative Inhibitions – Creating Positive Self-image through words - Appearance-Verbal and Non Verbal Manners) – Giving Polite Yet Assertive Responses – Responsive strategies to handle criticism - Accepting Failure and Declaring Success.

UNIT-II

Business Presentations:– Oral and Power Point Presentations; Preparing Successful Presentations; Assessing Audience, Making Effective Use of Visual Aids, Delivering Presentation, Using Prompts, Handling With Questions and Interruptions, Mock Presentations.

UNIT-III

Oratory Skills: –Advanced Group Discussion skills, Extempore, Mock Parliament and Mock Press.

UNIT-IV

Interview Management: – Resume Preparation, Types of Interviews, Preparing For Interviews, Facing Interviews, Handling Tough & Tricky Questions, Reviewing Performance, Participating In Mock Interviews.

REFERENCES:

1. "Personality Development and Soft Skills", Barun K.Mitra, Oxford University Press, Delhi:2007
2. Technical Communication Principles and Practices, Meenakshi Raman, Sangeeta Sharma: OUP: 2011.

CODE : 14CEL702 **LABORATORY**

COMPUTER AIDED ANALYSIS, DESIGN AND DETAILING OF STRUCTURES – II

Lectures	0	Tutorial	0		Practical	3	Self Study	0
Continuous Internal Assessment			:	40	Semester End Examination (3 Hours)			60

Note: A minimum of twelve (6No) shall be done and recorded

Students are required to analyze, design and detail the following using software package like Excel spread sheets/STAAD Pro/STRUDS/GTSTRUDL/STRAP etc.; Auto CAD/Micro station/Rivet etc., etc.

(At least SIX of the following) 6 x 2 = 12 lab classes

1. Two way slab
2. Isolated footing
3. Pile foundation
4. Cantilever Retaining wall
5. plate girder
6. Rectangular water tank (using pressed steel plates)
7. Column base
8. Industrial steel building
9. Pile cap

CODE : 14CEL703 **LABORATORY**

TRANSPORTATION ENGINEERING LABORATORY

Lectures	0	Tutorial	0		Practical	3	Self Study	0
Continuous Internal Assessment			:	40	Semester End Examination (3 Hours)			60

Note: A minimum of twelve (12No) shall be done and recorded

A. Tests On Aggregates

1. Aggregate Crushing value test.
2. Aggregate impact value test.
3. Los Angele's abrasion test.
4. Deval's attrition value test.
5. Shape test a) Flakiness index test b) Elongation index test c) Angularity number test. .
6. Specific gravity Test.

B. Tests On Bituminous Materials

7. Penetration test.
8. Softening point test.
9. Flash and fire point test.
10. Ductility test.
11. Viscosity test.
12. Bitumen Extractions Test.
13. Specific gravity of Bitumen.

C. Test On Bituminous Mixes

14. Marshall stability test.

D. Test On Soil Sub grade

15. California bearing ratio test.

CODE : 14CEL704

TERM PAPER
(Common to all branches)

Lectures	0	Tutorial	0		Practical	2	Self Study	0
Continuous Internal Assessment			:	20	Semester End Examination (3 Hours)			30

Description

The Term Paper is a precursor to the project work done in the 2nd semester of the final year B.Tech Programme. The paper may be of 8-10 (A4 size) in length and follows **the standard IEEE/Technical Journal Format.**

Purpose

The Term Paper helps to supplement the final year Project Work of the B.Tech students. It helps to identify their Reserch area/topic and complete the groundwork and preliminary research required for it comfortably. It trains the students to make use of Research Tools and Material available both in print and digital formats.

Procedure

The topic of Term Paper is chosen from the B.Tech curriculum. Based on the topic, a hypothesis is to be made by the team of students, under the guide. The hypothesis may be a null hypothesis also. The team students are then required to collect literature and support information for their term paper from Standard Reference Books, Journals, and Magazines - both printed and online. Each student should refer to a minimum of 5 reference sources outside their prescribed text books. The students also present their papers with the help of Power Point slides / OHP.

