

**ACADEMIC REGULATIONS
COURSE STRUCTURE
AND
DETAILED SYLLABUS**

CIVIL ENGINEERING



B.TECH. FOUR YEAR DEGREE COURSE

(Applicable for the batches admitted from 2011-2012)

**VNR VIGNANA JYOTHI
INSTITUTE OF ENGINEERING AND
TECHNOLOGY
(AFFILIATED TO JNTUH)
An Autonomous Institute under JNTUH**

**Bachupally, Nizampet (S.O),
Hyderabad – 500090
Andhra Pradesh, India**



**VNR VIGNANA JYOTHI INSTITUTE OF ENGINEERING AND TECHNOLOGY
HYDERABAD**

An Autonomous Institute under JNTUH

ACADEMIC REGULATIONS 2011 FOR B.TECH. DEGREE COURSE

(Applicable for Students admitted from the academic year 2011-2012)

1. Courses of study

The following courses of study are offered at present for specialization for the B. Tech. Course:

Branch Code	Branch
01	Civil Engineering.
02	Electrical and Electronics Engineering
03	Mechanical Engineering
04	Electronics and Communication Engineering
05	Computer Science and Engineering.
10	Electronics and Instrumentation Engineering
12	Information Technology
24	Automobile Engineering

1.1 Eligibility Criteria for Admission

The eligibility criteria for admission into engineering programmes shall be as mentioned below:

The candidate shall be an Indian National.

The candidate should have completed 16 years of age as on 31st December of the academic year for which the admissions are being conducted.

The Candidate should have passed the qualifying examination (10+2) or equivalent as on the date of admission.

Seats in each programme in the Institution are classified into **Category A** and **Category B** as per the G.Os.

1.1.1 Category – A Seats

These seats will be filled through counseling as per the rank at the Common Entrance Test (EAMCET) conducted by the State Government and State Government GOs as per other admission criteria laid down in the G.Os.

1.1.2 Category - B Seats

These seats will be filled by the institute as per the G.Os. Issued by State Government from time to time.

1.1.3 Category: Lateral Entry

He candidates shall be admitted into the Third Semester, based on the rank secured by the candidate at Engineering Common Entrance Test (ECET(FDH)) by the Convener, ECET.

2. Distribution and Weightage of Marks

- i. The performance of a student in each Semester shall be evaluated subject –wise with **a maximum of 100 marks for theory and 75 marks for practical subjects.** In addition, an Industry oriented mini-project, Seminar, Comprehensive viva-voce, and Project Work shall be evaluated for **50, 50, 50 and 200 marks** respectively.

- ii. For theory subjects the distribution shall be **30 marks for Internal Evaluation and 70 marks for the End-Examination.**

For theory subjects, Two mid examinations will be conducted in each Semester as per the academic calendar. Each mid examination is evaluated for 25 marks. First mid examination should be conducted for 1 – 2 ½ Units of syllabus and the second mid examination shall be conducted for 2 ½ - 5 Units of syllabus. The mid descriptive type exam paper consists of Section-A and Section-B.

Section-A [compulsory] consists of 5 short answer questions and each carries one mark.

Section-B consists of 5 questions out of which 4 are to be answered and each question carries 5 marks. The time duration of each mid examination is 90 minutes.

Two assignments are to be given to students covering the syllabus of first mid and second Mid examinations and are evaluated for 5 marks each. .

The first assignment shall be submitted before first mid examinations and second Assignment should be submitted before second mid examination.

At the end of the Semester Internal Marks Maximum 30 for the respective subjects are allotted as follows:

- (a) 25 marks for the better of the two mid term examinations

(b) 5 marks of the average of the two assignment marks

- iii. For practical subjects there shall be a continuous evaluation during the Semester for **25 internal marks and 50 marks for end examination**. Out of the 25 marks for internal, **day-to-day work in the laboratory shall be evaluated for 10 marks**, and 10 marks for internal examination (two internal practical examinations will be conducted and the better of the two examinations will be taken into account) and 5 marks for laboratory record.

NOTE: A student who is absent for any assignment/Mid term examination for any reason what so ever shall be deemed to have secured 'zero' marks in the test/examination and no makeup test/examination shall be conducted.

- iv. For the subjects having design and / or drawing, (such as Engineering Graphics, Engineering Drawing, Machine Drawing, Production Drawing Practice, and Estimation etc., the distribution shall be **30 marks for internal evaluation (15 marks for day-to-day work and 15 marks for internal tests** (the better of the two examinations will be taken into account) **and 70 marks for end examination**. There shall be **two internal tests** in a Semester.
- iv. There shall be an **industry-oriented mini-Project**, in collaboration with an industry of their specialization, to be taken up during the vacation after III year II Semester examination. The **mini project shall be evaluated during the IV year I Semester**. The industry oriented mini project shall be submitted in report form and should be presented before a committee, which shall be evaluated for **50 marks**. The committee consists of Head of the Department, the supervisor of mini project and a senior faculty member of the department. There shall be **no internal assessment for industry oriented mini project**.
- vi. There shall be a **Seminar presentation in IV year II Semester**. For the Seminar, the student shall collect the information on a specialized topic other than the project topic and prepare a technical report, showing his understanding of the topic, and submit to the department, which shall be evaluated by a Departmental committee consisting of the Head of the department, Seminar supervisor and a senior faculty member. The Seminar report shall be evaluated for **50 marks**. There shall be **no external examination for Seminar**.
- vii. There shall be a **Comprehensive Viva-Voce in IV year II Semester**. The Comprehensive Viva-Voce will be conducted by a Committee consisting of the Head of the Department and three Senior Faculty members of the Department. The Comprehensive Viva-Voce is aimed to assess the student's understanding in various subjects studied during the B.Tech. course of study. The

Comprehensive Viva-Voce is evaluated **for 50 marks** by the Committee. There will be **no internal assessment for the Comprehensive viva-voce.**

- viii. The Project work shall be started by the student in the beginning of the IV year I Semester. Out of a total of **200 marks** for the project work, **60 marks shall be for Internal Evaluation** and **140 marks for the Semester end Examination**. The Semester end Examination (viva-voce) shall be conducted by a committee comprising of an external examiner, Head of the Department and the project supervisor. The evaluation of project work shall be conducted at the end of the IV year II Semester. **The Internal Evaluation shall be on the basis of three Seminars conducted during the IV year II Semester for 30 marks by the committee consisting of Head of the Department, project supervisor and senior faculty member of the Department and for 30 marks by the supervisor of the project.**

3. Semester end Examination

(a) Theory Courses

Each course is evaluated for 70 marks. Examination is of 3 hours duration.

Question paper contains two sections [Section-A and Section-B]

Section-A: Carries 30 marks [Five questions of one mark each, five questions of two marks each and another five questions of three marks each] which is compulsory.

Section-B: carries 40 marks consisting of six essay type questions out of which four questions to be answered, each carrying 10 marks.

Drawing related subjects, question paper contains 8 questions (atleast one question from each unit), out of which the candidate has to answer any 5 questions, each carrying 14 marks.

(b) Practical Courses

Each lab course is evaluated for 50 marks. The examination shall be conducted by the laboratory teacher and another senior teacher concerned with the subject of the same/other department/Industry. The external examiner may be appointed by the Chief Superintendent in consultation with HOD as and when required.

(c) Supplementary Examinations

Supplementary examinations will be conducted along with regular Semester end examinations. (During even Semester regular examinations, supplementary examinations of odd Semester and during odd Semester regular examinations, supplementary examinations of even Semester will be conducted).

4. Attendance Requirements

- i. A student shall be eligible to appear for the Semester end examinations if he acquires a **minimum of 75% of attendance in aggregate of all the subjects** for Semester / year.
- ii. Condonation of shortage of attendance in aggregate **up to 10% (65% and above and below 75%)** in a Semester may be granted by **Institute Academic Committee**.
- iii. A student will not be permitted to write the end examination and hence not promoted to the next Semester unless he satisfies the attendance requirement of the present Semester, as applicable. They may seek re-admission for that Semester when offered next.
- iv. Shortage of Attendance **below 65% in aggregate** shall in **NO case be condoned**.
- v. Students whose shortage of attendance is not condoned in any Semester are not eligible to take their end examination of that Semester.
- vi. A stipulated fee shall be payable towards condonation of shortage of attendance.

5. Minimum Academic Requirements

The following academic requirements have to be satisfied in addition to the attendance requirements mentioned in item No.4.

- i. A student shall be deemed to have satisfied the minimum academic requirements and earned the credits allotted to each theory or practical design or drawing subject or project, if he secures **not less than 35% (25 out of 70 marks) of marks in the end examination and a minimum of 40% of marks in the sum total of the internal evaluation and end examination taken together**.
- ii. A student shall be **promoted from II to III year** only if he fulfils the academic requirement of **37 credits from Two regular and one supplementary examinations of I year I Semester and One Regular and One Supplementary exam of I year II Semester, and one regular examination of II year I Semester** irrespective of whether the candidate takes the examination or not.
- iii. A student shall be **promoted from III year to IV year** only if he fulfils the academic requirements of total **62 credits from the following examinations**, whether the candidate takes the examinations or not.
 - Three regular and Two supplementary examinations of I B Tech I Semester.
 - Two regular and two Supplementary examinations for I B Tech II Semester
 - Two regular and one supplementary examinations up to the end of II year I Semester.

- One regular and one supplementary examinations of II year II Semester.
 - One regular examination of III year I Semester.
- iv. A student shall register and put up minimum academic requirement in all 200 credits and earn the 200 credits. Marks obtained in all 200 credits shall be considered for the calculation of percentage of marks.
- v. Students who fail to earn 200 credits as indicated in the course structure **within eight academic years** from the year of their admission shall **forfeit their seat** in B.Tech. course and their **admission shall stand get cancelled**.

6. Course pattern

- i. The entire course of study is of four academic years. **All the I, II, III and IV years are of Semester pattern .**
- ii. A student eligible to appear for the end examination in a subject, but absent or has failed in the end examination may reappear for that subject at the supplementary examination whenever conducted.
- iii. When a student is detained due to shortage of attendance in any Semester, he may be re-admitted into that Semester when it is offered next, **with the academic regulations of the batch into which he gets readmitted.**
- iv. When a student is detained due to lack of credits in any year, he may be eligible to be promoted or for promotion into the next year after fulfillment of the academic requirements, **with the academic regulations of the batch into which he gets admitted**

7. Award of B.Tech. Degree and Class

A student will be declared eligible for the award of the B. Tech. Degree if he/she fulfils the following academic regulations:

- i. Pursued **a course of study for not less than four academic years and not more than eight academic years.**
- ii. Registered for **200 credits** and secured **200 credits**.

NOTE: Students, who fail to fulfill all the academic requirements for the award of the degree within eight academic years from the year of their admission, shall forfeit their seat in B.Tech. Course.

- iii After a student has satisfied the requirements prescribed for the completion of the program and is eligible for the award of B. Tech. Degree he shall be placed in one of the following four classes:

Class Awarded	% of marks to be secured	From the aggregate marks secured for the 200 Credits.
First Class with Distinction	70% and above	
First Class	Below 70% but not less than 60%	
Second Class	Below 60% but not less than 50%	
Pass Class	Below 50% but not less than 40%	
Fail	Below 40%	

(The marks in internal evaluation and end examination shall be shown separately in the marks memorandum).

8. Withholding of Results

If the student has not paid dues to College, or if any case of indiscipline is pending against him, the result of the candidate may be withheld and he will not be allowed to go into the next higher Semester. The award or issue of the Degree may also be withheld in such cases.

9. Transitory Regulations

Students who have discontinued or have been detained for want of attendance or any other academic requirements, may be considered for readmission as and when they become eligible. They have to take up Equivalent subjects, as substitute subject in place of repetition of subjects as decided by the Institute Academic Committee.

10. Minimum Instruction Days

The minimum instruction days for each Semester shall be **90 clear instruction days**.

11. There shall be **no branch transfers** after the completion of admission process.

12. **The decision of the Institute Academic Committee will be final in respect of equivalent subjects for those students who are transferred from other colleges. The procedure for permitting students to transfer from other colleges will be decided by the principal / Institute Academic Committee keeping the Government Rules concerned in view.**

13. General

- i. Where the words “he”, “him”, “his”, occur in the regulations, they include “she”, “her”, “hers”.
- ii. The academic regulations should be read as a whole for the purpose of any interpretation.
- iii. In the case of any doubt or ambiguity in the interpretation of the above rules, the decision of the Principal is final.
- iv. In the case of any discrepancy/ambiguity/doubt arises in the above rules and regulations, the decision of the Principal shall be final.
- v. The College may change or amend any or all of the academic regulations or syllabi at any time and the changes or amendments made shall be applicable to all the students concerned with effect from the dates notified by the College.

14. Academic Regulations for B.Tech. (Lateral Entry Scheme)

(Applicable for students admitted from the academic year 2012-2013)

- (i) A student shall register for all 150 credits and earn all the 150 credits. Marks obtained in all 150 credits shall be considered for the calculation of the class.
- (ii) A student who fails to earn 150 credits as indicated in the course structure within **six** academic years from the year of their admission shall forfeit their seat in B.Tech. programme and their admission stands cancelled.
- (iii) The same attendance regulations are adopted as that of B.Tech. Four year degree course.
- (iv) A student shall be promoted from third year to fourth year only on fulfilling the academic requirements of securing 37 credits from the following examinations.
 - a. Two regular and one supplementary examination of II year I Semester
 - b. One regular and one supplementary examination of II year II Semester
 - c. One regular examination of III year I Semester.

Irrespective of whether the candidate appears the Semester-End examination or not as per the normal course of study and in case of getting detained for want of credits the student may make up the credits through supplementary exams of the above exams before the date of commencement of class work for IV year I Semester.

(v) Award of B.Tech. Degree and Class

After a student has satisfied the requirements prescribed for the completion of the program and is eligible for the award of B. Tech. Degree he shall be placed in one of the following four classes:

Class Awarded	% of marks to be secured	From the aggregate marks secured for the 150 Credits. (i.e., II year to IV year)
First Class with Distinction	70% and above	
First Class	Below 70% but not less than 60%	
Second Class	Below 60% but not less than 50%	
Pass Class	Below 50% but not less than 40%	
Fail	Below 40%	

(The marks in internal evaluation and end examination shall be shown separately in the marks memorandum)

- (vi) All other regulations as applicable to B.Tech. four year degree course will hold good for B.Tech. (Lateral Entry Scheme).

Vision and Mission of the Institute

VISION

To be a World Class University providing value-based education, conducting interdisciplinary research in cutting edge technologies leading to sustainable socio economic development of the nation

MISSION

- To produce technically competent and socially responsible engineers, managers and entrepreneurs who will be future ready.
- To involve students and faculty in innovative research projects linked with industry, academic and research institutions in India and abroad.
- To use modern pedagogy for improving the teaching-learning process.

Vision and Mission of the Department

VISION

To develop Civil Engineering Department as a Centre of excellence for imparting value based education to the students at undergraduate and post-graduate level to meet industry needs and to develop as a major research center meeting national and international standards.

MISSION

- To impart in-depth and up-to-date knowledge of Civil Engineering concepts with focus on character enhancement, leadership qualities, effective communication, social responsibility and pursuit of lifelong learning and professional development.
- To provide a platform to the students to engage in original research work in association with faculty.

VNR Vignana Jyothi Institute of Engineering & Technology

Program Education Objectives (PEOs)

- I. To provide students with a solid foundation in Basic Sciences, Mathematics to analyze, synthesize and evaluate the information to achieve expertise in core areas of Civil Engineering.
- II. To equip students with modern professional abilities such as effective communication, collaborative work in diverse teams, ethical decision making, successful management of personal and professional career objectives and passion for continuous development through lifelong learning.
- III. To prepare the students to achieve high level technical expertise in the fields of Environmental Engineering, Geo- Technical Engineering, Structural Engineering, Transportation Engineering, Water Resources Engineering and to excel in the design and construction of various components or systems of Civil Engineering.
- IV. To provide expertise through learning advanced courses in various streams of Civil Engineering, by offering elective subjects with a view to make the students capable to pursue higher studies and research.
- V. To provide opportunities for students to learn multidisciplinary subjects such as Elements of Electrical and Mechanical Engineering, C Programming & Data Structures to make them a complete engineer
- VI. To establish acquaintance with the practical implementation of the theoretical concepts through laboratories, by bringing the real world into the academics through virtual industry labs, and to enhance experimental skills of students even beyond curriculum and encouraging them to carryout mini and major projects.
- VII. To prepare the students to continue their professional development based on their awareness of professional society activities, professional licensure requirements and opportunities for further education in graduate school.

Programme Outcomes (POs)

a: Engineering Knowledge: The student is capable of applying the principles of basic sciences and mathematics in learning the Civil Engineering subjects. Graduates will be proficient in the core principles of Civil Engineering as they pertain to the sub-fields of Structural Engineering, Water Resources Engineering, Transportation Engineering, Geotechnical Engineering and Environmental Engineering and will be able to apply these principles in engineering practice.

b: Problem Analysis: The Graduates will possess critical thinking skills, problem solving abilities and familiarity with the computational procedures essential to the field.

c: Design & Development of Solutions: The student is able to plan, analyse, design and look after the construction of various types of Civil Engineering structures with appropriate consideration for public health and safety and cultural, societal and environmental considerations.

d: Conduct investigations of complex problems: The student will use research based knowledge and research methods to design, conduct experiments and to analyze and interpret experimental data.

e: Modern Tool Usage: The student will get hands on training in the various Modern Civil Engineering software and modern equipment.

f: The Engineer and Society: The Students will apply reasoning informed by the appropriate knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to Civil Engineering practice.

g: Environment and Sustainability: As the students possess substantial knowledge in multi disciplinary subjects, he will be able to plan the various projects well keeping in view of its environmental effects on other related fields.

h: Ethics: The student will apply ethical principles and commitment to profession and responsibilities of their profession.

i: Individual and Team work: The Graduate is Capable of working productively as individual, as member or leader in driver set teams and in multi -disciplinary settings.

j: Communication: The Student will excel in expressing ideas, writing technical reports with good communication skills and managerial skills.

k: Project Management and Finance: The Graduates will demonstrate knowledge and understanding of the critical issues for professional practice such as the procurement of works, interaction with contractors during the construction phase of a project and the financial managerial capabilities.

l: Life-Long learning: The student will maintain an awareness of contemporary issues and will contribute to the well being of the community with life-long learning in the broadest context of ever growing technology.