The Term Paper contains

- The Aim and Objective of the study
- The need for Rationale behind the study
- Identify the work already done in the field
- Hypothesis and Discussion
- Conclusion
- Appendix with support data (Illlustrations, Tables, Graphs, etc.)

Page Limit : minimum of eight pages

Last date of submission of the Draft : One week after the 1st Mid Term Exams

Last date of submitting the Term Paper : One week before commencement of 2nd Mid Term Exams
Date of Seminar : During the Lab Internal Exam.

Method of Evolution

1. Review - I - 5 Marks
2. Review - II - 5 Marks
3. Term Paper Report - 10 marks

Total 20 marks

CODE: 14CE801

TRANSPORTATION ENGINEERING – II

Lectures	4	Tutorial	0		Practical	0	Self Study	0
Continuous Internal Assessment			:	40	Semester End Examination (3 Hours)			60

UNIT-I

1. INTRODUCTION TO RAILWAYS

Comparison of railway and highways transportation; Classification of Indian railways.

2. COMPONENTS OF RAILWAY TRACK

Gauges in Railway Track, Coning of Wheels, Permanent way-Rails-Types, Rail failures, Creep of Rails, Rail Joints-Types of Joints, Sleepers-Types, Comparison of sleepers, Ballast and formation-Types of Ballast materials- Specifications of Indian Railways.

UNIT-II

3. GEOMETRIC DESIGN OF RAILWAY TRACK

Geometric Design Of Track-Necessity; Gradients & Gradient Compensation; Elements of horizontal alignment; Super elevation; Cant deficiency and cant excess; Negative Super elevation; Length of Transition Curve.

4. POINTS AND CROSSINGS & SIGNALLING

Switches, Components and types of crossing, Turnouts and its working principle, Classification of signals.

UNIT-III

5. AIRPORT PLANNING AND DESIGN

Aero plane components; Air–craft characteristics; Selection of site for airport; Typical airport layouts; Airport Obstructions-Zoning laws; Classification of obstructions;

6. RUNWAY DESIGN

Runway Design-Runway orientation; Basic runway length; Corrections for elevation; Temperature and gradient; Runway geometric design

UNIT-IV

7 .AIRFIELD PAVEMENT DESIGN

Design of Airport Pavements- Design methods for flexible airfield Pavement- CBR Method, Mcleod Method and rigid pavement Design- PCA Method; LCN Method of pavement design.

8. HARBOUR ENGINEERING

Harbour layout: types of harbours, port terms, site selection, Break Waters, Piers and wharves, dry docks and slipwaves.

NOTE

Two questions of 12 marks each will be given from each unit out of which one is to be answered. Twelve questions of one mark each will be given from entire syllabus which is a compulsory question.

Text Books

1. Railway Engineering by S.C.Saxena and S.Arora Dhanpat Rai Publications (P) Ltd.
2. Airport Planning and Design by S. K. Khanna & M. G. Arora; Nemchand & Bros, Roorkee
3. Dock And Harbour Engineering by Dr. S.P. Bindra, Dhanpat Rai & Sons

Reference Books

1. Railway Engineering by M.M.Agarwal; Prabha & Co, New Delhi
2. Airport Engineering by G.V.Rao; Tata Mc Graw Hill, New Delhi.
3. Dock And Harbour Engineering by Hasmukh P. Oza, Gautam H. Oza, Charotar Publishing House, 8th Revised Edition : 2016

E-resources and other digital material:

NPTEL :

http://nptel.ac.in/courses/105107123/
http://nptel.ac.in/courses/105101008/
http://nptel.ac.in/courses/114106025/

CODE: 14CE802

CONSTRUCTION MANAGEMENT

Lectures	4	Tutorial	0		Practical	0	Self Study	0
Continuous Internal Assessment			:	40	Semester End Examination (3 Hours)			60

UNIT – I

1. Introduction

Construction projects; Project management; Main causes of project failure.

2. Planning And Scheduling

Steps involved in planning; Objectives; Principles; Advantages; Limitations; Stages of planning; Scheduling, Preparation of construction schedules; Methods of scheduling; Bar charts; Mile stone charts; Controlling; Job layout; Factors affecting job layout; Project work break down; Activities involved; Assessing activity duration.