VIII. VNR Vignana Jyothi Institute of Engineering and Technology
B. Tech. - CIVIL ENGINEERING

I YEAR I SEMESTER

COURSE STRUCTURE

Subject Code	Subject Name	L	T/P/D	Credits
R11MTH1101	Mathematics – I	3	1	3
R11PHY1101	Engineering Physics -1	3	0	3
R11CHE1102	Chemistry of Engineering Materials	3	0	3
R11ITD1101	Computer Programming and Data Structures	3	1	3
R11CED1101	Engineering Mechanics-I	4	1	4
R11EEE1130	Elements of Engineering	3	0	3
R11CED1102	Engineering Graphics – I	2	3	2
R11ITD1201	Computer Programming Lab	0	3	2
R11EPC1201	Engg. Physics /Chemistry Lab	0	3	2
Total:		21	12	25

VNR Vignana Jyothi Institute of Engineering and Technology

B. Tech. - CIVIL ENGINEERING

I YEAR II SEMESTER

COURSE STRUCTURE

Subject Code	Subject Name	L	T/P/D	Credits
R11MTH1102	Mathematics – II	3	1	3
R11MTH1104	Numerical Analysis and Linear Programming	3	1	3
R11PHY1102	Engineering Physics - II	3	0	3
R11HAS1101	English	3	0	3
R11CHE1101	Engineering Chemistry	3	0	3
R11CED1103	Engineering Mechanics -II	4	1	4
R11CED1104	Engineering Graphics – II	2	3	2
R11MED1201	Engineering Work Shop	0	3	2
R11HAS1203	English Language Communication Skills Lab	0	3	2
Total:		21	12	25

* T/P/D: Tutorial/Practical/Drawing Practice

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B. Tech. - CIVIL ENGINEERING

II YEAR I SEMESTER

COURSE STRUCTURE

Subject Code	Subject Name	L	T/P/D	C
R11MTH1106	Probability and Statistics	3	1	3
R11CED1105	Building Materials	3	1	3
R11CED1106	Strength of Materials-I	4	1	4
R11CED1107	Surveying – I	3	1	3
R11CED1108	Fluid Mechanics	4	1	4
R11HAS1102	Business Economics and Financial Analysis	4	0	4
R11CED1201	Surveying Field Work – I	0	3	2
R11CED1202	Strength of Materials Lab	0	3	2
	Total :	21	11	25

VNR Vignana Jyothi Institute of Engineering and Technology

B. Tech. - CIVIL ENGINEERING

II YEAR II SEMESTER

COURSE STRUCTURE

Subject Code	Subject Name	L	T/P/D	C
R11CED1109	Environmental Studies	3	0	3
R11CED1110	Strength of Materials – II	4	1	4
R11CED1111	Hydraulics and Hydraulic Machines	4	1	4
R11CED1112	Surveying – II	3	1	3
R11CED1113	Structural Analysis – I	4	1	4
R11CED1114	Building Construction and Planning	3	1	3
R11CED1203	Fluid Mechanics and Hydraulic Machines Lab	0	3	2
R11CED1204	Surveying Field Work – II	0	3	2
	Total :	21	11	25

VNR Vignana Jyothi Institute of Engineering and Technology

B. Tech. - CIVIL ENGINEERING

III YEAR I SEMESTER

COURSE STRUCTURE

Subject Code	Subject Name	L	T/P/D	C
R11CED1115	Structural Analysis – II	4	1	4
R11CED1116	Design of Reinforced Concrete Structures	4	1	4
R11CED1117	Engineering Geology	3	1	3
R11CED1118	Geotechnical Engineering – I	4	0	4
R11CED1119	Water Resources Engineering – I	4	1	4
	Elective - I			
R11CED1120	Waste Management	3	1	3
R11CED1121	Environmental Impact Assessment and Management			
R11CED1122	Construction Technology and Project Management			
R11CED1205	Computer Aided Drafting of Buildings and Engineering Geology Lab	0	3	2
R11HAS1204	Advanced English Language Communication Skills Laboratory	0	3	2
	Total :	22	11	26

VNR Vignana Jyothi Institute of Engineering and Technology

B. Tech. - CIVIL ENGINEERING

III YEAR II SEMESTER

COURSE STRUCTURE

Subject Code	Subject Name	L	T/P/D	C
R11CED1123	Concrete Technology	3	1	3
R11CED1124	Design of Steel Structures	4	1	4
R11CED1125	Geotechnical Engineering – II	3	1	3
R11CED1126	Water Resources Engineering – II	3	1	3
R11CED1127	Transportation Engineering	4	0	4
	Elective - II			
R11CED1128	Water Resources Planning and Management	3	1	3
R11CED1129	Urban Disaster Intelligent Controls Systems			
R11CED1130	Advanced Structural Analysis			
R11CED1206	Geotechnical Engineering Lab	0	3	2
R11CED1207	Concrete Lab and Highway Materials Lab	0	3	2
	Total :	20	11	24

VNR Vignana Jyothi Institute of Engineering and Technology

B. Tech. - CIVIL ENGINEERING

IVYEAR I SEMESTER

COURSE STRUCTURE

Subject Code	Subject Name	L	T/P/D	C
R11CED1131	Remote Sensing and GIS	3	0	3
R11CED1132	Environmental Engineering	3	0	3
R11CED1133	Estimating and Costing	3	1	3
R11CED1134	Finite Element Methods	3	1	3
	Elective – III			
R11CED1135	Ground Water Development and Management			
R11CED1136	Intellectual Property Rights	3	1	3
R11CED1137	Elements of Earthquake Engineering			
R11CED1138	Watershed Management			
	Elective – IV			
R11CED1139	Ground Improvement Techniques			
R11CED1140	Advanced Foundation Engineering			
R11CED1141	Disaster Management and Mitigation	3	1	3
R11CED1142	Rehabilitation and Retrofitting of Structures			
R11CED1143	Urban And Regional Transport Planning			
R11CED1208	CAD and GIS Lab	0	3	2
R11CED1209	Environmental Engineering Lab	0	3	2
R11CED1301	Industrial Training	0	8	2
	Total :	21	18	24

B. Tech. - CIVIL ENGINEERING

IV YEAR II SEMESTER

COURSE STRUCTURE

Subject Code	Subject Name	L	T/P/D	C
R11CED1144	Pavement Analysis and Design	3	1	3
R11HAS1103	Management Science	4	0	4
	Elective – V			
R11CED1145	Advanced Structural Design	3	1	3
R11CED1146	Design and Drawing of Irrigation Structures			
R11CED1147	Airport Planning and Design			
R11CED1148	Pre stressed Concrete Structures			
R11CED1302	Technical Seminar	0	3	2
R11CED1303	Major Project	6	12	12
R11CED1304	Comprehensive viva	0	0	2
	Total :	16	17	26

* T/P/D: Tutorial/Practical/Drawing Practice

(R11MTH1101) MATHEMATICS – I
(Advanced Calculus)

Course Objectives:

- Understand Taylor's theorem and its application to maxima and minima of $f(x,y)$
- Understand the process of curve sketching
- Understand multiple integrals and its applications
- Apply the integral theorems of vector calculus

Course Outcomes:

At the end of the course Student will be able to

- Solve problems involving the maxima and minima of $f(x,y)$.
- Apply the curve tracing concepts to find arc length of curves, surface area, and volume of solids of revolution.
- Evaluate the multiple integrals using appropriate change of variables.
- Verify the integral theorems.

UNIT I

Elementary analysis

Sequences and series - convergence and divergence, ratio test, comparison test, integral test, Cauchy's root test, Raabe's test (statements only for the tests), and absolute and conditional convergence.

Mean value theorems (statements only) - Rolle's theorem, Lagrange's theorem, Cauchy's theorem, and generalized mean value theorem (Taylor's Theorem).

UNIT II

Functions of several variables

Partial differentiation; Functional dependence; Jacobian; Maxima and Minima of functions of two variables with constraints and without constraints.

Radius of curvature; Centre and circle of curvature – evolutes and envelopes.

UNIT III

Improper integrals and special functions

Improper Integrals; Beta, Gamma, and Error functions - Properties and simple applications.

UNIT IV

Curve tracing, applications of integration and multiple integrals

Curve tracing – Cartesian, polar, and parametric curves; Applications of integration to

lengths, volumes and surface areas in cartesian and polar coordinates.

Multiple integrals - double and triple integrals, change of variables, and change of order of integration.

UNIT-V

Vector calculus

Introduction to vector and scalar functions; gradient, curl, divergence, and their related properties of sums and products; Laplacian and second order operators; Vector integration - line integral, work done, potential function; Area, surface, and volume integrals; Statements of Vector integral theorems and their verification (without proofs) - Green's theorem, Stoke's theorem, and Gauss divergence theorem.

TEXT BOOKS

1. Calculus and Analytic Geometry - Thomas and Finney, 9th edition, *Pearson Education*.

REFERENCES

1. Elementary Analysis: The Theory of Calculus - Kenneth Ross, *Springer*.
2. Principles of Mathematical Analysis - Walter Rudin, 3rd edition, *Paperbac*, 1976.
3. Advanced Engineering Mathematics - Erwin Kreyszig, 8th edition, *John Wiley*.
4. Calculus - Tom M. Apostol, Volume1 and Volume 2, 2nd edition, *John Wiley*, 2003.
5. Schaum's Outline of Vector Analysis - Murray R. Spiegel, 2nd edition, *Tata McGraw Hill* 2011.

(R11PHY1101) ENGINEERING PHYSICS-I

Course Objectives:

- To supplement and enhance the basic concepts in Physics essentially required in the study of materials..
- To know and understand some important applications of lasers and optical fibers.
- To learn the importance of wave and particle nature of light and to understand the behavior of an electron in one dimensional potential box.
- To understand the effect of temperature on Fermi Dirac Distribution Function and also learn the behavior of an electron in a periodic potential, the new concept of Effective mass of an electron and to know the classification of materials into conductors, semiconductors and insulators.

Course Outcomes:

After completion of the course, the students will be able to:

- Understand the Phenomenon of Interference, Diffraction & Polarization.
- Learn the principle, working, construction and energy mechanism of various lasers and their applications. Explain the light signal propagation and attenuation through optical fiber.
- Understand the differences between particle and wave nature, energy states in one dimensional potential box and also the Consequences of Heisenberg's Uncertainty principle.
- Understand the one dimensional Schrodinger's wave equation and the effect of temperature on Fermi-Dirac Distribution, Kronig Penny model.

UNIT – I

Interference And Diffraction: Superposition principle, resultant amplitude, coherence, methods to obtain coherent sources, interference, Young's double slit experiment, interference in thin films by reflection, Newton's rings Experiment, Distinguish between Fraunhofer and Fresnel diffraction, diffraction at single slit (Qualitative and Quantitative(Phasors approach)), double slit, circular aperture, and multiple slits (grating)(Qualitative Approach). Resolution of spectral lines, Rayleigh criterion, resolving power of grating and telescope.

UNIT - II

Polarization: Polarization phenomenon, Brewster's Law and Malus law, examples, types of polarization, double refraction, Nicol prism, Quarter and Half wave plates

Lasers: Characteristics of Lasers – Spontaneous and Stimulated Emission of radiation, meta stable state, population inversion, lasing action, Einstein's coefficients and relation

between them — Ruby Laser – Helium-Neon Laser – Carbon dioxide laser - Semiconductor Laser – Applications of lasers.

UNIT - III

Fiber Optics: Principle of optical fiber – Acceptance angle and acceptance cone – Numerical aperture – - Types of fibers and refractive index profiles – Qualitative analysis of attenuation in optical fibers –Application of optical fibers.

Crystal Structures: Space lattice – Unit cell – Lattice parameter – Crystal systems – Bravais lattices Atomic radius – Co-ordination number - Structures and Packing fractions of Simple Cubic – Body Centered Cubic – Face Centered Cubic crystals – Hexagonal closed packed crystals - Structures of diamond, NaCl.

UNIT - IV

Directions, Planes And X-Rd: Miller Indices for Crystal planes and directions – Inter planar spacing of orthogonal crystal systems –Diffraction of X-rays by crystal planes and Bragg's law– Laue method – Powder method – Applications of X-ray diffraction

Bonding In Solids: Force and energy between two approaching atoms, primary and secondary bonds, binding energy and cohesive energy, Madelung constant, cohesive energy and Madelung constant for NaCl crystal.

Defects In Solids: Imperfections in crystals – Point defects (Vacancies, Interstitial and Impurities) Schottky and Frenkel defects – (with mathematical treatment)- Line imperfections – Edge and Screw dislocation – Burger vector – Surface defects and volume defects (Qualitative Treatment).

UNIT - V

Surface Physics: Surface Electronic structure(work function, thermionic emission, surface states, tangential surface transport), Electron Microscope, Scanning Tunneling Microscope.

Science and Technology Of Nanomaterials: Origin of nanotechnology – (Basic principles of Nanoscience and Technology) surface to volume ratio, quantum confinement – Fabrication of nano materials Bottom up fabrication: sol-gel and combustion methods – Top down fabrication: CVD and PVD methods– Characterization (XRD and TEM) - Applications of nanotechnology.

TEXT BOOKS:

- (1) Introduction to Solid State Physics by Charles Kittel : John Wiley and Sons
- (2) Physics vol.2, by Halliday, Resnick and Krane; John Wiley and Sons
- (3) Applied Physics by P.K.Mittal, IK International Publishing House (P) Ltd.

REFERENCE BOOKS:

- (1) Engineering Physics by R.K.Gaur and S.L.Gupta; Dhanpat Rai and Sons
- (2) Solid State Physics by S.O.Pillai
- (3) Engineering Physics by M Chandra Shekar and P. Appala Naidu, VGS Book links.

(R11CHE1102) CHEMISTRY OF ENGINEERING MATERIALS

Course Objectives:

- Understand that a sustainable energy supply is needed for promoting economic development as well as protecting the environment.
- Understanding the significance of various Engineering materials like cement abrasives, adhesives and composites in structural enhancement of materials.
- Exposure to refractories and ceramics in industries and most recently, aerospace technology.
- Familiarize lubricants as a basic and fundamental necessity for the maintenance of any machines.

Course Outcomes:

At the end of the course student will be able to

- Acquire knowledge of the types of fuels, their sources and purification techniques.
- Understand the manufacturing process of cement, its properties and usage of abrasives, adhesives and composites in various industrial processes.
- Benefits of refractories as heat-resistant materials and applications of ceramics in various fields.
- Knowledge of lubricants in regard to their applications in various machines.

UNIT I:

Energy sources:

Fuels, classification – (solid, liquid, gaseous). Calorific value of fuel –HCV, LCV. Solid fuels – coal – analysis – proximate and ultimate analysis and their significance. Determination of calorific value by Bomb Calorimeter. Liquid fuels – petroleum, refining of petroleum, cracking, knocking, synthetic petrol – Bergius and Fischer- Tropsch's process; Gaseous fuels – natural gas, LPG, CNG: composition and uses. Biodiesel: properties and significance, analysis of flue gas by Orsat's method. Combustion –problems, determination of calorific value by Junker's gas calorimeter.

UNIT II:

Cement:

Types of cement, Chemical constituents and composition of Portland cement, methods of manufacture of Portland cement - Wet and Dry processes, Properties of cement: Setting

and Hardening of cement (reactions), testing of cement, decay of cement, cement concrete - RCC.

UNIT III:

Engineering materials:

III a) Abrasives: Introduction, types of abrasives, working of abrasives, classification and chemical composition of abrasives, and their applications.

III b) Adhesives: Introduction, Criteria of a good adhesive, classification of adhesives and their applications, advantages and disadvantages of adhesives.

UNIT IV:

Refractories and Ceramics:

Refractories: Definition, Classification with examples, Characteristics of a good refractory, causes for the failure of a refractory material, properties of refractories: refractoriness, RUL test, chemical inertness, Dimensional stability, Thermal expansion and contraction, Thermal conductivity, porosity, electrical conductivity, heat capacity, permeability, thermal spalling, texture.

Ceramics: Introduction, classification- glazed ceramics, and applications of ceramics.

UNIT V:

Lubricants:

Lubricants: Criteria of a good lubricant, classification of lubricants-lubricating oils, greases or semisolid lubricants, solid lubricants, mechanism of lubrication-fluid film lubrication, boundary lubrication, extreme pressure lubrication, properties of lubricants - Viscosity, Cloud point, pour point, flash and fire point, mechanical stability, saponification number, neutralization number, aniline point, oiliness and carbon residue.

TEXT BOOKS

1. Text book of Engineering Chemistry by Y.Bharathi Kumari, Jyotsna Cherukuri, VGS Book Links, Vijayawada.
2. Engineering Chemistry by P.C.Jain and Monica Jain, Dhanpatrai Publishing Company.
3. Text book of Engineering Chemistry by R.Gopalan, D.Venkappayya, Sulochana Nagarajan, Vikas Publishers

REFERENCES

1. Text book of Engineering Chemistry by Balram Pani, Galgotia Publications Pvt.Ltd.
2. Text book of Engineering Chemistry by S.S. Dhara and Mukkanti, S.Chand and Co. New Delhi.
3. Text book of Engineering Chemistry by C.P.Murthy, C.V.Agrawal, A.Naidu, B.S.Publications,Hyderabad.

(R11ITD1101) COMPUTER PROGRAMMING and DATA STRUCTURES

Course Objectives:

- Gain a working knowledge of C data structure programming
- Learn how to write modular, efficient and readable C and data structure programs
- Utilize pointers to efficiently solve problems
- Utilize searching and sorting concepts to solve problem
- Use functions from the portable C library

Course Outcomes:

- Understand the basic terminology used in computer programming.
- Write, compile and debug programs in C language
- Read, understand and trace the execution of programs .
- Use different data types in a computer program.
- Design programs involving decision structures, loops and functions.
- Explain the difference between call by value and call by reference
- Design programs using searching and sorting techniques.
- Understand the dynamics of memory by the use of pointers

UNIT – I

Introduction to Computers-Computer Systems, Computing Environments, Computer languages, creating and running programs, Software Development Methods.

UNIT – II

Algorithm / pseudo code, flowchart, program development steps, structure of C program, identifiers, basic data types, Constants, variables, operators, expressions, precedence and order of evaluation.

Input-output statements, if and switch statements, loops- while, do-while and for statements, break, continue, goto and labels, example C programs.

UNIT - III

Functions, basic concepts, parameter passing, storage classes, scope rules, user defined functions, standard library functions, recursive functions, example C programs.

Arrays- Basic concepts, one-dimensional and two-dimensional arrays, Character array, string handling functions, example C programs.

UNIT - IV

Derived types- structures- Basic concepts, nested structures, arrays of structures, program examples.

pointers- Basic concepts, pointers and functions, pointers and strings, pointers and arrays, pointers and structures, self referential structures, example C programs.

UNIT - V

Searching - Linear and binary search methods, sorting - Bubble sort, selection sort, Insertion sort.

Introduction to data structures, Dynamic memory allocation, stacks and queues-implementation using arrays.

TEXT BOOKS

1. Computer science, A structured programming approach using C, B.A. Forouzan and R.F. Gilberg, Third edition, Thomson.
2. The C Programming Language, B.W. Kernighan, Dennis M.Ritchie, PHI/Pearson Education
3. C Programming and Data structures, E.Balagurusamy, TMH.

REFERENCES

1. Data Structures Using C - A.S.Tanenbaum, Y. Langsam, and M.J. Augenstein, PHI/Pearson Education.
2. Programming in C - Stephen G. Kochan, III Edition, Pearson Eductaion.
3. Data Structures and Program Design in C, R.Kruse, C.L. Tondo, BP Leung, Shashi M, Second Edition, Pearson Education.

(R11CED1101) ENGINEERING MECHANICS - I

Course Objectives:

- Classify the various types of forces, computes the moment of a force and draw FBD.
- Know various types of friction and the laws of friction
- Distinguish between centroid, centre of mass and centre of gravity.
- Understand the concept of area moment of inertia and mass moment of inertia.

Course Outcomes:

At the end of the course, it is expected that students should be able to

- Calculate the resultant of coplanar concurrent and non-concurrent forces.
- Analyze the bodies on rough horizontal and inclined planes.
- Determine the centroid of composite areas, centre of gravity of composite bodies.
- Determine the moment of inertia of simple areas and mass MI of simple bodies.

UNIT – I

Forces : Introduction to Engineering Mechanics – Basic Concepts, Classification of a force system, Parallelogram law of forces, Triangle law of forces, Polygon law of forces, Lami's theorem, Free Body Diagram, Resultant, Equilibrant, Resultant of coplanar concurrent forces, Equilibrium of coplanar concurrent forces.

UNIT – II

Moments : Moment of a force, Varignon's principle, Parallel forces, Resultant of parallel forces, Couple, Moment of a couple about any point lying in the plane, Resolution of a force into a force-couple and viceversa, Resultant of coplanar non-concurrent forces, Equilibrium of coplanar non-concurrent forces.

UNIT - III

Friction : Types of Friction, Limiting Friction, Laws of Friction, Equilibrium of bodies on rough horizontal and inclined planes, Ladder friction.

UNIT – IV

Centroid, Centre of Mass, Centre of Gravity : Centroids of simple figures (from basic principles) – Centroids of composite figures and built-up sections, Centre of mass of simple bodies, Centre of gravity of simple bodies, Centre of gravity of composite bodies, Pappus theorems.

UNIT – V

Area Moment of Inertia : Introduction, Inertia, Inertia of areas, Rotation of areas, Radius of gyration, Polar moment of inertia, Parallel axis theorem, Perpendicular axis theorem, Moments of inertia of simple figures and composite figures.

TEXT BOOKS :

1. Engineering Mechanics by Timoshenko and Young, Tata Mc-Graw Hill Publishers
2. Engineering Mechanics by S.S. Bhavikatti, New age International Publishers
3. Engineering Mechanics by R.K. Bansal, Laxmi Publishers

REFERENCES :

1. Singer's Engineering Mechanics by K. Vijaya Kumar Reddy ,BS Publishers
2. Engineering Mechanics (Statics) by Meriam and Kraige, John Wilay Publishers
3. Engineering Mechanics by Tayal, Umesh Publishers

(R11EEE1130) ELEMENTS OF ENGINEERING

Course Objectives:

- Describe the importance of Electrical Power Generation and Transmission.
- Understand the utilization of electrical energy in illumination and traction systems
- Understand the conventional, non-conventional and renewable energy sources
- Understands the surface and air vehicles and their parts

Course Outcomes:

- Understand the principle of Power Generation using Steam and Hydel Power Plants.
- Appreciate the utilization of Electrical Energy in heating, welding, illumination and traction systems.
- Acquire the knowledge of power systems
- Understand the motor transport vehicles

Elements of Civil Engineering

UNIT-I

Construction and Facilities

Introduction: Impact of Infrastructural development on the economy of a country, role of civil engineers, importance of planning, scheduling in construction management

Surveying: Linear measurements, elevation measurements, areas, volumes, and modern tools of surveying like total station, GPS, and GIS.

Construction Materials: Importance of civil engineering materials like stones, bricks, cement, timber, reinforcing steel, paints, glass in construction

Soils and foundations: Types of soils, SBC of soils, suitable foundations for structures like buildings, bridges and towers.

Roads and Highways: Camber, stopping sight distance, overtaking sight distance, BOT projects.

Planning of buildings: Building byelaws and regulations, planning of residential and commercial facilities like institutes, hospitals, shopping malls and theatres

Dams and Reservoir: Water requirements and its conservation, hydraulic structures of storage and water conveyance systems

Elements of Electrical Engineering

UNIT-II

Electrical Power Systems

Electrical power generation concept-A.C Generator-principle; Steam Power Plant (thermal power plant); Hydel Power Plant (layouts only); Efficiency- Transformer-principle-need-types; Fuse -Substation-simple problems

UNIT-III

Utilization of Electrical Energy

Electrical heating-advantages-resistance heating-Illumination-definitions-laws of illumination-working of Incandescent lamp and Fluorescent lamps-Electric Welding-Electric Traction-Block diagram-Simplified speed-time curve-Energy meter (Principle only)

Elements of Mechanical Engineering

UNIT-IV

Power (Energy) Systems

Block diagram of a power system; sources of energy; conventional, non-conventional and renewable energy, application, resource availability; power produced, torque, speed, and efficiency; Materials used in turbine shafts, blades, nozzles; diagnostics and condition monitoring, commercial feasibility of power systems.(Turbine)

UNIT-V

Transport Vehicles (Surface and Air)

Road Vehicles – Power plant in vehicles, transmission, steering, chassis, body, wheels and axles

Rail vehicles - Distinction of rail vehicles from road vehicles Air vehicles - Aeroplane and its parts

Space vehicles - Rockets, 2 stage, 3 stage and 4 stage rockets, solid and liquid fuels Sea Vehicles – Power plant, transmission, steering, hull

Text Books

1. Electrical Engineering fundamentals by Vincent Deltora, Prentice hall of India,
2. Art and Science of Utilization of Electrical Energy by H.Partap, Dhanpat Rai and Co
3. Non-conventional Sources of Energy Systems by G.D. Roy, Standard Publishers
4. Automobile Engineering by Crouse, McGraw-Hill IPublishers

Reference Books:

1. Utilization of Electrical Energy by G.C.Garg, Khanna Publishers
2. Electrical Power Systems by Soni, Guptha, Batnagar, New Age International
3. Generation and Utilization of Electrical Energy by C.L Wadhwa, Turnbridge Wells : New Academic Science

I Year B. Tech CE - I Sem

L	T/P/D	C
2	3	2

(R11CED1102) ENGINEERING GRAPHICS – I

Course Objectives:

- Learn basic Auto Cad skills.
- Learn basic engineering drawing formats.
- Learn various curves used in engineering practice & types of scales.
- Learn orthographic projections and projection of planes & solids.

Course Outcomes:

- Draw two dimensional drawings using Auto Cad.
- Draw various curves used in engineering practice & types of scales.
- Draw orthographic projections and projection of planes and solids.

UNIT- I

Introduction to Engineering Drawing:

Principles of engineering graphics and their significance - Drawing instruments and their uses -conventions in drawing-lettering – BIS Convention, Different types of scales, scale of chords.

UNIT – II

Curves Used In Engineering Practice and Their Construction:

Ellipse, parabola, hyperbola and rectangular hyperbola-cycloid, epicycloids, hypocycloid – involutes.

UNIT- III

Orthographic Projection:

Points and straight lines inclined to both planes, true lengths and traces.

UNIT- IV

Projection of Planes:

Projection of regular planes inclined to both planes - auxiliary projections.

UNIT- V

Projection of Solids

Projection of regular solids-inclined to both planes - auxiliary projections.

TEXT BOOKS :

1. Elementary engineering drawing by N.D.Bhat, Charotar Publishing House Pvt.Limited
2. Engineering drawing and graphics by Narayana and Kannaiah, Scitech publishers
3. Engineering graphics for degree by K.C.John, PHI learning Publishers

REFERENCES

1. Engineering Drawing by M. B. Shah, Pearson Education India
2. Engineering Drawing and Graphics by K Venugopal, New Age International
3. Engineering Drawing by Guptha,IK International Pvt.Limited

VNR Vignana Jyothi Institute of Engineering and Technology

I Year B. Tech CE- I Sem

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2

(R11EPC1201) ENGG. PHYSICS and CHEMISTRY LAB

Course Objectives:

- To practically learn interaction of light with matter through physical phenomena like interference, diffraction and dispersion.
- To expose to the principle of superposition and resonance.
- To demonstrate the formation of standing waves and to understand the mechanical wave behavior and to determine Rigidity Modulus of different materials of wires .
- To demonstrate basic discharge phenomenon in capacitors and to know the characteristics of the circuit elements, like resistors, capacitors and inductors.

Course Outcomes:

After completion of the course, the students will be able to

- Understand clearly the interference principle in wave theory of light and able to relate it to the formation of Newton Rings and Obtain a pure spectrum when light passes through prism
- Understand the formation and propagation of mechanical waves
- Study simple oscillations of a load attached to a string and relate it to nature of material of string
- Understand the physical significance of time constant and related uses

ENGINEERING PHYSICS LABORATORY

Any Eight Experiments from the following:

1. Dispersive Power of the material of a Prism using Spectrometer
2. Diffraction Grating (both with Laser and non-laser source)
3. Single Slit with laser light
4. Newton's Rings
5. Finding thickness of a thin wire or sheet by forming a wedged shaped film
6. Energy gap of a semiconductor material
7. Torsional Pendulum Expt. to determine the rigidity modulus of material of a wire
8. Melde's experiment
9. Sonometer Experiment
10. Numerical Aperture and Acceptance angle of an optical fiber cable
11. Stewart Gee's experiment

12. Characteristics of LED.
13. Photo cell/ Solar Cell

Book: Essential Practical Lab Manual of Physics: by P.Raghavendra Rao

ENGINEERING CHEMISTRY: LIST OF EXPERIMENTS

1. Titrimetry

- a) Estimation of hardness of water by EDTA method.

2. Instrumental methods

(i) Conductometry

- a) Conductometric titration of strong acid Vs Strong base

(ii) Colorimetry

- a) Estimation of copper by colorimetric method

(iii) Potentiometry

- a) Titration of strong acid Vs Strong base by potentiometry

3. Physical properties

- a) Determination of viscosity of sample oil by Redwood viscometer.

4. Preparation of organic compounds

- a) Preparation of aspirin or Thiokol rubber

TEXT BOOKS:

1. Laboratory Manual on Engineering Chemistry by S.K.Bhasin and Sudha Rani, Dhanpat Rai Publishing Company.
2. Laboratory Manual on Engineering Chemistry by Y.Bharathi Kumari, Jyotsna Cherukuri, VGS Book Links, Vijayawada

(R11ITD1201) COMPUTER PROGRAMMING AND DATA STRUCTURES LABORATORY

Course Objectives

- Gain a working knowledge of C data structure programming
- Learn how to write modular, efficient and readable C and data structure programs
- Utilize pointers to efficiently solve problems
- Utilize searching and sorting concepts to solve problem
- Use functions from the portable C library

Course Outcomes

- Understand the basic terminology used in computer programming.
- write, compile and debug programs in C language
 - Read, understand and trace the execution of programs .
 - Use different data types in a computer program.
 - Design programs involving decision structures, loops and functions.

Week 1

1. Write a program that reads three different integers from the keyboard and prints – sum, average, product, smallest, largest of the numbers.
2. Write a program that reads two integers and prints – difference, quotient and remainder
3. WAP that reads two integers and determines whether the first is a multiple of the other

Week 2

1. Write a C program to find the sum of individual digits of a positive integer.
2. Write a C program for Fibonacci sequence.
3. Write a C program to generate the first n terms of the sequence.
4. Write a C program to generate all the prime numbers between 1 and n,
where n is a value supplied by the user.

Week 3

1. Write a C program to calculate the following Sum:
Sum= $1-x^2/2! +x^4/4!-x^6/6!+x^8/8!-x^{10}/10!$

2. Write a C program to find the roots of a quadratic equation.

Week 4

1. Write C programs that use both recursive and non-recursive functions
 - i) To find the factorial of a given integer.
 - ii) To find the GCD (greatest common divisor) of two given integers.
 - iii) To solve Towers of Hanoi problem.

Week 5

1. Write a C program, which takes two integer operands and one operator from the user, performs the operation and then prints the result. (Consider the operators +, -, *, /, % and use Switch Statement)
2. Write a program to print a given number [0-1000] in words. For example, 123 as One Hundred and Twenty Three

Week 6

1. WAP to check whether a given number is an Armstrong, Palindrome, Perfect, Prime, or a Fibonacci Number
2. Write a C program to find both the largest and smallest number in a list of integers

Week 7

1. Write a C program to generate Pascal's triangle.
2. Write a C program to construct a pyramid of numbers.

Week 8

1. Write a C program to calculate
 - i) Minimum and maximum of an 1-d array
 - ii) Sorting an array
 - iii) Searching an array

Week 9

1. Write a C program that uses functions to perform the following:
 - i) Addition of Two Matrices
 - ii) Multiplication of Two Matrices

iii) To find the determinant of a 3 by 3 matrix

Week 10

1. Write a C program that uses functions to perform the following operations using Pointers:
 - i) To insert a sub-string in to a given main string from a given position.
 - ii) To delete n Characters from a given position in a given string.
 - iii) To reverse a given string

Week 11

1. Write C Programs to implement Structures and Nested structures with suitable Examples
(Students has to practice with relevant examples taught in the class room)

Week 12

1. Write C Programs using Pointers and Pointer Arithmetic operations
2. Write C Programs using Pointers to structures, Pointers to Arrays and Pointers to strings

(Students has to practice with relevant examples taught in the class room)

Week 13

1. Write C Programs to implement the following sorting algorithms
 - a. Bubble Sort
 - b. Selection sort
 - c. Insertion Sort

Week 14

1. Write a C program to implement STACK and QUEUE operations using Arrays

Week 15

1. Write a C programs to implement the following searching techniques.
 - a. Linear Search
 - b. Binary Search

Week 16 Lab Internal Examination

I Year B. Tech CE - II Sem

L	T/P/D	C
3	1	3

(R11MTH1102) MATHEMATICS – II
(Linear Algebra and Ordinary Differential Equations)

Course Objectives:

- Understand the Echelon form and Normal form of a matrix and its applications in solving linear system of equations.
- Understand the methods of solving first order differential equations and learn about its applications to L-R and R-C circuits.
- Apply the convolution theorem to evaluate Laplace Transform of the functions.
- Apply Z-Transforms in solving the difference equations.

Course Outcomes:

- Find the rank using Echelon form and Normal form.
- Solve the problems in first order and second order differential equations.
- Learn Laplace Transform as a tool.
- Evaluate the Z-Transform of the given function

LINEAR ALGEBRA

UNIT I

Solution of linear systems

Matrices and linear systems of equations - elementary row transformations, Rank Echelon form, and normal form; Solution of linear systems - direct methods - LU decomposition, LU decomposition from Gauss elimination, and solution of Tri-diagonal systems; Eigen values, eigen vectors, and their properties - Linear dependence and independence; Cayley-Hamilton theorem - inverse and powers of a matrix by Cayley-Hamilton theorem, diagonalization of a matrix, calculation of powers of a matrix; Modal and spectral matrices.

UNIT II

Linear transformations

Real matrices - symmetric, skew symmetric, and orthogonal linear transformation; Complex matrices - Hermitian, Skew-Hermitian and unitary matrices; Eigen values and eigen vectors of complex matrices and their properties; Quadratic forms - reduction of quadratic form to canonical form, rank, positive, negative definite, semi definite, index, signature, Sylvester law, and singular value decomposition.

ORDINARY DIFFERENTIAL EQUATIONS

UNIT III

Ordinary differential equations and their applications

Differential equations of first order and first degree - Linear, Bernoulli and exact differential equation; Applications of differential equations of first order and first degree - Newton's law of cooling, Law of natural growth and decay, Orthogonal trajectories, and basic circuits.

UNIT IV

Differential equations of higher order and their applications

Differential equations of higher order - homogeneous and non-homogeneous type, differential equations of second order and higher order with constant coefficients with right hand side term of the type e^{ax} , $\sin(ax)$, $\cos(ax)$, polynomials in x , $e^{ax} V(x)$, $x V(x)$, and method of variation of parameters; Applications to bending of beams; Mechanical systems - Simple harmonic motion.

UNIT V

Linear differential equations and qualitative methods

Cauchy's linear differential equation; Legendre's differential equations; Simultaneous linear differential equations; The phase plane; Phase portraits and direction fields; Critical points and stability.

TEXT BOOKS

1. Advanced Engineering Mathematics - R.K Jain and S.R.K Iyengar, 3rd edition, Narosa Publications, 2011.
2. Differential Equations - Dennis G. Zill, Cengage learning, 2011.

REFERENCES

1. Advanced Engineering Mathematics - Erwin Kreyszig, 8th edition, *John Wiley*.
2. Advanced Engineering Mathematics - Peter V. O'Neil, 9th Edition, *Cengage Learning*.
3. Elementary Differential Equations and Boundary Value Problems - William E. Boyce and Richard C. Diprima, *Wiley*.
4. Linear Algebra and its applications - David C Clay, *Pearson Education*.
5. Differential Equations, with Applications and Historical Notes - George F. Simmons and John S. Robertson, 2nd Edition, *Tata McGraw Hill*, 2008.
6. Advanced Engineering Mathematics - Dennis G. Zill, Warren S. Wright, and Michael R. Cullen, 4th edition, *Jones & Bartlett Learning*.

I Year B. Tech CE - II Sem

L	T/P/D	C
3	1	3

(R11MTH1104) NUMERICAL ANALYSIS AND LINEAR PROGRAMMING

Course objectives:

- Understand the numerical methods for non linear systems, evaluating definite integrals and ordinary differential equations.
- Understand various methods of interpolation.
- Understand the simplex method and methods to solve the transportation problem.

Course outcomes:

- Learn the numerical methods to find a root of algebraic and transcendental equations.
- Apply the numerical methods to find the solutions of ordinary differential equations.
- Use simplex method procedure to optimize a linear function.
- Solve transportation problems

NUMERICAL ANALYSIS

UNIT I

Solutions of non-linear systems

Introduction; Mathematical preliminaries; Solution of algebraic and transcendental equations – the bisection method, the method of false position, the iteration method, Newton - Raphson method, and order of convergence.

UNIT II

Interpolation

Introduction; Errors in polynomial interpolation; Finite differences; Forward differences; Backward differences; Central differences; Symbolic relations and separation of symbols; Differences of a polynomial; Newton's formulae for interpolation; Central difference interpolation formulae; Gauss's central difference formulae; Lagrange and Hermite interpolation formulae; Cubic spline interpolation.

UNIT III

Numerical differentiation and Integration

Introduction; Differentiation of equally and unequally spaced data, and finite difference approximations; Trapezoidal rule, Simpson's 1/3 rule, and Simpson's 3/8 rule.

Numerical solutions of ordinary differential equations

Solution of initial value problems by Taylor's series - Picard's method of successive approximations, Euler's method, and Runge - Kutta methods; Predictor Corrector methods – Adams-Bashforth-Moulton method.

UNIT IV

Numerical solutions of partial differential equations (PDE)

Introduction; Classification of second order PDE; finite difference approximations to derivatives; Solution of Laplace and Poisson equation - Jacobi's method, Gauss-Seidal method by Leibmann's, Solution of parabolic equations (heat equation) by explicit and Crank Nicolson implicit scheme method; Solution of hyperbolic equations (wave equation).

LINEAR PROGRAMMING

UNIT V

Linear programming

Basic concepts; formulation of linear programming problem; constrained optimization-linear programming - simplex method, dual simplex method, and transportation problems.

TEXT BOOKS

1. Introduction to Numerical Analysis - S.S.Sastry, *PHI*, 2010.
2. Operations Research - Prem Kumar Gupta and D.S.Hira, *S.Chand*, 2003.

REFERENCES

1. Advanced Engineering Mathematics - Erwin Kreyszig, 8th Edition, *John Wiley and Sons*.
2. Advanced Engineering Mathematics - Peter V. O'Neil, 9th Edition, *Cengage Learning*.
3. Elementary Numerical Analysis – an algorithmic approach - Samuel D. Conte and Carl De Boor, 3rd edition, *Tata McGraw Hill*, 2006.
4. *Numerical Analysis* - R.L Burden and J.D Faires, , 7th edition, *Thomson*, 2007.

(R11PHY1102) ENGINEERING PHYSICS-II

Course Objectives:

- To learn the structure of solids, crystal systems, packing and arrangement of particles in crystals, simple planes and directions in solids, defects in crystals
- To learn the properties of magnetic materials and classification, Dielectric materials
- To learn the concept and applications of superconductors
- To introduce new concepts like surface phenomena and nano science.

Course Outcomes:

After completion of the course, the students will be able to:

- Identify different crystal types, various planes and directions in crystals and estimate one dimensional crystal defects
- Learn the magnetic properties of materials & classify the magnetic materials into Dia, Para and ferro.
- Learn the characteristics, properties and applications of superconductors and magnetic materials
- Realize surface phenomena are different from bulk; learn methods to estimate work functions and Compare optical and electron microscopes and learn principles of SEM&TEM

UNIT - I

Elements Of Statistical Mechanics: Maxwell-Boltzmann, Bose-Einstein and Fermi-Dirac statistics (non mathematical treatment) – Photon gas –Planck's law of black body radiation – Deduction of Wein's law and Rayleigh-Jeans law from Plank's law.

Principles Of Quantum Mechanics: Waves and particles – De Broglie hypothesis - Matter waves - Davisson and Germer experiment –Heisenberg's uncertainty principle - Schrodinger Wave Equation – Wave function and its Physical Significance - Particle in one dimensional potential box(wave functions, probability densities and energy states).

UNIT - II

Free Electron Fermi Gas: Energy levels in one dimension, Effect of temperature on the Fermi-Dirac distribution, Free electron gas in three dimensions, electrical conductivity and Ohm's law, Electrical Resistivity of Metals (Qualitative), thermal conductivity of metals.

Band Theory Of Solids: Electron in a periodic potential – Bloch Theorem - Kronig-Penney model (non mathematical treatment) – Origin of energy band formation in solids –

Classification of materials into conductors, semiconductors and Insulators - Concept of effective mass of an electron.

UNIT- III

Semiconductor Physics: Fermi level in Intrinsic and Extrinsic semiconductors - Intrinsic semiconductor and carrier concentration – Extrinsic semiconductor and carrier concentration – Equation of continuity – Direct and indirect band gap semiconductors - Hall effect.

Physics Of Semiconductor Devices: Formation of p-n junction – open circuit p-n junction – Energy diagram of diode – i/v characteristics of p-n junction diode – p-n diode as a rectifier – Diode equation – LED

UNIT- IV

Magnetic Properties: Permeability, Field intensity, magnetic field induction, Magnetization and Magnetic susceptibility – Origin of magnetic moment, Bohr magneton – Classification of magnetic materials (Dia, Para and Ferro)- Domain theory of ferromagnetism, Hysteresis curve – Soft and Hard magnetic materials – properties of Anti ferro and Ferri magnetic materials – Ferrites and their applications.

UNIT V

Superconductors: Experimental survey and superconductivity phenomenon, – Meissner effect – Critical fields and Persistent currents, Type I and Type II superconductors - London equations- flux quantization, BCS theory, Josephson effect – High temperature Superconductors, Applications of Superconductors.

Dielectric Properties: Electric dipole, Dipole moment, Dielectric constant, Electronic, Ionic and Orientation Polarization – Calculation of Polarizabilities – Internal fields – Clausius – Mossotti equation –Piezo and Ferro electricity

TEXT BOOKS:

- (1) Introduction to Solid State Physics by Charles Kittel (Publishers: John Wiley and Sons) for units 2 to 5
- (2) Concepts of Modern physics by Arthur Beiser, McGraw Hill Inc.
- (3) Applied Physics by P.K.Mittal, IK International Publishing House (P) Ltd

REFERENCES

1. Solid State Physics by S.O.Pillai, New Age Publishers
2. Solid State Physics by A.J.Dekker; Macmillan Publishers India Ltd.
3. Engineering Physics by Dr M Chandra Shekar and Dr P. Appala Naidu, VGS Book links.