UNIT – II

3. Project Management Through Networks

Objectives of network techniques; Fundamentals of network analysis; Events; Activities; Dummies; Types of networks; Choice of network type; Advantages of network techniques over conventional techniques.

4. Program Evaluation And Review Technique (PERT)

Introduction; Time estimates; Earliest expected time; Latest allowable occurrence time; Slack; Critical path; Probability of completion time for a project.

5. Critical Path Method (CPM)

Introduction; Difference between CPM and PERT; Earliest event time; Latest event time; Activity time; Float; Critical activities and critical path.

6. Cost Control

Direct cost; Indirect cost; Total project cost; Optimization of cost through networks; Steps involved in optimization of cost.

UNIT – III

7. Resource Management (Manpower)

Introduction; Resource smoothing; Resource levelling; Establishing workers productivity.

8. Resource Management (Materials)

Objectives of material management; Costs; Functions of material management department; ABC classification of materials; Inventory of materials; Material procurement; Stores management.

9. Resource Management (Machinery)

Classification of construction equipment; Earth moving equipment; Excavation equipment; Hauling equipment, Earth compaction equipment; Hoisting equipment; Concreting plant and equipment; Time and motion study; Selection of equipment– Task consideration, Cost consideration; Factors affecting the selection; Factors affecting cost owning and operating the equipment; Equipment maintenance.

UNIT – IV

10. Quality Control

Importance of quality; Elements of quality; Organization for quality control; Quality assurance techniques; Documentation; Quality control circles; Total quality management; ISO – 9000.

11. Safety Management

Accident prevention programme; Immediate attention in case of accident; Approaches to improve safety in construction; Safety benefits to employers, employees and customers; Prevention of fires in construction industries; Fault free analysis; Safety information system; Safety budgeting.

12. Management Information System In Construction

Communication tools; Management of information with computer; Project management information system concept; Computer as a decision making tool; Decision making by data base enquiry system; Knowledge based expert system in construction.

13. Project Economics

Modern school of thoughts; Business cycle; Capital; Assets; Money; Bond; Equity; Real assets; Marginal productivity of capital; Annuity; Profit; Discounted cash flow analysis; Payback period; Return on investment; Benefit cost ratio.

NOTE

Two questions of 12 marks each will be given from each unit out of which one is to be answered. Twelve questions of one mark each will be given from entire syllabus which is a compulsory question.

TEXT BOOKS

1. Construction Engineering and Management by Dr. S. Seetharaman; Umesh Publications, Nai Sarark, Delhi.
2. Fundamentals of PERT/CPM and Project Management by S. K. Bhattacharjee; Khanna Publishers, Nai Sarak; Delhi.

REFERENCE BOOKS

1. Construction Management & Planning by B. Sengupta & H. Guha; Tata Mc Graw – Hill Publishing Co. Ltd., New Delhi.
2. Construction Planning, Equipment & Methods by Peurifoy R. L.; Mc Graw – Hill International Book Company.
3. PERT & CPM Principles and applications by L. S. Srinath; Affiliated East West Press.

CODE: 14CE803/A **ELECTIVE – IV**

FINITE ELEMENT ANALYSIS

Lectures	4	Tutorial	1		Practical	0	Self Study	0
Continuous Internal Assessment			:	40	Semester End Examination (3 Hours)			60

UNIT -1

1. **BASIC PRINCIPLES OF STRUCTURAL MECHANICS:**

Equilibrium conditions; Strain. - displacement relations; Linear constitutive relations; Principle of virtual work, Energy principles; Application to finite element method,

2. **ELEMENT PROPERTIES:**

Displacement models; Relation between nodal degrees of freedom and generalized co - ordinates; Convergence requirements; Natural coordinate systems; Shape functions; Element strains and stresses; Element stiffness matrix; Static condensation.

UNIT – II

3. **ISOPARAMETRIC ELEMENTS:**

Two dimensional isoparametric elements; Computations of stiffness matrix for isoparametric elements; Convergence criteria for isoparametric element.