(R11HAS1101) ENGLISH

Introduction

This is the age of information and communication technologies. Engineers and technical professionals need to convey technical information in English for various purposes.

Besides learning general English as an international language, engineering students need to be equipped with adequate writing ability so that they can communicate technical information clearly on at least a basic level. A good English writing proficiency can be a contributing factor to professional recognition and career prospects. This course teaches those writing strategies that scientists, engineers, and others will need in order to write successfully on the job. It initiates the students into Technical Writing. The purposes of technical writing are to inform and persuade. This program aims to train students in writing clear, concise and effective English.

This Syllabus is therefore, a Pragmatic English Writing Program for engineering students with intermediate proficiency. The program covers a syllabus outline and instructional approaches on basic writing skills with particular reference to technical writing.

Course Objectives:

- i) To equip the students with all the LSRW skills for advanced writing and speaking.
- ii) To equip the students with basic grammar, infrastructural patterns and grammatical constructions required of in technical writing.
- iii) To acquaint the students with the writing process, beginning with paragraph writing. This would prepare them for academic and workplace writing.
- iv) Equip the students with Oral Communication Skills.

Course Outcomes:

- i) Comprehend technical writing produced in the engineering profession
- ii) Understand the writing process and create logical paragraphs
- iii) Use infrastructural patterns in writing and speaking

Methodology

A Task-based, process oriented methodology will be used by the teachers to give a practical orientation to the teaching of language. An inductive approach will be used to demonstrate the use of language in context. This should enable the students to internalize the language

structures and vocabulary used in context. Students will be exposed to numerous examples and ample practice will be given in the contextual use of language structures.

Syllabus Outline

Unit I : Prose

1. Heaven's Gate by Pico Iyer
2. The Connoisseur by Nergis Dalal

Unit II : Basic Grammar

- | | |
|----------------------------|-------------------------------------|
| i) Common Errors | v) Use of Articles and Prepositions |
| ii) Subject-Verb Agreement | vi) Conjunctions |
| iii) Adverbs | vii) pronoun reference |
| iv) Transitional elements | |

Unit III Reading and Writing Skills

- | | |
|--------------------------|-----------------------------|
| i) Reading Comprehension | vi) Synonyms and Antonyms |
| ii) Paragraph Writing | vii) One Word Substitutes |
| iii) Letter Writing | viii) Prefixes and Suffixes |
| iv) Memo Writing | ix) Idioms and Phrases |
| v) Words often Confused | |

Unit IV : Prose

1. The Cuddalore Experience by Anu George
2. The Odds Against Us by Satyajit Ray

Unit V : Technical Writing Component

- A. Definition of a Technical Term
- B. Description of a Mechanism
- C. Description of a Technical Process
- D. Classification
- E. Cause and Effect
- F. Comparison and Contrast
- G. Analogy

Text Books

1. Ashraf Rizvi, Effective Technical Communication

2. M. Raman and S. Sharma, Technical Communication : Principles and Practices, OUP, (Indian Edition)

References

1. Gerson Sharon J. and Steven Gerson : Technical Writing Process and Product. 3rd edition, New Jersey: Prentice Hall 1999
2. Blanton, L.L. 1993; Composition Practice, Book 4 ,Second Edition, Heinle and Heinle Publishers, pp. 54
3. Georges, T.M. 1996; A course in Analytical Writing for Science and Technology, <http://www.mspiggy.etl.noaa.gov/write/>
4. Glendinning, E.H. and Glendinning, N. 1995; Oxford English for Electrical and Mechanical Engineering, Oxford University Press, pp.28,68,83
5. Greaney, G.L. 1997; Less is More: Summary Writing and Sentence Structure in the Advanced ESL Classroom, The Internet TESL Journal, Vol.III, No.9 <http://iteslj.org/Techniques/Greaney-Writing.html>
6. Neufeld, J.K. 1987; A Handbook for Technical Communication, Prentice-Hall, Inc. pp.20,65-68
7. Yalden, J. 1987; Principles of Course Design for Language Teaching, Cambridge University Press
8. David F. Beer and David McMurrey, Guide to Writing as an Engineer, 2nd ed., Wiley, 2004, ISBN: 0471430749.
9. Dale Jungk, Applied Writing for Technicians, McGraw-Hill, 2005, ISBN 0-07-828357-4.
10. Diane Hacker, Pocket Style Manual, Bedford/St. Martin's, 2003, ISBN: 0312406843.

(R11CHE1101) ENGINEERING CHEMISTRY

Course Objectives:

- Understand electrochemistry which deals with the utilization of electrical energy of an external source for bringing about a physical or chemical change.
- Knowledge of “Corrosion engineering education” and Usage of polymers in modern world as an integral part of every human’s life.
- Knowledge of purification techniques and various applications of soft water in industries.
- Usage of nanomaterials as emerging scientific components with amazing potential applications in various fields.

Course Outcomes:

- Visualize the chemical applications of electricity.
- Prevention of corrosion of metals and applications of polymers from domestic articles to sophisticated scientific and medical instruments.
- Benefits of treated water as source in steam generation and other fields like production of steel, paper, textiles, atomic energy etc.
- The applicability and greater efficiency of using a material at nanoscale in different engineering fields.

UNIT- I

Electrochemical cells and Batteries:

Cell representation, Galvanic cells, Single electrode potential, standard electrode potential, Electrochemical series, Nernst equation, Concentration cells. Reference electrodes – (Hydrogen, Calomel, Quinhydrone electrode), Ion Selective Electrodes (Glass Electrode and Fluoride Electrode), Numerical problems.

Batteries: Primary and secondary cells, (lead-Acid cell, Ni-Cd cell, Lithium cells). Applications of batteries. Fuel cells – Hydrogen – Oxygen fuel cells, Advantages of fuel cells. Solar cells: working, principle and applications.

UNIT- II

Corrosion and its control: Introduction, causes and different types of corrosion and effects of corrosion. Theories of corrosion – Chemical, Electrochemical corrosion, corrosion reactions, factors affecting corrosion – Nature of metal – galvanic series, over voltage, purity of metal, nature of oxide film, nature of corrosion product. Nature of environment -effect of temperature, effect of pH, Humidity, effect of oxidant. Corrosion control methods – cathodic

protection, sacrificial anode, impressed current cathode. Surface coatings – methods of application on metals - hot dipping, galvanizing, tinning, cladding, electroplating -Organic surface coatings – paints constituents and functions.

UNIT- III

Polymers:

III a).Polymers: Introduction, Types of Polymerization, Plastics: Thermoplastic resins and Thermoset resins. Compounding and fabrication of plastics, preparation, properties, engineering applications of: polyethylene, PVC, PS, Teflon, Bakelite, Nylon.

III b).Rubber: Characteristics and uses Rubber –Natural rubber, vulcanization. Elastomers – Buna-s, Butyl rubber, Thiokol rubbers, Fibers – polyester, Fiber reinforced plastics (FRP), applications.

UNIT- IV

Water: Introduction, Hardness: Causes, expression of hardness – units – types of hardness, estimation of temporary and permanent hardness of water, numerical problems. Boiler troubles – Scale and sludge formation, caustic embrittlement, corrosion, priming and foaming Softening of water (Internal and external treatment-Lime soda, Zeolite, Ion exchange process and Numerical problems) Reverse osmosis, Electro dialysis.

UNIT- V

Nano-materials: Introduction, preparation and applications of nanomaterials with special reference to Carbon nano tubes.

Insulators: Classification of insulators, characteristics of thermal and electrical insulators and applications of Superconductors (Nb-Sn alloy, $YBa_2Cu_3O_{7-x}$).

TEXT BOOKS

1. Text book of Engineering Chemistry by Y.Bharathi Kumari, Jyotsna Cherukuri, VGS Book Links, Vijayawada.
2. Engineering Chemistry by P.C.Jain and Monica Jain, Dhanpatrai Publishing Company.

REFERENCES

1. Text book of Engineering Chemistry by S.S. Dhara and Mukkanti, S.Chand and Co. New Delhi.
2. Text book of Engineering Chemistry by C.P.Murthy, C.V.Agrawal, A.Naidu, B.S.Publications,Hyderabad.
3. Text book of Engineering Chemistry by R.Gopalan,D.Venkappayya,Sulochana Nagarajan, Vikas Publishers.

(R11CED1103) ENGINEERING MECHANICS - II

Course Objectives:

- To know the various assumptions in the analysis of trusses and types of trusses.
- To understand the principle of virtual work and its applications.
- To differentiate between statics and dynamics & kinematics and kinetics
- To know the work-energy principle and impulse-momentum principle.

Course Outcomes:

- Calculate the member forces in trusses using method of joints and method of sections.
- Calculate the reactions in beams and frames using the virtual work principle.
- Learn the kinematics of particles and kinematics of rigid body problems.
- Learn the kinetics of particles and kinetics of rigid body problems

UNIT – I

Trusses : Types of frames – Assumptions for forces in members of a perfect frame, Method of Joints, Method of Sections, Force table, Cantilever Trusses, Trusses with one end hinged and the other freely supported on rollers carrying horizontal or inclined loads.

UNIT – II

Virtual work : Concept of virtual work, Principle of virtual work, Application of principle of virtual work to beams, ladders, framed structures.

UNIT – III

Kinematics : Kinematics of particles - Rectilinear and Curvilinear motions, Projectiles, Kinematics of rigid bodies

UNIT - IV

Kinetics : Kinetics of particles – Newton's Second Law, D'Alembert's Principle, Kinetics of rigid bodies

UNIT – V

Work–Energy, Impulse–Momentum method : Work of a force, Principle of Work and Energy, Application of principle of Work-Energy, Impulse-Momentum Principle, Application of Impulse-Momentum principle to connected bodies.

TEXT BOOKS :

- 1.Engineering Mechanics by Timoshenko and Young,Tata Mc-Graw Hill Publishers
- 2.Engineering Mechanics by S.S. Bhavikatti, New age International Publishers
- 3.Engineering Mechanics by R.K. Bansal, Laxmi Publishersl

REFERENCES :

- 1.Singer's Engineering Mechanics by K. Vijaya Kumar Reddy ,BS Publishers
- 2.Engineering Mechanics (Statics) by Meriam and Kraige, John Wilay Publishers
- 3.Engineering Mechanics by Tayal, Umesh Publishers

1.

(R11CED1104) ENGINEERING GRAPHICS - II

Course Objectives:

- Learn Sections and Sectional views of prisms, pyramids, cylinders and cones.
- Learn development of surfaces of regular solids prisms, pyramids, cylinders and cones.
- Learn Isometric projections.
- Learn Transformation of Projections & Perspective Projections

Course Outcomes:

- Draw Sections and Sectional views of prisms, pyramids, cylinders and cones.
- Draw development of surfaces of solids prisms, pyramids, cylinders and cones.
- Draw Isometric projections.
- Draw Transformation of Projections & Perspective Projections.

UNIT-I

UNIT-I

Sections and Sectional Views:

Sections of right regular solids-prisms, pyramids, cylinders and cones – auxiliary views

UNIT-II

Development of Surfaces And Intersection Of Surfaces

Development of surfaces of right regular solids prisms, pyramids, cylinders and cones.

Intersection of prism Vs prism, cylinder Vs prism, cylinder Vs cylinder, and cylinder Vs cone

UNIT-III

Isometric Projections:

Principles of isometric projections, Isometric scale, isometric views, conventions, isometric views of lines, planes, simple and compound solids, isometric views of objects having spherical parts.

UNIT-IV

Transformation Of Projections:

Conversion of isometric views to orthographic views-conventions and vice versa.

UNIT-V

Perspective Projections:

Perspective view of points, lines, plane figures and simple solids, vanishing point method and visual ray method

Introduction To Auto Cad

TEXT BOOKS

- 1 Elementary engineering drawing by N.D.Bhat, Charotar Publishing House Pvt.Limited
- 2 Engineering drawing and graphics by Narayana and Kannaiah, Scitech publishers
- 3 Engineering graphics for degree by K.C.John, PHI learning Publishers

REFERENCES

1. Engineering Drawing by M. B. Shah, Pearson Education India
2. Engineering Drawing and Graphics by K Venugopal, New Age International
3. Engineering Drawing by Guptha,IK International Pvt.Limited

VNR Vignana Jyothi Institute of Engineering and Technology

I Year B. Tech CE - II Sem

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(R11MED1201) ENGINEERING WORKSHOP

(12 Weeks+4 Weeks)

Course Prerequisites:

- To study/demonstrate the concepts of computer
- To conduct the experiments related to production engineering technology.
- To demonstrate the usage of power tools, CNC lathe and machine shop for different exercises

Course Outcomes:

- Identify, assemble, disassemble, install and write commands for a given configuration of a computer.
- Develop the own components using the techniques of carpentry, tin smithy, forging, etc. listed in trades for exercises.
- Work out the given models in machine shop and CNC lathe.

TRADES FOR EXERCISES

At least two exercises from each trade:

1. Carpentry
2. Tin-Smithy
3. Fitting
4. Welding
5. Electrical Wiring

TRADES FOR DEMONSTRATION and EXPOSURE:

1. Power Tools in Construction, Wood Working, Electrical Engineering and Mechanical Engineering
2. Machine shop

IT Workshop: Computer Hardware: Identification of Parts, Assembling and disassembling

TEXT BOOKS

1. Work shop Manual - P.Kannaiah/ K.L.Narayana, Scitech Publishers.
2. Workshop Manual by Venkat Reddy.
3. Engineering Workshop Practice – V Ramesh Babu, VRB Publishers Pvt. Ltd.
- 4.. IT Essentials PC Hardware and Software Companion Guide Third Edition by Davis Anfinson and Ken Quamme – CISCO Press, Pearson Education.
5. PC Hardware and A+ Handbook – Kate J. Chase PHI (Microsoft)

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(R11HAS1203) ENGLISH LANGUAGE COMMUNICATION SKILLS LABORATORY

The English language Communication Skills Lab aims to provide practice in all the four skills of LSRW, and provide ample practice in listening and speaking skills.

Course Objectives:

- Provide ample practice in LSRW skills.
- Provide practice in grammatical construction, structural patterns, word usage and improve comprehension abilities in the students.
- Train students to use neutral pronunciation through phonetic sounds, symbols, stress and intonation.
- Enable students to transfer information from verbal to graphic representation and vice versa.
- Train students to use effective language for oral presentations, public speaking, role play and situational dialogue.

Course Outcomes:

- Comprehend spoken and written discourse.
- Speak fluently with neutral pronunciation and exhibit interpersonal skills.
- Write accurately, coherently and lucidly making appropriate use of words depending on context and present data clearly.
- Introduce one self to people and be able to speak extempore.

Syllabus for Lab Sessions

Unit 1

Multimedia Lab

1. Phonetics
2. Listening Comprehension
3. Vocabulary Lesson 1

Oral Communication Skills Lab: Self Introduction ; E-mail

Unit 2

Multimedia Lab

1. Grammar ---Nouns and Pronouns; The Present Tense 2. Vocabulary Lesson 2

3. Listening Skills

Oral Communication Skills Lab: Role Play/ Situational Dialogues

Unit 3

Multimedia Lab

1. Telephoning Skills 2. Grammar --- Articles; The Past Tense 3. Vocabulary Lesson 3

Oral Communication Skills Lab: JAM/ Short Talk

Unit 4

Multimedia Lab

1. Grammar ---- Concord; The Future Tense 2. Vocabulary Lesson 4

3. Listening Comprehension

Oral Communication Skills Lab: Information Transfer

Unit 5 Multimedia Lab

1. Grammar --- Adjectives, adverbs, conjunctions 2. Vocabulary -- Lesson 5

Oral Communication Skills Lab : Presentation Skills

Multimedia Lab Requirements

The English Language Lab shall have two parts:

i) **The Computer aided Language Lab** for 60 students with 60 systems, one master console,

LAN facility and English language software for self- study by learners.

ii) **The Communication Skills Lab** with movable chairs and audio-visual aids with a P.A System,

a T. V., a digital stereo –audio and video system and camcorder etc.

System Requirement (Hardware component):

Computer network with Lan with minimum 60 multimedia systems with the following specifications:

iv) P – IV Processor

- a) Speed – 2.8 GHZ
- b) RAM – 512 MB Minimum
- c) Hard Disk – 80 GB
- v) Headphones of High quality

5. Suggested Software:

The software consisting of the prescribed topics elaborated above should be procured and used.

Suggested Software:

- **Clarity Pronunciation Power – part II**
- **Oxford Advanced Learner's Compass, 7th Edition**
- **DELTA's key to the Next Generation TOEFL Test: Advanced Skill Practice.**

- **Lingua TOEFL CBT Insider, by Dreamtech**

- **TOEFL and GRE (KAPLAN, AARCO and BARRONS, USA, Cracking GRE by CLIFFS)**

(R11MTH1106) PROBABILITY AND STATISTICS

Course Objectives:

- To understand the elementary ideas in basic probability.
- To understand the different types of probability distribution functions
- To understand the basic concepts in estimation theory and test of hypothesis
- To understand the basic concepts of time series.

Course Outcomes:

Students will be able to

- Solve problems involving basic probability.
- Apply the knowledge of different probability distribution to Test of Hypothesis.
- Calculate correlation, regression coefficients.
- Use Least squares method to compute time series

UNIT I

Probability and Distributions

Sample space and events, Probability- The axioms of probability, some elementary theorems, conditional probability, Baye's theorem. Random variables - discrete and continuous. Distributions - Binomial, Poisson and Normal distributions–related properties.

UNIT II

Sampling Distributions and Testing of Hypothesis

Sampling distributions, sampling distribution of means (σ known and unknown). Point estimation, interval estimation. Tests of hypothesis - null hypothesis, alternate hypothesis, type I, type II errors, critical region. Inferences concerning means and proportions- Large samples- test of hypothesis for single mean and difference between the means. Test of hypothesis for the proportions- single and difference between the proportions, confidence interval for the mean and proportions.

UNIT III

Tests of significance- Small samples

Tests of significance-t distributions, confidence interval for the t- distribution, F-distributions and Chi square distributions.

UNIT IV

Correlation and Regression

Coefficient of correlation, regression coefficient, the lines of regression, rank correlation, correlation for bivariate frequency distributions.

UNIT V

Reliability theory and Time Series analysis

Basic concepts of reliability, Normal failure law, Exponential failure law, The Weibull failure law and reliability of systems. Time series- utility of time series analysis, components of time series. Preliminary adjustments before analyzing time series. Measurement of trend by the method of least squares.

TEXT BOOKS

1. Probability and Statistics for Engineers - Miller I.R. and Freund J.E, 5th Edition, Prentice-Hall, 1995.
2. Introductory Probability and Statistical Application – Meyer, 2nd edition, Oxford and Ibh, 1970.
3. Statistical Methods - S.P. Gupta, Sultan Chand and sons, 2011.

REFERENCES

1. Reliability Engineering- Balagurusamy E, Tata McGraw Hill , 1984.
2. Elements of Applied Stochastic processes- Bhat U.N, Wiley Series in Probability and Mathematical Statistics, 1983.

(R11CED1105) BUILDING MATERIALS

Course Objectives:

- Know the list of construction material.
- know about the construction techniques
- understands the building bye-laws
- Know insights in to smart building materials

Course Outcomes:

- Understand the Basic terminology that is used in the industry
- Know about the Prevention of damage measures and good workmanship
- Learn the properties of building materials and services

UNIT – I

Stones, Bricks And Tiles

Building stones – classification and quarrying – properties – structural requirements – dressing, Bricks – composition of Brick earth – manufacture and structural requirements- Tiles-Types of Tiles-Properties-Applications

UNIT – II

Cement and Admixtures

Cement Manufacturing-various types of cement and their properties – various field and laboratory tests for cement – Admixtures – mineral and chemical admixtures – uses.

UNIT – III

Wood, Aluminium And Steel

Wood – structure – types and properties – seasoning – classification of various types of woods used in buildings, defects in timber- Properties steel-composition-Applications- Corrosion of steel-Preventive measures-Manufacturing of Aluminium-Properties-Applications

.UNIT – IV

Foundations and Masonry

Foundations – shallow foundations – spread, combined, strap and mat foundations, Brick masonry – types – bonds, Stone masonry – types.

UNIT – V

Finishings and Formwork

Finishes – Plastering, pointing, painting, claddings – ACP, Requirements – Standards – formwork- Scaffolding – Types-Shoring- Underpinning.