UNIT – III

4. **DIRECT STIFFNESS METHOD OF ANALYSIS AND SOLUTION TECHNIQUE:**

Assemblage of elements - Direct stiffness method; Gauss elimination and matrix decomposition.

UNIT – IV

5. **PLANE STRESS AND PLANE STRAIN ANALYSIS:**

Triangular elements; Rectangular elements; Isoparametric elements; Incompatible displacement models; The patch test; Reinforced concrete element; Application to plane stress analysis of a gravity dam.

NOTE:

Two questions of 12 marks each will be given from each unit out of which one is to be answered. Twelve questions of one mark each will be given from entire syllabus which is a compulsory question.

TEXT BOOK:

1.Finite Element Analysis - Theory and Programming by C. S. Krishnamoorthy; Tata Me Graw - Hill Publishing Co.Ltd., New Delhi

REFERENCE BOOK:

1. Introduction to the Finite Element method - A Numerical method for engineering analysis by Desai & Abel; CBS Publishers & Distributors., Delhi

2. The finite element method in engineering by S. S.Rao, Butterworth-Heinemann, New Delhi, 1999

CODE: 14CE803/B **ELECTIVE – IV**

BRIDGE ENGINEERING

Lectures	4	Tutorial	1		Practical	0	Self Study	0
Continuous Internal Assessment			:	40	Semester End Examination (3 Hours)			60

(Working stress method is to be adopted for all designs)

UNIT – 1

1. Introduction & Investigation For Bridges

Components of a Bridge; Classification; Standard Specifications; Need for Investigation; Selection of Bridge Site; Preliminary Data to be Collected; Preliminary Drawings; Determination of Design Discharge; Economical Span; Location of Piers and Abutments; Vertical clearance above HFL; Scour depth; Traffic Projection; Choice of Bridge type; Importance of Proper Investigation.

UNIT – II

2. Concrete Bridges

Various types of bridges; I. R. C. Specifications for road bridges.

3. Culverts

Design of R. C. slab culvert.

UNIT – III

4. T – Beam Bridge

Pigeaud's method for computation of slab moments; Courbon's method for computation of moments in girders; Design of simply supported T – beam bridge.

UNIT – IV

5. Sub Structure For Bridges

Pier and abutment caps; Materials for piers and abutments; Design of pier; Design of abutment; Backfill behind abutment; Approach slab.

UNIT – V

6. Bearings For Bridges

Importance of bearings; Bearings for slab bridges; Bearings for girder bridges; Expansion bearings; Fixed bearings; Design of elastomeric pad bearing.

7. Foundations For Bridges

Scour at abutments and piers; Grip length; Types of foundations; Design of well foundation.

NOTE

Two questions of 14 marks each will be given from each unit, out of which one is to be answered.

TEXT BOOK

1. Essentials of Bridge Engineering by Dr. Johnson Victor; Oxford & IBH Publishing Co. Pvt. Ltd., New Delhi.
2. Design of Bridge Engineering by Jagadeesh T . R, Jayaram .M PHI Learning Pvt. Ltd, New Delhi
3. Bridge Engineering by Rangwala Charotar Publishing House Pvt. Ltd.,

CODE: 14CE803/C **ELECTIVE – IV**

ADVANCED ENVIRONMENTAL ENGINEERING

Lectures	4	Tutorial	1	Practical	0	Self Study	0
Continuous Internal Assessment		:	40	Semester End Examination (3 Hours)			60

UNIT – I

1. Stream Sanitation

Introduction; Self-purification in streams; factors affecting self-purification; Dissolved Oxygen Balance in streams; Streeter-Phelps's Dissolved Oxygen Model; Zones of Self-purification;

2. Low Cost Wastewater Treatment Systems

Introduction; Stabilization ponds (including design aspects); Aerated lagoons; Oxidation ditch; Extended aeration process.

UNIT – II

3. Industrial Wastewater Treatment

Characteristics of industrial wastewater, Introduction to Industrial Wastewater treatments.

Sugar Plant: Sources and characteristics of liquid waste; Methods of its treatment and disposal.

Dairy Industry: Sources and characteristics of liquid waste; Methods of its treatment and disposal.

Pulp and Paper Industry: Sources and characteristics of liquid waste; Methods of its treatment and disposal.

UNIT – III

4. New Concepts In Biological Waste Treatment

Introduction; Nitrogen removal by biological nitrification and de-nitrification; Phosphate removal from the activated sludge process; Rotating Disc Biological Contactor; U-Tube aeration systems.

5. Sources And Effects Of Air Pollution

Natural and Anthropogenic sources; Stationary and mobile sources; Primary and secondary pollutants; Particulate matter; Gaseous pollutants; Effects of air pollutants on human health; Effects on plants; Economical effects.

UNIT – IV

6. Meteorology And Air Pollution

Atmospheric stability and temperature inversions; Design of Stack Height based on Board formulas; Plume rise models; Plume behaviour; Gaussian Dispersion Model; Wind rose diagramme;

7. Control of Air Pollution

Objectives; Types of collection equipment: Settling chamber; Inertial separators; Cyclones; Filters; Electrostatic Precipitators; Scrubbers.

8. Noise Pollution

Introduction; Sources of noise and their noise levels; Acceptable noise levels; Effects of noise pollution; Control measures of noise pollution.

NOTE

Two questions of 12 marks each will be given from each unit out of which one is to be answered. Twelve questions of one mark each will be given from entire syllabus which is a compulsory question.

TEXT BOOKS

1. Wastewater Treatment by M.N. Rao and A.K. Datta; Oxford & IBH Publishing Co. Pvt. Ltd., New Delhi.
2. Wastewater Engineering, Treatment, Disposal and Reuse by Metcalf & Eddy Inc.; Tata Mc Graw – Hill Publishing Co. Ltd., New Delhi.
3. Air Pollution by M.N. Rao and H.V.N. Rao; Tata Mc Graw – Hill Publishing Co. Ltd., New Delhi.

REFERENCES

1. Environmental Pollution Control Engineering by C.S. Rao; Wiley Eastern Ltd., New Delhi.
2. Water Supply and Wastewater Disposal by G.M. Fair et all; John Wiley & Sons.
3. Sewage Disposal and Air Pollution Engineering by S.K. Garg; Khanna Publications, Delhi.
4. Sewage and Sewage Treatment by S.K. Kshirasagar; Roorkee Publishing House, Roorkee.

CODE: 14CE803/D **ELECTIVE – IV**

GROUND IMPROVEMENT TECHNIQUES

Lectures	4	Tutorial	1	Practical	0	Self Study	0
Continuous Internal Assessment		:	40	Semester End Examination (3 Hours)			60

UNIT-I

1. **Introduction**

Need for engineered ground improvement, classification of ground modification techniques; suitability, feasibility and desirability of ground improvement technique; objectives of improving soil.

2. **In-situ densification methods in granular soils**

Introduction, Vibration at the ground surface, impact at the ground surface, vibration at depth, impact at depth.

UNIT-II

3. **In-situ densification methods in cohesive soils**

Introduction, preloading, sand drains, sand wicks, band drains, stone and lime columns.

4. **Reinforced earth**

Principles, components of reinforced earth, governing design of reinforced earth walls, design principles of reinforced earth walls.

UNIT-III

5. Geotextiles

Introduction, types of geotextiles, functions and their applications, tests for geotextiles, geogrids and its functions.

6. **Mechanical Stabilization**

Soil aggregate mixtures, properties and proportioning techniques, soft aggregate stabilization, compaction, field compaction control.

UNIT-IV

7. Cement Stabilization

Mechanism, factors affecting and properties, use of additives, design of soil cement mixtures, construction techniques.

8. Lime and Bituminous Stabilization

Type of admixtures, mechanism, factors affecting, design of mixtures, construction methods.

NOTE

Two questions of 12 marks each will be given from each unit out of which one is to be answered. Twelve questions of one mark each will be given from entire syllabus which is a compulsory question.