TEXT BOOKS

1. Building Materials and Construction-AroraandBindra, Dhanpat Roy Publications
2. Building Materials by P. C. Varghese
3. Engineering Materials by S. C. Rangwala

REFERENCES

1. Building Materials by Duggal , New Age International
2. Building Materials by Gurucharan Singh
3. Building Materials by R. K. Rajput

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(R11CED1106) STRENGTH OF MATERIALS-I

Course Objectives:

- To understand various forces, various supports, deformation of the structures or member, combination of various loads.
- To find the difference in strengthening a member by increasing the cross sectional dimensions or making it unnecessarily large and uneconomical
- To predict the displacements or deformations due to various Loads and Load combinations.

Course Outcomes:

- To know the characteristic strengths of various materials used in construction, fabrication of various members.
- To know types of straining actions that will occur due to what type of Loadings.
- To articulate the geometry of the structure to avoid development of undesirable straining actions..
- To learn how to economize the structure by proper modification like making it composite member or pre-stressing it to introduce stresses of opposite nature.
- Predicting the displacements of a given member under given conditions.

UNIT – I

Simple Stresses and Strains

Elasticity and Plasticity, Types of Stresses and Strains – Hooke's law - Stress-Strain diagram for mild steel - Working stress- Factor of safety - Lateral strain , Poisson's Ratio and volumetric strain - Elastic moduli and the relationship between them - Bars of varying section - Composite bars - Temperature Stresses.

UNIT – II

Shear Force and Bending Moment :

Types of supports, loads, beams – Concept of shear force and bending moment – SF and BM diagrams for Cantilever, Simply supported and Over hanging beams subjected to point load, udl, uniformly varying loads and combination of loads. Point of Contraflexure-Relation between SF, BM and Rate of loading.

UNIT – III

Flexural and Shear Stresses

Theory of Simple bending –Assumptions - Derivation of flexure formula-Neutral axis – Bending stresses - Section modulus for various sections-flexural rigidity- Design of simple beam sections.

Derivation of Shear stress formula - Shear stress distribution across various beam sections like rectangular, circular, triangular, I, T, and angle sections.

UNIT - IV

Deflection of beams:

Slope, Deflection and Radius of curvature - Differential equation for the elastic line of a beam –Double Integration and Macaulay's method – Determination of slope and deflection for Cantilever and Simply supported beams subjected to point loads, udl, uniformly varying loads - Mohr's theorems of Moment Area method applied to simple cases, Conjugate beam method.

UNIT – V

Thin and Thick Cylinders

Thin seamless cylindrical shells - Derivation of formula for longitudinal and circumferential stresses - hoop, longitudinal and volumetric strains – changes in diameter, length and volume of thin cylinders – Wire wound thin cylinders-Thin spherical shells.

Introduction to Thick Cylinders - Lamé's Theory for thick cylinders – Derivation of Lamé's equations- Distribution of hoop and radial stresses across the thickness – Compound cylinders.

Text Books :

1. A Text book of Strength of materials by R.K. Bansal – Laxmi Publications (P) ltd. New Delhi.
2. Introduction to Strength of Materials by U.C. Jindal, Galgotia Publications, New Delhi
3. Strength of Materials by B.C.Punmia, Laxmi Publications, New Delhi

References :

1. Strength of Materials by SS Rattan, Tata Mc. Grawhill Publications ,New Delhi
2. Mechanics of Solids by Ferdinand , P Beer and others – Tata Mc. Grawhill Publications ,New Delhi
3. Strength of Materials by A.R.Basu, Dhanpat Rai and Co. Nai Sarah, New Delhi

II Year B. Tech CE - I Sem

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(R11CED1107) SURVEYING – I

Course Objective

- To learn and understand the various basic concept and principles used in surveying.
- To learn and understand various instrument used in surveying.
- Understand how to calculate Area of plot and Ground.
- To understand about Horizontal Angle, Vertical Angle, Horizontal distance and Vertical distance to study the ground profile.

Course Outcome

- Student will be able to prepare Map and Plan for required site with suitable scale.
- Student will be able to prepare contour Map and Estimate the Quantity of earthwork required for formation level for Road and Railway Alignment.
- Student will be able to judge which type of instrument to be used for carrying out survey for a Particular Area and estimate the area.
- Student will be able to judge the profile of ground by observing the available existing contour map.

UNIT – 1

Surveying and Measurements:

Surveying – History; Definition; Classification; Principles of surveying; Plan and map; Measurements – Basic Measurements and methods; Errors in surveying; Types of errors sources and their propagation.

UNIT – II

Linear Measurements:

Different methods; Ranging out; Chaining a line on a flat and on uneven ground; Principles of chain surveying; Basic definitions; Equipment used for chain survey; Field work; Offsets; Obstacles in chain survey; Chain and Tape corrections; Degree of accuracy.

UNIT – III

Compass and Plane Table Surveying:

Compass introduction and its types; Prismatic and Surveyor compass; angular measurements Bearings: Azimuths; deflection angles; Local attraction; Plane table and its accessories; setting up; Plane tabling methods, Two point problem. Errors in plane tabling.

UNIT – IV

Areas and Volumes

Introduction; Simpson's rule; Boundaries with offsets at irregular intervals; Coordinate method; Planimeter. Area of cross sections; two and multi level section; Trapezoidal rule; Prismoidal formula; Volume from spot levels- volume from contour plan; Capacity of a reservoir.

UNIT – V

Simple Levelling :

Basic definitions; Different methods of leveling; Classification of direct leveling methods; Profile leveling; Cross sectioning; Reciprocal leveling; correction for Curvature and Refraction; Sources of errors in leveling. Contour: contour interval; Characteristics of contours; Methods of locating contours; – Uses of contour maps.

TEXT BOOKS

- 1.Surveying Vol I by K R Arora, Standard Book house.
- 2.Fundamentals of Surveying by S K Roy, Prentice- Hall of India Private Ltd.
- 3.Plane Surveying by AM Chandra, New Age International (P) Ltd.

REFERENCES

- 1.Elements of Plane Surveying by Arthur R Benton and Philip J Taety, Mc. Graw Hill – 2000
- 2.Surveying and Levelling by R. Subramanian, Oxford University Press, New Delhi
- 3.Surveying and Levelling by NN Basak, Tata McGraw-Hill Publishing Company Ltd.

II Year B. Tech CE - I Sem

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(R11CED1108) FLUID MECHANICS

Course Objectives

- Understand values of fluid properties and relationship between them.
- Understand the principles of continuity, momentum, and energy as applied to fluid motions.
- Recognize these principles written in form of mathematical equations.
- Analyze problems by making appropriate assumptions

Course Outcomes

- Learn fundamental knowledge of mathematics to modeling and analysis of fluid flow problems in civil and environmental engineering.
- Conduct experiments (in teams) in pipe flows and open-channel flows and interpreting data from model studies to prototype cases, as well as documenting them in engineering reports.
- Understand or become aware of disasters caused by an incorrect analysis in hydraulic engineering system.
- Solve analytical problems of practical civil engineering problems of water conveyance in pipes, orifices, mouth pieces, notches and weirs.

UNIT – I

Properties of Fluid:

Introduction; Properties of Fluid; Units of measurement; Fluid Continuum; Newtonian and Non-Newtonian fluids; Vapour pressure.

Fluid Statics:

Variation of static pressure; Absolute and gauge pressure; Pressure measurement by mechanical gauges and manometers; Pressure on plane surfaces and curved surfaces.

UNIT - II

Kinematics of Fluid Motion:

Methods of describing fluid motion; Classification of flow; 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 acceleration; Continuity equation; Velocity potential and stream function; Flownet; Vortex flow – free vortex and forced vortex flow.

Dynamics of Fluid Flow:

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

UNIT - III

Flow Measurements in Pipes :

Discharge through venturimeter; Discharge through orifice meter; Discharge through flow nozzle; Measurement of velocity by Pitot tube.

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.

UNIT - IV

Flow Over Notches and Weirs:

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

UNIT - V

Analysis of Pipe Flow:

Energy losses in pipelines; Darcy – Weisbach equation; Minor losses in pipelines; Concept of equivalent length; Hydraulic power transmission through a pipe; Siphon; Pipes in series, parallel and branched pipes; water hammer.

Laminar Flow:

Reynold's experiment; Critical velocity; steady laminar flow through a circular pipe.

TEXT BOOKS

1. Fluid Mechanics by Modi and Seth (Standard Book House).
2. Fluid Mechanics by A.K.Jain (Khanna Publishers).
3. Introduction to Fluid Mechanics by S.K. Som and G. Biswas (Tata Mc.Grawhill Pvt. Ltd.)

REFERENCES:

1. Fluid Mechanics by Douglas, J.M. Gaserek and J.A.Swaffird (Longman Publishers)
2. Fluid Mechanics by Frank.M.White (Tata Mc.Grawhill Pvt. Ltd.)
3. Fluid Mechanics by A.K.Mohanty, (Prentice Hall of India Pvt. Ltd., New Delhi)

Course Objectives:

- To explain the features, merits, limitations and suitability of different forms of organizing private and public business enterprises and to analyze the significance of Managerial Economics and how it helps business managers in performing decision – making function.
- To define Demand, Elasticity of Demand and Demand Forecasting and to explain and analyze the factors of Demand, Elasticity of Demand and Demand Forecasting.
- To analyze the nature of various costs and how they influence the total cost, to determine the level of output at which there is neither profit nor loss and to identify the volume of sales at which desired amount of profit can be earned.
- To estimate capital requirements, to describe the sources of mobilizing capital and to evaluate the investment opportunities. To explain input – output relationship in short and long period and to identify least cost combinations of inputs to produce desired quantity of output.
- To describe the features of different market structure and different pricing strategies.
- To explain the basic accounting concepts and conventions. To elaborate the importance of finance function for evaluating the economics status of a business unit.

Course Outcomes

- Select the suitable form of business organization which meets the requirement of selected business also perform decision – making effectively in an uncertain frame work by applying concepts of Managerial Economics
- Meet and manipulate the demand efficiently and plan the future course of action.
- Apply right kind cost and to reduce cost by paying attention towards the costs which can be regulated or reduced. Take decision whether to buy or produce?
- Reduce the cost of capital by selecting best sources of fund mobilization and select best investment opportunity which yields higher rate of return.

UNIT I

Business and new economic environment

Characteristic features of business; Features and evaluation of sole proprietorship; Partnership; Joint stock company; Public enterprises and their types; Changing business environment in post- liberalization scenario.

UNIT II

Introduction to business economics, and demand analysis

Definition; Nature and scope of managerial economics - demand analysis determinants; Law of demand and its exceptions.

Elasticity of demand and demand forecasting

Definition; Types; Measurement and significance of elasticity of demand; Demand forecasting; Factors governing demand forecasting; Methods of demand forecasting - survey methods, statistical methods, expert opinion method, test marketing, controlled experiments, and judgmental approach to demand forecasting.

UNIT III

Cost analysis

Cost concepts - opportunity cost, fixed vs. variable costs, explicit costs vs. implicit costs, and out of pocket costs vs. imputed costs; Break-even analysis (BEA) - determination of break-even point (simple problems), managerial significance, and limitations of BEA.

Capital and capital budgeting

Capital and its significance; Types of capital; Estimation of fixed and working capital requirements; Methods and sources of raising finance.

Nature and scope of capital budgeting; Features of capital budgeting proposals; Methods of capital budgeting - payback method, accounting rate of return (ARR), and net present value method (simple problems)

UNIT IV

Theory of production

Production function - isoquants and isocosts, least cost combination of inputs, and laws of returns; Internal and external economics of scale.

Market structures

Types of competition; Features of perfect competition, monopoly, and monopolistic competition; Price-output determination in case of perfect competition and monopoly.

Pricing policies and methods

Cost plus pricing; Marginal cost pricing; Sealed bid pricing; Going rate pricing, Limit pricing, Market skimming pricing, Penetration pricing, Two-part pricing, Block pricing, Bundling pricing, Peak load pricing, Cross subsidization.

UNIT V

Introduction to financial accounting

Double-entry book keeping; Journal; Ledger; Trial balance; Final accounts - trading account, profit and loss account, and balance sheet with simple adjustments.

Financial analysis through ratios

Computation; Analysis and interpretation of liquidity ratios - current ratio, and quick ratio; Activity ratios - inventory turnover ratio, and debtor turnover ratio; Capital structure ratios – debt-equity ratio, and interest coverage ratio; Profitability ratios - gross profit ratio, net profit ratio, operating ratio, P/E ratio, and EPs.

TEXT BOOK

1. Managerial Economics and Financial Analysis by Aryasri, 2009; *Publisher: Tata McGraw Hill.*
2. Managerial Economics by Varshney and Maheswari, 2009; *Publisher: Sultan Chand.*

REFERENCES

1. Financial Accounting for Management: An analytical perspective by Ambrish Gupta, 2010; *Publisher: Pearson Education.*
2. Managerial Economics by H. Craig Peterson and W. Cris Lewis; *Publisher: Prentice Hall of India.*

(R11CED 1201) SURVEYING FIELD WORK - I

Course Objective

- To learn and understand the various basic concept and principles used in surveying..
- To learn and understand various instrument used in surveying.
- To learn how to calculate Area of plot and Ground.
- To learn Horizontal Angle, Vertical Angle, Horizontal distance and Vertical distance to study the ground profile.

Course Outcomes

- Prepare Map and Plan for required site with suitable scale.
- Prepare contour Map and Estimate the Quantity of earthwork required for formation level for Road and Railway Alignment.
- Understand which type of instrument to be used for carrying out survey for a Particular Area and estimate the area.
- Judge the profile of ground by observing the available existing contour map.

CYCLE - I

Chain surveying

1. Chaining of a line using chain, measurements of area by cross staff survey.
2. Measurement of distance between two points when there is an obstacle for both chaining and ranging.

Compass survey

3. Traversing by compass and adjustments in included angles and measurement of area - graphical adjustments.
4. Distance between two inaccessible points by compass.

Plane Table Surveying

5. Measurement and Plotting of the area by Radiation method.

6. Determination of Positions objects by Intersection Method – Plane Table Survey.
7. Traverse by Plane table Survey.

CYCLE - II

Leveling

8. Measurement of elevation of various given points.
9. Elevation difference between two given points by reciprocal leveling.
10. Longitudinal Leveling
11. Cross – section Leveling
12. Plotting of Contours by Indirect Methods

(R11CED1202)STRENGTH OF MATERIALS LAB

Course Objectives:

- To study the uses of various types of testing machines and capacities.
- To test various materials against various types of straining actions for assessing the strength of materials regarding strengths.
- To understand various implements to apply specific forces using the machine or to augment the utility of the same machine.

Course Outcomes:

- Comprehend the concepts of deciding the shape or type of specimen for assessing different strengths against various straining actions.
- Design the specimens for assessing a particular property of the material with the available machines.
- Design the experiments making use of various techniques of load measuring or deformation measuring instruments.

1. Tension test on Mild Steel Specimen
2. Bending test on (Steel / Wood) Cantilever beam.(Mild Steel/Wood)
3. Bending test on simply supported beam.
4. Torsion test
5. Hardness test(Rockwell and Brinell)
6. Spring test
7. Compression test on wood or concrete
8. Impact test (Izod and Charpy)
9. Direct Shear test
10. Verification of Maxwell's Reciprocal theorem on beams.
11. Demonstration of electrical resistance strain gauges
12. Deflection test on a Continuous Beam

(R11CED1109) ENVIRONMENTAL STUDIES

Course Objectives:

- To understand the necessity of protection of environment
- To develop an understanding of Natural resources
- To develop an understanding of Biodiversity
- To develop an understanding of Global Environmental problems
- To develop an understanding of Environmental pollution

Course Outcomes:

- Learn about elements of environment
- Learn about various Natural Resources
- Understanding of various environmental problems
- Learn about various ways used to protect the Environment

UNIT-I

Introduction, Definition, scope and Importance

Ecosystems: Introduction, types, Classification of Eco system, structure and functions of ecosystems.

Bio-diversity and its conservation, Value of bio-diversity Bio-geographical classification of India – India as a mega diversity habitat, Threats to bio-diversity –Hot-spots of Bio Diversity, Conservation of bio-diversity.

UNIT-II

Natural Resources: Classification of Resources, Land resources, Land degradation, Soil erosion and desertification, Food resources, Effects of modern agriculture, fertilizer pesticide problems, Food miles, organic farming, Forest resources, Use and over-exploitation, Water resources, Dams –benefits, Conflicts over Water, Energy resources-sustainable Development, and Energy Audit

UNIT III

Environmental pollution and its control : Classification of pollution and pollutants, Air pollution, causes ,Effects ,Control measures, ambient air quality standards, water pollution causes , Effects ,Control measures, water and waste water treatment methods, water quality standards, Noise pollution causes ,Effects ,Control measures, land pollution causes ,Effects ,Control measures, solid waste disposal methods ,characteristics of e-waste and management

UNIT IV

Global Environmental problems and global Efforts: Nuclear hazards, Global warming, Acid rain, hurricanes, Hazardous Waste, Overpopulation , ozone layer depletion, Clean development mechanism , Green computing ,Green Building ,carbon credits, carbon trading

International conventions/protocols: Earth summit, Kyoto protocol and Montreal protocol, Stockholm Declaration

UNIT V

Environmental Impact Assessment and Environmental Management plan: Definition of impact, Classification of Impacts, Prediction of Impacts and Impact assessment Methodologies, Environmental Impact Statement, Environmental Management plan: Technological Solutions

TEXT BOOKS

1. Introduction to Environmental Science by Y.Anjaneyulu, BS Publications
2. Text book of Environmental studies by Deeksha dave, Cengage publishers
3. Text book of Environmental studies by M.Anji Reddy, BS Publications

REFERENCES

1. Text book of Environmental studies by Anuba Kaushik and C P Kaushik, Newage International Pvt.Limited
2. Text book of Environmental studies by S V S Rana, Rastogi Publications
3. Text book of Environmental studies by Dr. K Raghavan Nambiar, Scitech Publishers

(R11CED1110) STRENGTH OF MATERIALS-II

Course Objective

- To understand Principal Stresses and strains and different theories of failure.
- To understand the concept of Pure torsion and different types of springs.
- To understand Euler's formula, secant and straight line formula and their application to long and short columns.
- To analyze the stresses for the combined action of direct load and Bending Moment, determination of stresses for masonry structures.
- To analyze the stresses in beams subjected to unsymmetrical bending.

Course Outcome

- Define Principal stresses and strains, Solve the problems on an inclined section of a bar under axial load, determine the Principal stresses by using the Mohr's stress circle method
- Learn about pure torsion, torsion equation & assumptions, polar section modulus, and they will be able to derive the Torsional moment of resistance for shafts and equations for open and close coiled helical springs
- Define Columns and struts, Analyze columns and struts with different end conditions by using different theories.
- Determine stresses for different masonry structures.

UNIT-I

Principal Stresses and Strains:

Introduction - Stresses on an inclined plane of a bar under axial loading – compound stresses – Normal and tangential stresses on an inclined plane for biaxial stresses – Two perpendicular stresses accompanied by a state of simple shear –Mohr's Circle of stresses – Principal stresses and strains –Analytical and graphical solutions.

Theories of Failure–Various Theories of failure like Maximum principal stress theory-Maximum Principal strain theory –Maximum shear stress theory –Maximum strain energy theory –Maximum shear strain energy theory

UNIT-II

Torsion of Circular Shafts :

Theory of pure torsion – Assumptions made in the theory of pure torsion -Derivation of Torsion equation -Torsional moment of resistance –Torsional rigidity –Polar section modulus

–Power transmitted by shafts –Combined bending and torsion and end thrust –Torsional Rigidity-Design of shafts according to theories of failure

Springs-types of springs –deflection of close and open coiled springs under axial pull,axial compression and axial couple –springs in series and parallel –Carriage or leaf springs.

UNIT -III

Columns and Struts :

Introduction –Types of columns – Short and long columns –Axially loaded compression members –Crushing load-Euler's theory for long columns –assumptions –derivation of Euler's critical load formulae for various end conditions –Effective length of a column – slenderness ratio –Euler's critical stress-Limitations of Euler's theory –Rankine –Gordon formula –Long columns subjected to eccentric loading –Secant formula –Empirical formulae –Straight line formula –Prof Perry's formula.

Laterally loaded struts –Subjected to uniformly distributed and concentrated loads – Maximum B.M and stress due to transverse and lateral loading

UNIT -IV

Direct and Bending Stresses :

Stresses under the combined action of direct loading and B.M ., core of a section – determination of stresses in the case of chimneys ,retaining walls and dams –conditions for stability –stresses due to direct loading and B.M about both axes

UNIT -V

Unsymmetrical Bending

Introduction –Centroidal principal axes of section –Product of Inertia –Moments of inertia referred to any set of rectangular axes –Stresses in beams subjected to unsymmetrical bending –Principal axes –Resolution of bending moment into two rectangular axes through the centroid –Location of neutral axis deflection of beams under unsymmetrical bending .