TEXT BOOK

1. Hausmann M.R(1990) Engineering Principles of ground modification, McGraw-Hill International edition.

REFERENCES

1. Ground improvement Techniques, P.Purushothama Raju, Laxmi Publications Pvt. Ltd., New Delhi.
2. Robert M. Koerner, Designing with Geosynthatics, Prentice Hall New Jercy, USA.
3. Construction and Geotechnical methods in Foundation Engineering, R.M.Koerner, McGraw-Hill Book Company.
4. Current Practices in Geotechnical Engineering Vol.-I, Alam Singh and Joshi, International Book Traders, New Delhi.

CODE: 14CE804/A **ELECTIVE – V**

ADVANCED DESIGN OF CONCRETE STRUCTURES

Lectures	4	Tutorial	0	Practical	0	Self Study	1
Continuous Internal Assessment		:	40	Semester End Examination (3 Hours)			60

UNIT – I

1. Grid Floors

Introduction, Analysis and Design of Grid Floors

2. Raft Foundation

Introduction, Analysis and Design of Raft Foundation using grid beams

UNIT – II

3. Circular water tanks:

Introduction, Underground circular water tanks, on ground circular water tanks

4 Desing Of Concrete Corbels

UNIT – III

5. Elevated water tanks:

Introduction, Analysis & Design of INTZ Tanks including staging

UNIT – IV

6. Bunkers And Silos

Design of rectangular and circular bunkers; design of silos

UNIT – V

7. Yieldline Theory

Introduction; assumptions; analysis by virtual work method; analysis by equilibrium method; analysis and design of simply supported square, rectangular and circular slabs.

8. Introduction To Deep Beams

Parmeters influencing design; IS code provisions; design of simply supported and continuous deep beams.

NOTE:

Two questions of 14 marks each will be given from each unit, out of which one is to be answered.

TEXT BOOK

1.Advanced Reinforced Concrete Design, by N.Krishna Raju CBS publishers

REFERENCE BOOKS

1. Reinforced Concrete Volume II by H.J Shah, Charotar
2. Advanced Reinforced Concrete Design by Varghese,PHI
3. Advanced Reinforced Concrete Design (vol-II) by S. S. Bhavikatti, New age international

CODE: 14CE804/B **ELECTIVE – V**

PAVEMENT ANALYSIS AND DESIGN

Lectures	4	Tutorial	0	Practical	0	Self Study	1
Continuous Internal Assessment		:	40	Semester End Examination (3 Hours)			60

UNIT-1

Types of pavement-factors affecting design of pavements-wheel loads-type pressure-contact pressure, Material characteristics-Environmental and other factors.

Stresses in rigid pavement- layered systems concept-one layer system- Boussinesq, Two layer system –Burmister.

UNIT-II

Stress in rigid pavement-relative stiffness of slab, modulus of sub-grade reaction-stresses due to warping, stresses due to loads, stresses due to friction. Pavement design: IRC method of flexible pavement design.

UNIT-III

IRC method of rigid pavement design –joints-Dowel & Tie bar.

Highway material tests-Bitumenous material tests.

UNIT-IV

Highway construction –Gravel, WBM, Bituminous pavements types- cement concrete roads.

Failure in Rigid & Flexible pavements, Highway maintenance-Routine-periodic- special repairs.

Sub-grade soil quality improvement techniques.

NOTE

Two questions of 12 marks each will be given from each unit out of which one is to be answered. Twelve questions of one mark each will be given from entire syllabus which is a compulsory question.

TEXT BOOKS

1. Highway Engineering-S.K.Khanna & C.J.Justo, Nemchand & Bros.,7th Edition (2000).

2. Principles and Practices of highway Engineering – Dr.L.R.Kadiyali & Dr.N.B.Lal – Khanna publishers- (2003).

REFERENCE

1. Principles of Pavement Design-Yoder & Wit Zorac- John Willey & Sons.

INDIAN STANDARD CODES

1. IRC Code for Flexible pavement-IRC-37-2011.
2. IRC Code for Rigid pavement-IRC-58-2012.

CODE: 14CE804/C **ELECTIVE – V**

EARTHQUAKE RESISTANT DESIGN OF STRUCTURES

Lectures	4	Tutorial	0	Practical	0	Self Study	1
Continuous Internal Assessment		:	40	Semester End Examination (3 Hours)			60

UNIT-I

1) Elements of structural dynamics

Sources of vibrations; Types of vibrations; Degrees of freedom; Spring action and damping; Free vibration of undamped system having single degree of freedom; Free vibration of viscous damped system having single degree of freedom; Forced vibration of a viscous damped single degree freedom system subjected to harmonic excitation; Earthquake excitation (Base excitation) of a single degree freedom system.