Shear Centre: Introduction-Determination of shear centre for simple sections

Text Books :

1. A Text book of Strength of materials by R.K. Bansal – Laxmi Publications (P) Ltd. New Delhi.
2. Introduction to Strength of Materials by U.C. Jindal, Galgotia Publications,New Delhi

3. Strength of Materials by B.C.Punmia,Laxmi Publications,New Delhi

References :

1. Mechanics of Solids, by Ferdinand P Beer and others – Tata Mc. Grawhill Publications,New Delhi
2. Strength of Materials by Schaum's out line series – Mc. Graw Hill International Editions
3. Strength of Materials by S.Rama Krishna and R.Narayan – Dhanpat Rai Publications,New Delhi

II Year B. Tech CE – II Sem

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(R11CED1111) HYDRAULICS and HYDRAULIC MACHINES

Course Objectives:

- Apply fundamental principles of fluid mechanics for the solution of practical Civil Engineering problems.
- Learn the operating characteristics of hydraulic machinery (pumps and turbines) and the factors affecting their operation and specifications, as well as their operation in a system.
- Study and Analyze different types of different types and elements of Hydro Electric Power plants.

Course Outcomes:

- Know the fundamental knowledge of fluid mechanics in solving problems and making design of open-channel hydraulics in Civil and Environmental Engineering.
- Learn dimensional analysis and similarity to develop hydraulic models and testing.
- Understand the basics of hydraulic machinery and their operation design in water distribution systems.
- Solve problems about appropriate pumps, classification, identify and design of hydraulic turbines and their and their application in Hydro Electric Power plants.

UNIT I

Open Channel Flow – I: Types of flows – Types of channels – Velocity distribution – Energy and momentum correction factors - Chezy's, Manning's and Bazin formulae for uniform flow – Most economical sections.

Critical Flow: Specific energy – critical depth - computation of critical depth – critical, sub critical and super critical flows.

UNIT II

Open Channel Flow – II: Non uniform flow – Dynamic equation for G.V.F; Mild, Critical, Steep, Horizontal and Adverse slopes – Surface profiles – Direct step method.

Rapidly varied flow: Hydraulic jump – derivation - energy dissipation applications. Surges (Theory only)

UNIT III

Hydraulic Similitude: Dimensional analysis – Rayleigh's method and Buckingham's pi theorem – study of Hydraulic models – Geometric, Kinematic and Dynamic similarities – Dimensionless numbers – Model and Prototype relations.

Basics of Turbo Machinery: Hydrodynamic force of jets on stationary and moving flat, inclined and curved vanes, Jet striking centrally and at tip, Velocity triangles at inlet and outlet, expressions for work done and efficiency – Angular momentum principle, applications to radial flow turbines.

UNIT IV

Hydraulic Turbines – I: Elements of a typical Hydropower installation – Heads and efficiencies – Classification of turbines – Pelton wheel – Francis turbine – Kaplan turbine – working, working proportions, velocity diagram, work done and efficiency, hydraulic design, draft tube – theory and function efficiency.

Hydraulic Turbines -II: Governing of turbines – Surge tanks – Unit and specific turbines – Unit speed – Unit quantity – Unit power – Specific speed – Performance characteristics – Geometric similarity – Cavitation.

UNIT V

Centrifugal Pumps: Pump installation details – classification – work done – Manometric head – minimum starting speed – losses and efficiencies – specific speed. Multistage pumps – pumps in parallel – performance of pumps – characteristic curves – NPSH – Cavitation.

Hydropower Engineering: Classification of Hydropower plants – Definition of terms – load factor, utilization factor, capacity factor, estimation of hydropower potential.

TEXT BOOKS

1. Fluid Mechanics, Hydraulic and Hydraulic Machines by Modi and Seth (Standard Book House).
2. Open channel flow by V.T.Chow (Mc.Graw Hill Book Company).
3. Open Channel Flow by K.Subramanya (Tata Mc.Grawhill Pvt. Ltd.).

REFERENCES:

1. Fluid Mechanic and Fluid Machines by Rajput (S.Chand and co).
3. Fluid Mechanic and Fluid Power Engineering by D.S.Kumar (Kataria and Sons Publications Pvt. Ltd.).
3. Hydraulic Machines by Banga and Sharma (Khanna Publishers).

(R11CED1112) SURVEYING - II

Course Objectives

- Learn about use and principles Theodolite Traverse
- Learn about Tacheometric surveying.
- Understand Circular curves
- Learn to do triangulation

Course Outcomes

- Use of Theodolite
- Learning Tacheometric surveying
- Understand triangulation and EDM
- Know modern surveying methods

UNIT – 1

Theodolite and Theodolite traverse:

Vernier theodolite – basic definitions, fundamental lines, Measurement of a horizontal angle; repetition and reiteration methods of horizontal angle measurement. Measurement of vertical angle; Selection of traverse stations; Sources of errors in theodolite traversing; Methods of adjustments; Traverse Computations – Gale's traverse table; Methods of adjustments Omitted measurements.

UNIT – II

Tacheometric surveying

Basic systems of tacheometric measurements; Inclined sight with staff vertical; Inclined sight with staff normal to the line of sight. Trigonometric Levelling: Introduction; Determination of the level of the top of an object, When its base is accessible and When its base is not accessible; Determination of the height of the object when the two instrument stations are not in the same vertical plane; Axis signal correction; Difference in elevation by single observation.

UNIT – III

Circular curves:

Basic definitions; Designation of a curve; Relationship between radius and degree of curve; Elements of a simple circular curve; Methods of setting out; Setting out of compound curves setting.

UNIT – IV

Triangulation and EDM

Principles of triangulation; Uses of triangulation survey; Classification of triangulation; Field and office work in triangulation – Selection of triangulation stations, Electronic Distance Measurements: Basic concepts, Classification of Electronic Radiation, Basic principle of Electronic Distance Measurement Sources of error in EDM

UNIT – V

Modern surveying

Introduction to Geodetic surveying, Total station and Global positioning system, Introduction to Geographic Information System (GIS).

TEXT BOOKS

1. Surveying Vol II by K R Arora, Standard Book house.
2. Fundamentals of Surveying by S K Roy, Prentice- Hall of India Private Ltd.
3. Plane Surveying by AM Chandra, New Age International (P) Ltd.

REFERENCES

1. Elements of Plane Surveying by Arthur R Benton and Philip J Taety, Mc. Graw Hill – 2000
2. Surveying and Levelling by R. Subramanian, Oxford University Press, New Delhi
3. Surveying and Levelling by NN Basak, Tata McGraw-Hill Publishing Company Ltd.

(R11CED1113) STRUCTURAL ANALYSIS - I

Course Objectives:

- The student will learn how to analyze the statically indeterminate structure through consistency in deformation.
- The student understands the difference between concepts of flexibility and stiffness methods.
- The student will observe the necessity of aid from the computer in analysis.

Course Outcomes

- Judge which type of support is suitable for given conditions of loading and spans.
- Understand the advantage of statically indeterminate structure over the statically determinate structure.
- Confidence in the minds of the students to deal with indeterminate structures under various situations.
- Analyze the indeterminate structure through computer oriented methods of analysis.
- Superimpose the effects of settlement or rotation of the supports over the regular analysis.

UNIT-I

Arches: Three hinged arches-Elastic theory of arches-Eddy's theorem-Determination of horizontal thrust-bending moment, normal thrust and radial shear-effect of temperature

UNIT-II

Propped cantilevers: Introduction to statically indeterminate beams -Analysis of propped cantilevers-shear force and bending moment diagrams-Deflection of propped cantilevers.

Fixed beams: Fixed beams with u.d.l., central point load, eccentric point load. Number of point loads, uniformly varying load, couple and combination of loads, shear force and bending moment diagrams-deflection of fixed beams effect of sinking of support, effect of rotation of a support.

UNIT-III

Continuous beams: Introduction- Clapeyron's theorem of three moments-analysis of continuous beams of constant moment of inertia with one or both ends fixed-continuous

beams with overhang, continuous beams with different moments of inertia for different spans-effects of sinking of supports-shear force and bending moment diagrams.

UNIT-IV

Energy theorems: introduction-strain energy in linear elastic system, expression of strain energy due to axial load, bending moment and shear forces – Castigliano's first theorem – deflection of simple beam and pin jointed trusses-solution of trusses upto two degrees of internal and external indeterminacies-Castigliano's second theorem.

UNIT-V

Influence lines: Definition of influence line for SF, influence line for BM- load position for maximum SF at a section-load position for maximum BM at a section single point load, U.D loads longer than the span U.D load shorter than the span-influence lines for forces in members of Pratt and Warren trusses.

Moving loads: Introduction, maximum SF and BM at a given section and absolute maximum S.F. and B.M. due to single concentrated load, U.D. load longer than the span, U.D. load shorter than the span, two points loads with fixed distance between them and several point loads- Equivalent uniformly distributed load-focal length.

TEXT BOOKS

1. Analysis of Structures – Vol I and Vol II by V.N.Vazirani and M.M. Ratwani, Khanna Publications, New Delhi.
2. Structural Analysis by V.D.Prasad Galgotia publications, 2nd Editions.
3. Analysis of Structures by T.S. Thandavamoorthy, Oxford University Press, New Delhi.

REFERENCES

1. Mechanics of Structures by S.B.Junnarkar, Charotar Publishing House, Anand, gujrat
2. Theory of Structures by Gupta, Pandit and Gupta; Tat Mc. Graw – Hill Publishing Co. Ltd. New Delhi.
3. Theory of Structures by R.S.Khurmi , S.Chand Publishers

(R11CED1114) BUILDING CONSTRUCTION and PLANNING

Course Objectives:

- List the construction material.
- know about the construction techniques
- understands the building bye-laws
- Know insights in to smart building materials

Course Outcomes:

- Learn the Basic terminology that is used in the industry
- Understands the Prevention of damage measures and good workmanship
- Understands the properties of building materials and services

UNIT – I

Building components

Lintels, Arches, walls, stair cases – types of floors, types of roofs – flat, curved, trussed; foundations – types; Damp Proof Course; Joinery – doors – windows.

UNIT – II

Building services

Plumbing Services, Water Distribution, Sanitary – Lines and Fittings; Ventilators: Functional requirements, systems of ventilators, Air conditioning – Essentials and Types; Acoustics – characteristic – absorption – Acoustic design; Fire protection – Fire hazards.

UNIT – III

Construction equipments

Cost of owning and operation – power showels, bulldozers, trucks, other earth moving equipment, belt conveyors, dozers, scrappers, power showels, earth compaction equipment, concrete equipment, equipment for pumping of water, draglines and clean shells and cranes.

UNIT – IV

Building byelaws and regulations

Introduction – terminology – objectives of building byelaws – floor area ratio (FAR) – floor space index (FSI), principles underlying building byelaws – classification of buildings – open space requirements – built up area limitations – height of buildings – wall thickness – lighting and ventilation requirement.

UNIT – V

Residential and public buildings

Residential buildings - Minimum standards for various parts of buildings – requirements of different rooms and their grouping – characteristics of various types of residential buildings – public buildings – planning of educational institutions, hospitals, dispensaries, office buildings, banks, industrial buildings, hotels, and motels, buildings for recreation.

TEXT BOOKS

1. Building Materials and Construction-AroraandBindra, Dhanpat Roy Publications
2. Building Construction by B.C.Punmia, Ashok Kumar Jain and Arun Kumar Jain- Laxmi Publications(P) ltd, New Delhi.
3. Building construction by Sushil kumar

REFERENCES

1. Building Construction by PC Varghese PHI
2. Construction Technology – Vol- I and II by R.Chuddy, Longman UK
3. Building by laws by State and Central governments and Municipal corporations

Course Objectives:

- To compare the results of analytical models introduced in lecture to the actual behavior of real fluid flows.
- To discuss and practice standard measurement techniques of fluid mechanics and their applications.
- To familiarize the students with the components and working principles of the Hydraulic machines- different types of Turbines, Pumps, and other miscellaneous hydraulics machines.
- To learn and practice writing technical reports and to work on small design projects.

Course Outcomes:

- Utilize basic measurement techniques of fluid mechanics and able to differentiate among measurement techniques their relevance and applications.
- Practical understanding of Minor and friction losses in pipe flows.
- Understand practical working of Hydraulic machines- different types of Turbines, Pumps, and other miscellaneous hydraulics machines.
- Compare the results of analytical models introduced in lecture to the actual behavior of real fluid flows and draw correct and sustainable conclusions.

1. Verification of Bernoulli's equation

2. Determination of Coefficient of discharge for a small orifice by a constant head method

3. Calibration of Venturimeter and Orifice Meter

4. Calibration of Triangular / Trapezoidal Notch

5. Study of Minor losses in pipe flow

6. Determination of Friction factor of a pipe line

7. Impact of jet on vanes

8. Study of Hydraulic jump
9. Main characteristics of Pelton wheel turbine
10. Performance test on Francis turbine
11. Main characteristics of a single stage Centrifugal Pump
12. Operating characteristics of multi stage Centrifugal Pump
13. Operating characteristics of Reciprocating Pump (Demonstration only)
14. Performance test on Kaplan turbine (Demonstration only)

(R11CED1204) SURVEYING FIELD WORK - II

Course Objective

- Student will be able to learn and understand the various basic concept and principles used in surveying like Chain Surveying, Compass Surveying, Plane Table Surveying, and Levelling Surveying.
- Student will be able to learn and understand about theodolite and total station in surveying.
- Student will learn and understand how to calculate Area of plot and Ground.
- Student will learn and understand about Horizontal Angle, Vertical Angle, Horizontal distance and Vertical distance to study the ground profile using total station.

Course Outcome

- Prepare Map and Plan for required site with suitable scale.
- Prepare contour Map and Estimate the Quantity of earthwork required for formation level for Road and Railway Alignment.
- Judge which type of instrument to be used for carrying out survey for a Particular Area and estimate the area.
- Judge the profile of ground by observing the available existing contour map.

CYCLE - I

Theodolite surveying:

1. Measurement of horizontal angles and vertical angles.
2. Distance between two inaccessible points.
3. Measurement of area by theodolite traversing (Gales traverse table).
4. Determination of tachometer constants.
5. Distance between two inaccessible points using the principles of tachometer surveying.
6. Distance between two inaccessible points using the principles of trigonometric surveying

CYCLE - I

Total Station.

7. Area Measurement
8. Stake Out
9. Remote Elevation Measurement
10. Missing Line Measurement
11. Longitudinal and Cross Section Profile
12. Contouring
13. Providing a Simple Circular Curve

III Year B. Tech CE - I Sem

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(R11CED1115) STRUCTURAL ANALYSIS-II

Course Objectives:

- idealize and analyze statically determinate and indeterminate structures
- Introduce Displacement methods of analysis for statically indeterminate structures.
- Introduce the approximate methods of analysis for both gravity and Lateral loads.
- Familiarity with professional and contemporary issues

Course outcomes:

- analyze Two hinged and three hinged arch structures
- determine deflections of beams using classical methods
- solve statically indeterminate structures using classical methods
- to solve statically indeterminate structures using Approximate methods

UNIT I

Two hinged arches: Determination of horizontal thrust bending moment, normal thrust and radial shear – Rib shortening and temperature stresses, tied arches – fixed arches

UNIT-II

Approximate method of structural analysis: application to building frames. (i) Portal method (ii) Cantilever method.(iii) Substitute frame method.

UNIT – III

Slope-deflection method: Introduction, derivation of slope deflection equation, application to continuous beams with and without settlement of supports-Application to portal frames with and without sway.

UNIT – IV

Moment Distribution method – Stiffness and carry over factors – Distribution factors – Analysis of continuous beams with and without sinking of supports – portal frames – including Sway

UNIT – V

Kani's Method : Analysis of continuous beams – including settlement of supports and single bay portal frames with side sway .

TEXT BOOKS

1. Analysis of Structures – Vol. I and 2 by Bhavikathi, Vikas publications
2. Analysis of structures by Vazrani and Ratwani – Khanna Publications.

3. Strength of Materials and mechanics of solids Vol-2 by B.C. Punmia, Laxmi Publications, New Delhi

REFERENCES

1. Structural Analysis (Matrix Approach) by Pundit and Gupta – Tata Mc.Graw Hill publishers.
2. Theory of structures by Ramamuratam
3. Structural Analysis by C.S. Reddy, Tata Macgrawhill, New Delhi

(R11CED1116) DESIGN OF REINFORCED CONCRETE STRUCTURES

Course Objectives:

- Know the salient features of Limit State Method of design of RC structures.
- Understand the various codal provisions given in IS. 456.
- Know the behavior of RC beams under flexure, shear and compression.
- Understand the concepts of limit state of collapse and limit state of serviceability.

Course Outcomes:

- Design the singly reinforced, doubly reinforced and flanged sections.
- Design the axially loaded, uniaxial and biaxial bending columns.
- Design the isolated square, rectangular and circular footings
- Design the one-way and two-way slabs.

UNIT - 1

Concepts of RC Design, Limit state design, Basic statistical principles, Characteristic loads, Characteristic strength, Partial load and safety factors, Representative stress- strain curves for cold worked deformed bars and mild steel bars, Assumptions in limit state design, Stress block parameters, Limiting moment of resistance, IS 456 Codal provisions

Limit state method of analysis and design of Singly reinforced , Doubly reinforced , T and L beam sections.

UNIT – II

Limit state method of analysis and design of sections for Shear and Torsion, Concept of bond, Anchorage and Development length, Design examples in Simply supported and Continuous beams, Detailing.

UNIT – III

Short and long columns under axial loads, Uni-axial bending and Bi-axial bending, Design of columns using SP-16 charts

UNIT – IV

Different types of footings, Design of isolated Square, Rectangular and Circular footings

UNIT-V

Design of One-way slabs, Continuous slabs using I.S. coefficients, Two-way slabs

Limit state of serviceability for Deflection, Cracking and codal provisions.

Text Books :

1. Reinforced Concrete Design by S.Unnikrishnan Pillai and Devdas Menon, TMH, New Delhi
2. Fundamentals of Reinforced Concrete Design by M.L.Gambhir, Printice Hall of India Private Ltd., New Delhi.
4. Limit State Design by B.C.Punmia, Ashok Kumar Jain and Arun Kumar Jain, Laxmi Publications Pvt. Ltd., New Delhi.

References

1. Reinforced Concrete Design by N.Krishna Raju and R.N.Pranesh, New age International Publishers, New Delhi.
2. Fundamentals of Reinforced Concrete by N.C.Sinha and S.K.Roy, S.Chand Publishers
3. Design of Concrete structures by Arthus H.Nilson, David Darwin and Chorles W.Dolor, TMH.

Final Examination Pattern

The final examination paper should consists of Part A and Part B. Part A consists of two questions in design and drawing (Not to scale), out of which one question is to be answered. Part B should consists of five questions in design, out of which three are to be answered. Weightage for Part A is 40 % (i.e. 28 Marks) and Part B is 60 % (i.e. 42 Marks)

(R11CED1117) ENGINEERING GEOLOGY

Course Objectives:

- Know geology from Civil Engineering point of view
- Understand Mineral and rock properties
- Understands the significance of structural geology
- Understand the concepts of Geophysical methods

Course Outcomes:

- Understand geology and its importance in Civil Engineering
- Learn different properties of Minerals
- Classify the rocks
- the knowledge of structural geology

UNIT-I

Introduction: Definition of Geology, Engineering Geology. Importance of geology from Civil Engineering point of view. Importance of physical geology, petrology and structural geology. Case studies of failures of few civil engineering constructions. Weathering of rocks and its effect on the properties of rocks, importance of weathering with reference to dams, reservoirs and tunnels.

UNIT-II

Mineralogy: Definition of mineral, mineralogy, Importance of study of minerals: rock forming and ore forming minerals. Different methods of study minerals. Advantages of study of minerals by physical identification method. Physical Properties of minerals for identification of minerals. Physical properties of following minerals: Feldspar, Quartz, Flint, Jasper, Olivine, Augite, Hornblende, Muscovite, Biotite, Asbestos, Chlorite, Kyanite, Garnet, Talc, Calcite. Study of ore forming minerals such as Pyrite, Hematite, Magnetite, Amethyst, Galena, Pyrolusite, Graphite, Magnesite, and Bauxite, Coral reefs.

UNIT-III

Petrology: Definition of a rock, petrology. Classification of rocks-Geological classification of rocks. Rock Cycle. Classification of igneous Forms, structures and textures of igneous rocks. Classification of sedimentary rocks, and its structures and textures. Classification metamorphic rocks, its structures and textures.