UNIT-II

2) Elements of Earth Quake Ground motion

Earthquake size- Intensity and magnitude; Seismic Zoning-Introduction; Strong Motion Earthquakes - Introduction; Response spectrum (elastic); Local site effect (Effect of type of soil).

3) Elements of Geotechnical Earthquake Engineering

Liquefaction – Definition and types, Effect of liquefaction on built environment, Evaluation of liquefaction susceptibility, Liquefaction hazard mitigation

Seismic slope stability – Introduction, Pseudo-static analysis, Sliding block methods

UNIT III

4) Analysis of single storey and single bay RCC Plane Frame (Columns vertical) : (As per IS:1893(part-I)-2002)

Calculation of lateral force due to earthquake using equivalent static method ; Analysis for different load combinations; Design forces and moments in beam and columns.

UNIT-IV

5) Design of single storey and single bay RCC plane frames (Columns vertical)

(As per IS:456-2000 and IS13920-1993)

Design of column; Design of beam; Design of footing ; Detailing of entire frame

6) Masonry Structures

House types and damages, cause and location of damage, Understanding the knowledge hidden in your existing houses, Making houses earthquake resistant, Earthquake resistant features, Retrofitting-some examples, Technology choice, summary of earthquake resistant features, improving housing designs.

NOTE

Two questions of 12 marks each will be given from each unit out of which one is to be answered. Twelve questions of one mark each will be given from entire syllabus which is a compulsory question.

TEXT BOOKS

1)Elements of Earthquake Engineering by Jai Krishna, A.R.Chandrasekaran and Brijesh Chandra, Second Edition(1994), South Asian Publishers, New Delhi. (For Chapters 1 and 2)

2) Geotechnical Engineering - S.K.Gulati & Manoj Datta, Tata McGraw-Hill Publishing Company Ltd. (For Chapter 3)

3)Earthquake Resistant Design of Structures by Pankaj Agarwal, Manish Shrikhande , First edition(2006), Prentice Hall of India Private Ltd., New Delhi . (for Chapters 1,2,4 and 5)

4) Earthquakes and Buildings – A.S.Arya, A.Revi, Pawan Jain (For Chapter-6)

CODES

IS:1893(part-I)-2002 -

IS13920-1993 -

IS:456-2000 -

SP16

REFERENCE BOOK

1) Dynamics of Structures by A.K.Chopra, Second edition (2001), Prentice Hall India Private Ltd

CODE: 14CE804/D **ELECTIVE – V**

GROUND WATER DEVELOPMENT AND MANAGEMENT

Lectures	4	Tutorial	0	Practical	0	Self Study	1
Continuous Internal Assessment		:	40	Semester End Examination (3 Hours)			60

UNIT – I

1. Introduction

Ground Water Occurrence: Ground water hydrologic cycle, origin of ground water, vertical distribution of ground water, zone of aeration and zone of saturation, geologic formation as Aquifers, types of aquifers, porosity, Specific yield and Specific retention.

2. Ground Water Movement

Permeability, Darcy's law, Transmissivity, differential equation governing ground water flow in three dimensions derivation, Ground water flow contours their applications.

UNIT – II

3. Analysis of Pumping Test Data

Steady groundwater flow towards a well in confined and unconfined aquifers – Dupit's and Theim's equations, yield of an open well interface and well tests. Unsteady groundwater flow towards a well in confined and unconfined aquifers – Non equilibrium equations, Theis's solution – Jacob's and Chow's simplifications, Leaky aquifers.