Megascopic Study of Granite, Dolerite, Basalt, Pegmatite, Charnockite, Sandstone, Shale, Limestone, Gneiss, Schist, Quartzite, Marble and Slate.

UNIT-IV

Structural Geology: Out Crop, Study of geological structures associate with rocks such as folds, faults, joints, unconformities-their important types. Significance of Strike and dip in geological structures.

Earthquakes, their causes and effects, shield areas and seismic belts, seismic waves Richter scale, Precautions to be taken for building construction in seismic areas. Land slides, their causes and effect, measure to be taken to prevent their occurrence. Ground Water, water table, common types of ground water, springs, geological controls of ground water movement, ground water exploration.

UNIT V

Importance of Geophysical Investigations: Principles of geophysical methods. Importance of Electrical resistivity method and seismic refraction method from civil engineering point of view.

Geology of Dams, Reservoirs, Tunnels: Types of Dams, importance of geology in their site selection and geological considerations in the site selection of a dam, reservoir, tunnels. Histories of dams, geological factors affecting the water tightness and life of a reservoir. Purpose of tunneling, types of tunnels, out break, lining of tunnels.

TEXT BOOKS

1. Engineering Geology by N.Chennakesavulu, Mac-Millan, India Ltd.
2. Principals of Engineering Geology by K.V.G.K. Gokhale, B.S publications
3. Engineering Geology by Parbin Singh.

REFERENCES

1. Fundamentals of Engineering Geology by F.G Bell, Butterworth's publications, New Delhi.
2. Engineering Geology by Venkat Reddy, Vikas Publications.
3. Engineering Geology for Civil Engineers by P.C Varghese, PHI Publications.

(R11CED1118) GEOTECHNICAL ENGINEERING- I

Course Objectives

- Understand the basics of geotechnical engineering.
- Learn the basic principles of soil mechanics and its application to solve problems related to geotechnical engineering.
- basic understanding of the index and engineering properties of soils

Course Objectives

- Identify, formulate and solve geotechnical engineering problems.
- Improvising techniques, skills, and modern engineering tools necessary for necessary understanding in geotechnical engineering practice.
- A complete awareness of the classical concept of soil mechanics and its necessity

Unit 1

Properties of Soil

Introduction: Historical development – Physical properties of Soil – Void ratio – Porosity, Degree of Saturation, Water content, Unit Weights, Specific Gravity – their relationships, Relative density. Consistency limits – determination and various indices – plasticity index Liquidity index – Significance and Importance, Activity Classification of soils : Mechanical analysis – Sieve analysis, stoke's law, hydrometer and Pipette Analysis Textural Classification, Structural Classification based on size – unified soil classification and Indian Standard classification System- Basic concepts of clay minerals.

Unit II

Permeability and Seepage

Capillary water. Darcy's law. Factors affecting permeability. Determination of permeability by constant head and falling head method as per IS - 2720, field test as per IS – 5529 (part I)-pumping in test and pumping out test. Permeability of layered soils. Seepage forces. General flow equation (Laplace equation). Flow net construction and applications, Anisotropic soil conditions, quick sand condition. Uplift pressure, exit gradient, failure due to piping. Criteria for design of filters.

Unit III

Compaction

Soil compaction phenomenon. Factors affecting compaction. Dry density and moisture content relationship. Zero air voids line. Effect of compaction on soil structure. Standard

Proctor test and Modified Proctor test as per IS – 2720. Field compaction equipment and methods. Placement water content. Field control of compaction.

Consolidation: Oedometer Test, e-p and e-log p curves – compression index, coefficient of compressibility and coefficient of volume decrease. Terzaghi's one dimensional consolidation theory assumption, derivation and application, coefficient of consolidation time curve fitting methods, initial compression, primary compression and secondary compression determination of preconsolidation pressure. Normally consolidated, over consolidated and under consolidated clays.

Unit IV

Stress Distribution in Soils

Effective stress concept, Nature of effective stresses, Effect of water table fluctuations on effective stress, Effective stress in a soil mass under hydro static condition, Effective stress under steady seepage condition, failure of structures by piping. Boussinesq theory- point load, line load, strip load, pressure distribution diagram on a horizontal and vertical plane, pressure bulb, Westergaard's theory, equivalent point load method, Newmark chart, contact pressure, approximate stress distribution method.

Unit V

Shear Strength of Soil

Stress strain curve, stress at a point-Mohr circle of stress, Mohr-coulomb failure criteria, pore pressure, total and effective stress. Peak and residual shear strength. Factors affecting shear strength. Laboratory measurement of shear strength by direct, unconfined and triaxial tests under

different drainage conditions. Vane shear test. Shear strength characteristics of sands. Sensitivity and thixotropy of cohesive soils. Shear strength of sands, critical void ratio and dilatancy, shear strength of clays, total stress analysis and effective stress analysis, skempton's pore pressure coefficients, stress paths.

TEXT BOOKS

1. Basic and Applied Soil Mechanics by Gopal Rajan and A.S.R. Rao, New Age International Publishers
2. Soil Mechanics, Foundation Engineering by V.N.S. Murthy, CBS Publishers
3. Soil Mechanics and Foundation Engineering by K.R. Arora, Standard Publishers

REFERENCE BOOKS

1. Modern Geotechnical Engineering By Alam Singh, CBS Publishers
2. Geotechnical Engineering by C.Venkata Ramaiah, University Press
3. Soil Mechanics and Foundations by B.C.Punmia, LP

(R11CED1119) WATER RESOURCES ENGINEERING - I

Course Objectives:

- Learn the fundamentals of hydrology.
- understand the various formula used in Hydrology
- Solve analytical problems
- apply the hydrology to real problems

Course Outcomes:

- Find the average precipitation using several methods
- Find the evaporation, evapotranspiration and infiltration on a given field
- Construct Unit Hydrographs and determine design discharges for various structures.
- Learn the basics of Groundwater Hydrology and Well Hydraulics

UNIT : I

Introduction:

Hydrology – Definition, surface water hydrology and groundwater hydrology, Hydrology cycle – Different forms, Global Water Budget.

Precipitation:

Rain-gauge – Recording and non recording types, Mass rainfall curves – Characteristics mean rainfall on a basin – Arithmetic, Thiessen and Isohyetal methods, Intensity – Duration Analysis, Intensity – Frequency – Duration analysis, Depth – Area – Duration curves, PMP, Missing Rainfall Data – Estimation, Consistency of Rainfall records, Double mass curve, Rain gauge network analysis.

UNIT : II

Evaporation:

Evaporation process, Factors affecting evaporation, Estimation of evaporation, Measurement of evaporation – Evaporation pans, Control of evaporation; Transpiration, Evapo-transpiration, PET, Consumptive use, Lysimeter, Formulae for estimation of PET.

Infiltration:

Infiltration process, Factors affecting, Measurement of infiltration, Infiltrometer, Infiltration capacity curve, Horton's relation, Infiltration Indices, Φ -Index, W-Index and W_{min} Index.

UNIT : III

Runoff:

Components of Runoff, Factors affecting runoff; Estimation of runoff; Basin yield; Flow duration curves; Mass curve of runoff – Analysis; Estimation of safe yield from a reservoir of given capacity.

Hydrographs:

Hydrograph – components, separation of hydrograph into base flow and DRO – Methods; Unit hydrograph – principles, derivation of UH of Isolated unit storms, UH for various

durations – S-curve techniques, Estimation of runoff from UH; Average UH; limitations of UH theory; Synthetic UH; IUH. Instantaneous Unit Hydrograph

UNIT : IV

Design Discharge over a catchment:

Computation of design discharge – Rational formula. SCS curve number method, Introduction to Flood frequency analysis. Stream gauging – Measurement and Estimation.

UNIT : V

Groundwater Hydrology:

Occurrence, movement and distribution of groundwater, aquifers – types, specific yield, permeability, storage coefficient, Transmissibility, Rock properties affecting groundwater.

Well Hydraulics:

Steady radial flows into well confined and unconfined aquifers; Recuperation tests, Well interference, Well characteristics.

Text Books

1. Engineering Hydrology by Jaya Rami Reddy ,Laxmi Publications
2. Hydrology by Madan Mohan Das and Mimi Das Saikia ,PHI Publishers
3. Hydrology by K. Subramanya ,Tata McGraw-Hill

References

1. Elements of Engineering Hydrology by V.P. Singh ,PHI Publications
2. Ground water Hydrology by David Keith Todd, John Wiley and Son, New York.
3. Elements of water Resources Engineering by K.N.Duggal and J.P.Soni ,New Age International

VNR Vignana Jyothi Institute of Engineering and Technology

III Year B. Tech CE – I Sem	L	T/P/D	C
Elective-I	3	1	3
(R11CED1120) WASTE MANAGEMENT			

Student will be able to

- Develop an understanding the necessity of waste & waste water management
- Develop an understanding quality requirement of industrial waste water
- Develop an understanding treatment of Industrial waste water
- Develop an understanding of Common Effluent Treatment plant

Course Outcomes:

On successful completion of this course, it is expected that students should be able to

- Acquire the knowledge of solid waste management
- Acquire the knowledge of solid waste disposal techniques
- Acquire the knowledge of Bio medical waste disposal techniques
- Acquire the knowledge of e- waste disposal techniques

UNIT-I

Quality requirements of boiler and cooling waters – quality requirements of process water for textiles – food processing and Brewery industries – boiler and cooling water treatment methods.

UNIT-II

Basic theories of industrial waste water management – volume reduction – strength reduction – neutralization – equalization and proportioning. Joint treatment of industrial waste and domestic sewage – consequent problems.

UNIT-III

Industrial waste water discharges into streams, lakes and oceans and problems. Recirculation of industrial wastes – use of municipal waste water in industries.

UNIT –IV

Manufacturing process and design origin of liquid waste from textiles, paper and pulp industries, thermal power plants tanneries, fertilizers, distillers, dairy, sugar mills, steel plants, oil refineries, and pharmaceutical plants, special characteristics, effects and treatment methods.

UNIT –V

Common Effluent Treatment plants –Advantages and suitability, limitations, Effluent Disposal Methods

TEXT BOOKS

1. Waste water Treatment by M.N.Rao and Dutta, Oxford and IBH, New Delhi
2. Modern Technology of Waste Management: Pollution Control, Recycling, Treatment and Utilization by NIIR board, Asia Pacific Business Press Inc.
3. Handbook of Solid Waste Management by Frank Kreith, George Tchobanoglous, McGraw-Hill.

REFERENCES

1. Liquid waste of industry by Newmerow
2. Water and waste water technology by Mark J.Hammer and mark J.Hammer (Jr)
3. Environmental Engineering –II: Sewage disposal and Air Pollution Engineering, by Garg, S.K. Khanna Publishers.

III Year B. Tech CE – I Sem	L	T/P/D	C
Elective-I	3	1	3

(R11CED1121) ENVIRONMENTAL IMPACT ASSESSMENT AND MANAGEMENT

Course Objectives:

- Understand Environmental Impacts and assessment
- Understand the EIA methodology
- Understand about environmental audits

Course Outcomes:

- Learn the knowledge of Environmental examination
- Understand environmental clearances and guidelines
- Learn to prepare an audit report
- Know about environment laws and regulations

UNIT-I

Introduction to EIA, Definition of E IA and EIS. preparation of EIS, Elements of EIA, Classification of Environmental parameter.

UNIT – II

EIA methodology: Introduction, criteria for selection of EIA Methodology, Various methods.

UNIT – III

Environmental impacts, Identification measurement, Aggregation, Secondary and Cumulative Impacts, Criteria for selection of methodology, impact assessment methodologies, procedure for reviewing environment impact statement

UNIT – IV

Agency Activities, Environmental setting. Environmental attributes, air, water, soil, ecology, noise Socio-Economic aspects, Culture and human aspects (Human settlements – rehabilitations)

UNIT – V

Case studies in India and abroad, Environmental laws and regulations-Air act, Water act, environment protection act.

Text Books:

- 1.Environmental Impact Analysis by Urban and Jain.
- 2.Environmental Impact Analysis by Canter, Mc. Graw Hill Publishers
- 3.Environmental Impact Analysis by Y.Anjaneyulu,BS Publications

References:

1. EIA:A Practical guide by Betty Marriot , Mc. Graw Hill Publishers
2. Introduction to EIA BY John Gasson , Rini therivel and Andrew Chadwi,UCI Press

III Year B.Tech.C.E I – Sem

L T/P/D C

Elective-I

3 1 3

(R11CED1122) CONSTRUCTION TECHNOLOGY AND PROJECT MANAGEMENT

Course Objectives:

- Learn the fundamentals of construction law.
- Learn the fundamentals of construction safety.
- Understand various equipments used in construction.
- Learn Fundamentals of Project Planning.

Course Outcomes:

- Differentiate construction equipment.
- Prepare Plan and control resources of projects.
- Prepare Construction Schedule by using different methods.
- Know ISO 9000 Standards

UNIT-I :

Fundamentals of construction Technology – Construction activities – process – construction schedule – construction records – documents – quality – safety – codes and regulations.

UNIT-II :

Construction method – earthwork – piling – concrete and concreting – formwork – fabrication and erection - Mechanised construction – construction equipment – equipment economics – excavators – Rollers – Dozers – Scrapers – Handling equipment – concrete equipment – cranes – draglines and clamshalls

UNIT-III :

Quality control, Assurance and safety – ISO – 9000 – quality systems – principles on safety – personnel, fire and electrical safety – environment protection – concept of green building.

UNIT-IV :

Contract management – project estimation – types of estimation – contract document – classification – bidding – procurement process - Construction planning – project planning techniques – planning of manpower, material, equipment and finance.

UNIT-V :

Project scheduling – PERT – CPM, Resource leveling - Construction claims, Dispute and project closure – source of claim – claim management – Dispute Resolution – Arbitration – Construction Closure – Contract Closure – Documentation.

TEXT BOOK

1. Construction Technology by Subir K.Sarkar, Subhajit Saraswati / Oxford University Press
2. Construction Project Management – Theory and Practice, Nirajjha, Pearson Education

REFERENCES

1. Construction Planning Equipment and Methods by Peurifacy, Schexnayder, Sharpira TMH
2. Project Planning and Control with PERT and CPM – B.C. Punmia, K.K.Khandelwala – Laxmi Publication.

(R11CED1205) COMPUTER AIDED DRAFTING OF BUILDINGS and ENGINEERING GEOLOGY LAB

COMPUTER AIDED DRAFTING OF BUILDINGS:

Course Objectives:

- Use AutoCAD software.
- Use different commands to draw Building Drawings.
- Draw different components of Doors and Windows.
- Draw different types of Trusses.

Course Outcomes:

- Use different Autocad Commands to develop Plan, Section and elevation of single Storied and Multi Storied Buildings.
- Draw and detail different Components of different types of doors and windows.
- Develop Working Drawings of Residential Buildings.
- Prepare drawing with details of roof trusses

1. Introduction to Computer Aided Drafting.
2. Software for CAD- Introduction to different software's.
3. Practice exercises on CAD software.
4. Drawing of plans of buildings using software a) single storied buildings b) multi storied buildings.
5. Developing sections and elevations for a) single storied buildings b) multi storied buildings.
6. Detailing of building components like Doors, Windows, Roof Trusses etc. using CAD software.
7. Exercise on development of working drawings of buildings

TEXT BOOKS

1. Computer Aided Design Laboratory by M.N.Sesha Prakash and Dr. G.S.Servesh – Laxmi Publications
2. Engineering Graphics by P.J.Sha-S.Chand and Co.

ENGINEERING GEOLOGY:

Course Objectives:

- Identify the mineral name by studying the properties
- Identify the rocks
- Interpretation of geological maps

Course Outcomes:

- Identify various Minerals
- Identify the rocks
- Interpret and draw the sections for geological maps showing horizontal beds, vertical beds, inclined beds, folds, faults, unconformities

List of Experiments

1. Study of physical properties and identification of minerals referred under theory. Feldspar, Quartz, Flint, Jasper, Olivine, Augite, Hornblende, Muscovite, Biotite, Asbestos, Chlorite, Kyanite, Garnet, Talc, Calcite. Study of ore forming minerals such as Pyrite, Hematite, Magnetite, Amethyst, Galena, Pyrolusite, Graphite, Magnesite, and Bauxite, Coral reefs.

2. Megascopic description and identification of rocks referred under theory. Granite, Dolerite, Basalt, Pegmatite, Charnockite, Sandstone, Shale, Limestone, Gneiss, Schist, Quartzite, Marble and Slate.

3. Interpretation and drawing of sections for geological maps showing horizontal beds, vertical beds, inclined beds, folds, faults, unconformities.

III Year B. Tech CE – I Sem

L	T/P/D	C
0	3	2

(R11HAS1204) ADVANCED ENGLISH LANGUAGE COMMUNICATION SKILLS
LABORATORY

Introduction

This course aims to offer students a practical approach to Technical Writing, and provide a relevant, contemporary and authoritative introduction to the dynamic field of technical communication that prepares them for Workplace Communication. Each unit in the syllabus is devised so as to include a writing component as well as an oral component.

Course objectives:

- enable the students to create clear, accurate, and succinct content to write business letters, resume, SOP, Proposals and Technical Reports for academics as well as for workplace
- enable students to adjust technical content to meet the needs of a specific target audience
- groom students to speak accurately and fluently and prepare them for real world activities through behavioral skills

Course Outcomes:

- summarize and synthesize information and produce technical writing that is required in academics as well as in the engineering profession
- write covering letters, resume, SOP, Project Proposals and Technical Reports
- speak fluently and address a large group of audience and participate in debates and discussions

Methodology

Writing Component

A Process- Genre methodology will be used in teaching the technical genres. This method would enable students to understand the use of particular lexico-grammatical patterns required of in the context of technical writing. They would learn to use language to express the particular communicative intent that is required of in the context of writing these genres.

Oral Communication Component

The objective of including Oral Communication is to impart behavioral skills and prepare students to speak to a large group or team, keeping in mind the audience, context and purpose of communication. This Oral Communication component must enable students to speak in an organized and mature way, without any inhibitions. They will be groomed to relate their speech to their audience.

Objectives of Oral Communication Component

- i) equip students with Behavioral skills
- ii) prepare them for Oral presentations, and Group Discussions
- iii) equip them with Interview skills

Syllabus Outline

Unit I

1. Applications and Covering letters
2. Resume Writing
3. Oral Communication :Self Introduction

Unit II

1. Introduction to Technical Writing

- Defining Technical Writing
- Distinguishing it from other types of writing
- Determining audience, purpose and context

2. Summarizing and Synthesizing Information

3. Behavioral Skills and Personality Development

- a) Building a Positive Attitude, Building a Positive Personality, Motivation, Goal Setting and Values and Vision
- b) Problem Solving and Decision Making; Negotiation Skills through Role Play
- c) Team Building and Leadership Abilities

Unit III

1. Verbal Ability : Language, Reasoning Skills, Analytical Ability, Reading and Listening Skills
2. Oral Communication: Presentation Skills (Oral and Visual)

Unit IV

1. Writing Research Abstracts
2. Oral Communication: Group Discussions

Unit V.

1. Writing Project Proposals
2. Writing Project Reports
3. Oral Communication: Interview Skills

REQUIRED TEXT BOOKS AND MATERIALS

1. Technical Writing: Process and Product by Sharon J. Gerson and Steven M. Gerson (1999); *Publisher: Prentice Hall.*
2. Effective Technical Communication by Ashraf Rizvi, M., (2005); *Publisher: Tata Mc Graw Hill.*
3. Anderson, Paul V. (2003). Reports. In Paul V. Anderson's Technical Communication: A Reader-Centered Approach (5th ed.) (pp. 457-473). Boston: Heinle.