UNIT – III

4. Surface and Subsurface Investigation

Surface method exploration, Electrical resistivity and Seismic refraction methods. Sub-surface method exploration, Geophysical logging and resistivity logging.

5. Artificial Recharge of Ground Water

Concept of artificial recharge – recharge methods, relative merits. Applications of GIS and Remote Sensing in Artificial Recharge of Ground water along with Case studies.

UNIT – IV

7. **Saline Water Intrusion in aquifer**

Occurrence's of saline water intrusions, Ghyben- Herzberg relation, Shape of interface, control of seawater intrusion.

8. **Groundwater Basin Management**

Concepts of conjunction use, Case studies.

NOTE

Two questions of 12 marks each will be given from each unit out of which one is to be answered. Twelve questions of one mark each will be given from entire syllabus which is a compulsory question.

TEXT BOOKS

1. Groundwater by H.M. Raghunath, Wiley Eastern Ltd.
2. Ground water Hydrology by David Keith Todd, John Wiley & Son, New York

REFERENCES

1. Groundwater by Bawvr, John Wiley & sons.
2. Groundwater Syatem Planning & Managemnet – R. Willes & W.W.G. Yeh, Printice Hall.

CODE : 14CEPR801 **ROJECT WORK**

PROJECT WORK

Lectures	0	Tutorial	0	Practical	12	Self Study	0
Continuous Internal Assessment		:	50	Semester End Examination (3 Hours)			100

The Project work shall be carried out by a batch consisting not more than four students for one semester. It should help the students to comprehend and apply different theories and technologies that they have learnt through and are learning. It should lead to a substantial result as a comparative study, a new application of the technologies available or some extension to the works carried out by some researcher and published in referred journals. Each batch must carry out the analysis, design, and implementation /New Material Testing in the laboratory and its application. There shall be a total of three reviews made by the batch regarding:

1. 0th Review : The idea/concept which forms the basis for their project shall be presented to the guide, concerned in charge and classmates and shall get the approval for continuation.

2. 1st Review : The analysis and design carried out, Implementation and the testing done

3. 2nd Review : Over all Presentation of the work carried out and the results found out for the valuation under the internal assessment

A comprehensive report is to be submitted at the end of the semester, which is certified by the concerned guide and the HOD. There shall be an external guide appointed by the C.O.E to make an assessment and to carryout the Viva-Voce examination.

CODE : 14CEL802 **LABORATORY**

QUANTITY ESTIMATION & PROJECT MANAGEMENT

Lectures	0	Tutorial	0	Practical	3	Self Study	0
Continuous Internal Assessment		:	40	Semester End Examination (3 Hours)			60

Note: A minimum of twelve (12No) shall be done and recorded

UNIT - I

Quantity Surveying

*(At least **SIX** of the following using softwares like MS Excel/ Qty./Road Estimate/Super Rate analysis etc.)*

1. Quantity estimation of a single storey residential building (different items).
2. Cost estimation of a single storey residential building.
3. Quantity estimation of a B.T.Road(different items).
4. Cost estimation of a B.T.Road.
5. Quantity estimation of a Canal (different items).
6. Cost estimation of a Canal.
7. Find out the labour requirement and preparing the Rate Analysis for different items of work.
   a) C.C b) R.C.C c) Brick work d) Flooring

UNIT - II

Project Management

*(Any **THREE** of the following using softwares like MS Project / Primavera etc.)*

1. Preparing the Project management report for a single storey residential building/Road/Canal by using the Bar Chart/Mile stone chart.
2. Preparing the Project management report for a single storey residential building by using the network technique (PERT/CPM).
3. Preparing the Project management report for a B.T.Road by using the network technique (PERT/CPM).
4. Preparing the Project management report for a Canal by using the network technique (PERT/CPM).

UNIT – III

*(At least **THREE** of the following by using soft ware's like MS Excel)*

1. Quantity estimation of RCC roof slab and preparing schedule of bars
2. Quantity estimation of RCC beam and preparing schedule of bars
3. Quantity estimation of RCC Column with foundation footing and preparing schedule of bars.
4. Quantity estimation of RCC retaining wall and preparing schedule of bars