REFERENCES

1. Technical Communication by Rebecca E. Burnett, 5th edition (2001); *Publisher: Thomson/Wadsworth*
2. Technical Communication: A Practical Approach (7th ed.) by William S. Pfeiffer; *Publisher: Person education*
3. Technical Communication: Situations and Strategies by Mike Markel (2006-2007); *Publisher: Bedford/ St. Martins.*
4. Anderson, Paul V. (2003). Three Types of Special Reports. In Paul V. Anderson's Technical Communication: A Reader-Centered Approach (5th ed.) (pp. 474-513). Boston:Heinle.
5. Bolter, Jay David (2001), "The Late Age of Print" in Robert P. Yagelski's Literacies and Technologies: A Reader for Contemporary Writers (135-145); *Publisher: Longman.*
6. Brandt, Deborah. (1998) Sponsors of literacy. *College Composition and Communication* 49.2, 165-185.
7. Burnett, Rebecca, E. (2001) "Locating and Recording Information" in Rebecca E. Burnett's Technical Communication (pp. 164-195).
8. Johnson-Sheehan, Richard (2007). "Starting Your Career" in Richard Johnson-Sheehan's Technical Communication Today (2nd ed.) (pp. 388-402). New York: Longman.
9. Business Correspondence and Report Writing by R. C. Sharma and K. Mohan, Third Edition (2002); *Publisher: Tata McGraw Hill.*
10. Technical Communication: Principles and Practices by M. Raman and S. Sharma (Indian edition; 2004); *Publisher: Oxford University Press.*

III Year B. Tech CE – II Sem

L	T/P/D	C
3	1	3

(R11CED1123) CONCRETE TECHNOLOGY

UNIT -I

Course Objectives:

- Use different types of cement as per their properties for different field applications.
- Design economic concrete mix proportion for different exposure conditions and intended purposes.
- Supervise various concreting operations.
- Carry out field and laboratory tests on concrete in plastic and hardened stage.

Course Outcomes:

- Determine the properties of concrete ingredients i.e. cement, sand, coarse aggregate by conducting different tests.
- Recognize the effects of the rheology and early age properties of concrete on its long-term behavior.
- Develop an advanced knowledge of the mechanical performance of cement based materials and how it can be controlled
- Use various chemical admixtures and mineral additives to design cement based materials with tailor-made properties
- Use advanced laboratory techniques to characterize cement-based materials.
- Understand the mix design and engineering properties of special concretes such as high-performance concrete, self-compacting concrete, fibre reinforced concrete, etc.

Cements, Aggregates and Admixtures : Portland cement – chemical composition, hydration, setting of cement , structure of hydrated cement –Tests on physical properties – Different grades of cement – Classification of aggregates - Mechanical properties of aggregates – Specific gravity – Bulk density – Porosity – Absorption and moisture content of aggregates - Alkali aggregate reaction – Fineness modulus - Grading curves - Grading of fine and coarse aggregates - Admixtures – Mineral and chemical admixtures.

UNIT –II

Fresh concrete: Workability – Factors affecting workability – Measurement of workability by different tests - setting times of concrete - Effect of time and temperature on workability -

Segregation and Bleeding - Mixing and vibration of concrete - Steps in the manufacture of concrete - Quality of mixing water.

UNIT –III

Hardened concrete:

Water/cement ratio - Abram's Law – Gel space ratio - Nature of strength of concrete - Maturity concept - strength in tension and compression - Factors affecting strength -Relation between compression and tensile strength – Curing.

UNIT –IV

Testing of hardened concrete:

Compression test -Tension Test - Flexure Test - Splitting Test- Factors affecting strength- Non-Destructing Testing methods – Codal provisions for NDT - Modulus of Elasticity - Dynamic modulus of elasticity- Poisson's ratio - Creep of concrete - Factors influencing creep – Relation between creep and time – Nature of creep - Shrinkage- types of shrinkage.

UNIT-V

Mix design: Factors in the choice of mix proportions - Durability of concrete- Statistical methods – Acceptance criteria –Proportioning of concrete mixes by various methods - BIS method of mix design.

Special Concretes: Light weight aggregates – Light weight aggregate concrete – High density concrete – Fibre reinforced concrete – Polymer concrete – Types of polymer concrete – High performance concrete – Self compacting concrete-Ready Mix Concrete.

TEXT BOOKS

1. Concrete Technology by M.S.Shetty, S.Chand and Co.
2. Concrete Technology by M.L.Gambhir, Tata Mc. Graw Hill Publishers, New Delhi.
3. Concrete Technology by A.R.Santha Kumar, Oxford university press, New Delhi

REFERENCE BOOKS

1. Properties of concrete by A.M.Neville, Low priced edition-4th Edition
2. Concrete: Micro Structure, Properties and materials by P.K.Mehta and J.M. Monteiro, Mc.Graw Hill Publishers
3. Concrete Technology by A.M.Neville and J.J.Brooks – Pearson Education Ltd.

(R11CED1124) DESIGN OF STEEL STRUCTURES

Course Objectives:

- Know about the manufacturing process of steel, types of steel and their properties
- Understand the salient features of Limit State Method of design of Steel structures.
- Understand the various codal provisions given in IS. 800.
- Know the behaviour of steel structures under tension, compression and flexure.

Course Outcomes:

- Design the tension members and compression members.
- Design the slab and gusset type column bases.
- Design the welded plate girder and various stiffeners.
- Design the various components of roof trusses

UNIT-I

Materials-Manufacturing of iron and steel-types of structural steel-mechanical properties of steel-concepts of plasticity-yield strength-loads and combinations-local buckling behavior of steel-concept of limit state design-limit states-design strengths-deflection limits-serviceability-stability check

UNIT-II

Bolted connections-riveted connections-IS-800-2007-specifications-Design strength-efficiency of joint-prying action-welded connections-Types of welded joints-specifications-design requirements

Design of tension members-Design strength-Design procedure- splice-lug angles

UNIT-III

Design of compression members—buckling-slenderness ratio/strength design-laced columns-battened columns-splice-column base-slab base

UNIT-IV

Design of beams-plastic moment-bending and shear strength/buckling- built up sections-laterally supported beams

UNIT-V

Design of welded plate girder-elements-economical depth-design of main section-connections between web and flange-design of stiffness bearing-intermediate stiffeners-design of web splice and flange splice

Text Books :

1. Limit state Design of Steel Structures by S K Duggal, Tata McGraw Hill Education Pvt. Limited
2. Design of Steel Structures by N Subramanian Oxford University Press
3. Design of Steel Structures by S.S. Bhavikatti(By limit statemethod), IK international Publishing House Pvt.Limited

References

1. Limit state Design of steel structures by Dr.V L Shaw, Structures Publications, Pune
2. Design of Steel Structures by K S SaiRam Pearson Education,India

I.S.Codes :

1. IS 800 : 2007
2. IS 875 (Part III):1983
3. Steel Tables.

Final Examination Pattern

The final examination paper should consists of Part A and Part B. Part A consists of two questions in design and drawing (Detailed dimensioned sketches-Not to scale), out of which one question is to be answered. Part B should consists of five questions , out of which three are to be answered. Weightage for Part A is 40 % (i.e. 28 Marks) and Part B is 60 % (i.e. 42 Marks)

(R11CED1125) GEOTECHNICAL ENGINEERING – II

Course Objectives:

- Solve foundation engineering problems.
- Understanding of sampling techniques in soils.
- Impact of engineering solutions related to the ground stability.
- Design shallow and deep foundations.

Course Outcomes:

- Knowledge of foundation engineering to improve stability of the slopes.
- Design an effective foundation system for economic and safe aspects.
- An understanding of the various problems related to the different types of foundations and their adoption to site conditions.

UNIT – I

Subsoil Exploration : Methods of subsoil exploration Direct, semi direct and indirect methods, Soundings by Standard, Dynamic cone and static cone penetration tests, Types of Boring, Types of samples, Criteria for undisturbed samples, Transport and preservation of samples, Borelogs, planning of exploration programmes, report writing.

UNIT – II

Earth slope stability: Infinite and finite earth slopes – types of failures – factor of safety of infinite slopes – stability analysis by Swedish arc method, standard method of slices, Bishop's Simplified method– Taylor's Stability Number- Stability of slopes of earth dams under different conditions.

UNIT – III

Earth Pressure : Types of Earth pressure. Rankines Active and passive earth pressure, Smooth Vertical wall with horizontal backfill. Extension to Soil Coloumbs wedge theory, Culmans and Rebhanns graphical method for active earth pressure. **RETAINING WALLS**: Types of retaining walls - Stability of retaining walls.

UNIT – IV

Bearing Capacity : Safe bearing capacity and allowable bearing pressure, Terzaghi's bearing capacity equations its modifications for square, rectangular and circular foundation, General and local shear failure conditions. Factors affecting bearing capacity of Soil.

Allowable bearing pressure based on N-values. Bearing capacity from plate load tests. Shallow Foundations : Factors effecting locations of foundation and design considerations of shallow foundations, choice of type of foundations. Foundations on expansive soils.

Settlement analysis : causes of settlement, Computation of settlement, allowable settlement. Measures to reduce settlement.

UNIT – V

Pile Foundations : Types, Construction, load carrying capacity of single pile – Dynamic Formula, Static formula, Pile load tests, Load carrying capacity of pile groups, settlement of pile groups, Negative skin friction.

TEXT BOOKS

1. Analysis, Design of foundations and Earth retaining structures by Shamsher Prakash, Gopal Ranjan and Swami Saran, IBH Publishers
2. Foundation Analysis and Design by J. E. Bowles.,Tata Mc-Graw Hill Publishers
3. Soil Mechanics and Foundation Engineering by K.R. Arora,Standard Publishers

REFERENCE BOOKS

1. Foundation Design By W.C Teng, Prentice Hall Publishers
2. Geotechnical Engineering by VNS Murthy, CBS Publishers
3. Geotechnical Engineering by S.K.Gulhati and Manoj Datta

III Year B. Tech CE – II Sem	L	T/P/D	C
	3	1	3
(R11CED1126) WATER RESOURCES ENGINEERING - II			

Course Objectives:

- Learn the fundamentals of Irrigation Engineering.
- the details of water requirement of crops
- solve analytical problems
- design different components of a Irrigation System

Course Outcomes:

- Compute the water requirement of various crops
- Calculate the reservoir capacity required for Irrigation
- Design various types of Diversion Head Works
- Design Irrigation Canals using different theories

UNIT – I

Introduction to Irrigation Engineering:

Necessity and importance of irrigation, advantages and ill effects of irrigation, types of irrigation, methods of application of irrigation water, Indian agricultural soils, methods of improving soil fertility, preparation of land for irrigation, standards of quality for irrigation water.

Water Requirements of Crops:

Soil-water-plant relationship, vertical distribution of soil moisture, soil moisture constants, soil moisture tension, consumptive use, estimation of consumptive use, Duty and delta, factors affecting duty, depth and frequency of Irrigation, irrigation efficiencies.

UNIT – II

Reservoir Planning: Factors governing selection of site for reservoirs, zones of storage of a reservoir, reservoir yield, estimation of capacity of reservoir using mass curve. Reservoir sedimentation-control.

Dams: Gravity Dams: Types of dams, factors affecting selection of type of dam, Forces acting on gravity dam, causes of failure of a gravity dam, elementary profile and practical profile of a gravity dam, limiting height of a low gravity dam, stability analysis, drainage galleries.

UNIT – III

Earthen Dams : Types of Earth dams, causes of failure of earth dam, criteria for safe design of earth dam, seepage through earth dam-graphical method, measures for control of seepage.

Spillways: Types of spillways, design principles of Ogee spillways, types of spillway gates.

UNIT – IV

Diversion Head works : Types of Diversion head works-diversion and storage head works, weirs and barrages, layout of diversion head works, components, Causes and failure of hydraulic structures on permeable foundations, Bligh's creep theory, Khosla's theory, determination of uplift pressure, impervious floors using Bligh's and Khosla's theory, exit gradient, functions of U/s and d/s sheet piles.

Canal Falls: Types of falls and their location , Design Principles of Sarda type fall, trapezoidal notch fall..

UNIT – V

Irrigation Canals: Classification of canals, Silt Theories –Kennedy's Theory, design procedure of canals, Silt supporting capacity, drawbacks, Lacey's regime theory – design procedure of canals, comparison of Kennedy's and Lacey's regime theory.

Design of Irrigation Canals: Balancing depth of cutting – use of Garret's diagrams in canal design – use of Lacey's diagrams – canal design – water logging and canal lining, Cross drainage works – Types, selection of suitable types of CD works.

Text Books

1. Irrigation Engineering and Hydraulic Structures by S.K. Garg (Khanna Publishers)
2. Irrigation Engineering by K.R. Arora (Standard Publishers)
3. Irrigation Engineering by R.K. Sharma and T.K. Sharma (S.Chand Publishers)

References:

1. Irrigation and Water Resources Engineering by G.L.Asawa (New Age Publishers)
2. Irrigation and Water Power Engineering by Punmia and Lal , Laxmi Publications Pvt.Ltd.,New Delhi.
3. Theory and Design of Hydraulic Structures by Varshney (Gupta and Gupta)

Course Objectives:

- Introduce students the principal of highway design, road safety and highway construction materials.
- Applying the skills to design roads and select material for road construction.

Course Outcomes:

- Classify roads based on functional classification,
- Describe design element: sight distance, horizontal curvature, super elevation, grades, visibility on vertical curves, cross section elements
- Use fundamental physics and mathematical knowledge in deriving geometric design equations
- Plan surveys, preparation of survey forms and data collection from field for highway design
- Construct safety audit at different stage of road construction and Describe the structural elements of highway and causes for structural failures in pavement

UNIT – I

Highway Development and Planning

Highway Development in India; Necessity for Highway Planning; Different Development Plan – Classification of Roads – Road Network pattern – Highway Alignment - Factors controlling alignment; Engineering surveys; drawing and report.

UNIT - II

Highway Geometric Design:

Importance of Highway Geometrics– Highway Cross-section elements; Sight distance – Stopping Sight Distance – Design of Horizontal alignment – Design of Super Elevation and Extra Widening – Design of Transition Curves - Design of vertical alignment – Gradients – Vertical Curves.

UNIT – III

Traffic Engineering

Parameters of Traffic Volume, Speed and Density – Traffic Volume Studies – Data Collection and presentation of speed studies – Parking Studies and Parking Characteristics – Road Accidents – Causes and Preventative Measures – Accident Data Recording – Condition and collision diagram.

Traffic Regulation and Management

Road Traffic Signs – Types and Specifications – Road Marking – Need for Road Marking – Types of Road Marking – Design of Traffic Signals – Webster and IRC method

Intersection Design

Intersections – Conflicts at Intersections – Types of At – Grade Intersections – Channelisation: Objectives – Traffic Islands and Design Criteria – Types of Grade Separated Intersections – Rotary Intersection – Concept of Rotary and Design Criteria – Advantageous and Disadvantageous of Rotary.

UNIT - IV

Railway Engineering:

Permanent Way components – Cross Section of Permanent Way – Functions of various components like Rails, Sleepers and Ballast – Rail Fastenings – Creep of Rails – Theories related to Creep – Adzing of Sleepers – Sleeper Density.

Geometric Design Of Track:

Gradients and Gradient Compensation; Cant and Negative Super elevation; Cant Deficiency – Degree of the curve – Crossing and Turnouts.

UNIT - V

Airport Engineering

Factor affecting selection of site for Airport; Air–craft characteristics, Geometric Design of Runway – Computation of Runway length – Correction for Runway length – Orientation of Runway – Wind Rose Diagram – Runway Lighting System.

TEXT BOOKS

- 1.Highway Engineering by S. K. Khanna and C. E. G. Justo; Nemchand and Brothers, Roorkee.
- 2.Railway engineering by S.C. Saxena and S. Arora; Dhanpat Rai and Sons; Delhi.

3. Airport planning and Design by S.K. Khanna and M.G Arora; Nemchand and Bros, Roorkee.

REFERENCES

1. Principles of Transportation Engineering by Partha Chakroborty and Aminesh Das; Prentice Hall of India, New Delhi.

2. Transport planning and Traffic Engineering by Dr. L. R. Kadiyali, Khanna Publications, New Delhi

III Year B. Tech CE – II Sem	L	T/P/D	C
Elective- II	3	1	3

(R11CED1128) WATER RESOURCES PLANNING AND MANAGEMENT

Course Objectives:

- The concepts of Water Resource Planning and Management.
- understand different types of Optimization Techniques
- solve analytical problems
- optimal allocation of water resources

Course Outcomes:

- Do Linear and Dynamic Programming
- Use non linear optimization models
- Perform benefit cost calculation for Projects
- Allocate water resources based on scientific criterion

UNIT I

Introduction: Concepts of systems analysis, definition, systems approach to water resources planning and management, role of optimization models objective function and constraints, types of optimization techniques.

Linear Programming - I : Formulation linear programming models, graphical method, simplex method, application of Linear programming in water resources.

UNIT II

Linear Programming - II : Revised simplex method, duality in linear programming, sensitivity and past optimality analysis.

UNIT III

Dynamic programming : Belman's principles of optimality forward and backward recursive dynamic programming, case of dimensionality, application of dynamic for resource allocation.

UNIT IV

Non-linear Optimization Techniques : Clerical of method optimization, Kuch-Tucleer, gradient based research techniques for simple unconstrained optimization.

Simulation : Application of simulation techniques in water resources.

UNIT V

Water- resources economics : Principles of Economics analysis, benefit cost analysis socio economic intutional and pricing of water resources.

Water resources Management: Planning of reservoir system, optimal operation of single reservoir system, allocation of water resources, optimal cropping pattern, conjunctive use of surface and sub-surface water resources.

TEXT BOOKS

1. Water Resources Systems by S. Vedula and P.P Mujumdar – Tata Mc.Graw-Hill Company Ltd.2005.
2. Water Resources Economics by James and Lee. Oxford Publishers 2005.
3. Water Resources Systems Planning and Analysis by D.P. Loucks, J.R.Stednger and D.A.Houth – Printice-Hall, Englewood Cliffs. N.J

REFERENCES

1. Optimal design of water distribution networks P.R.Bhave, Narosa Publishing house 2003.
2. Water Resources Systems Engineering by W.A.Hall and J.A.Dracup – McGraw Hill, Inc New York
3. Engineering Optimization:Theory and Practice by S.S.Rao, New Age International (P) Ltd. New Delhi

III Year B. Tech CE – II Sem	L	T/P/D	C
Elective- II	3	1	3
(R11CED1129) URBAN DISASTER INTELLIGENT CONTROL SYSTEMS			

Course Objectives :

Student will be able to

- Classify the various types of disasters, understand the various terminologies
- Analyze the various causes of disasters (both natural and man-made) and their impacts
- Gain the knowledge of different monitoring profiles (engineering profile and planning profile) to track the urban disasters. And know the means to use the information systems like GIS, MIS in disaster control system.
- Forecast the different approaches through decision supporting systems, online monitoring systems etc.

Course Outcomes:

On successful completion of this course, it is expected that students should be able to

- Identify the various disasters and group them
- Identify the important major disasters and their impacts in the urban society
- Learn some technical skills and software proficiency to monitor the urban disasters
- Forecast the important urban disasters using online support systems.

UNIT – I

Disasters : Types of disaster, Significant aspects of disasters, Economic impact of disasters, Risk aspects, Hazards and disasters.

UNIT - II

Urban disaster and their environmental impacts : Impact of earthquakes, floods, fire, droughts, landslides, Congestion pollution, Accident risk on urban environmental policies for remedial measures, Technology to forecast their impact

UNIT – III

Technology to track Urban disasters : Monitoring profile – Cameras, Sensors and Communication systems. Engineering profile – Total station, Terrestrial scanners and other survey equipment. Planning profile – GPS, Satellite technology and Photographic technique

UNIT – IV

Information Systems : GIS – Overview of different packages. MIS – Architecture, Overview of Web enabled communication systems

UNIT – V

Intelligent Control Systems : Technology enabled online monitoring system, Post evaluation multi criteria systems, Forecasting approaches through decision supporting systems

Text Books

1. Disasters – Global challenges and local solutions by Rajib Shaw, R.R. Krishna Murthy, University Press
2. Disaster mitigation – Experiences and Reflections by Pradeep Sahni, Alka Dhameja and Uma Madhuri, PHI.
3. Disaster Management – H K Gupta, Universities Press

References

1. A S Arya Action Plan for Earthquake, Disaster, Mitigation by V K Sharma, Disaster Management IIPA Publication, NewDelhi
2. An Overview on Natural and Man made Disasters and their reduction by R K Bhandani, CSIR, NewDelhi
3. Manuals on Natural Disaster Management in India by M C Gupta , National Centre for Disaster Management, IIPA, NewDelhi.

III Year B. Tech CE – II Sem
Elective- II

L	T/P/D	C
3	1	3

(R11CED1130) ADVANCED STRUCTURAL ANALYSIS

Course objectives:

- To apply the Displacement methods of analysis to frames with inclined legs and gable frames.
- To understand the effects of moving loads on indeterminate structures
- To understand the flexibility and stiffness methods of analysis of beams, frames and plane trusses
- To understand plastic analysis of beams and frames

Course outcomes:

- Apply the displacement method to complex structural systems.
- Understand the qualitative use of influence lines of indeterminate beams and Trusses to loading positions for maximum internal forces
- Use the displacement methods over force methods for various structures.
- Plastic analysis of structures and be able to determine collapse load and collapse for beams and frames

UNIT-I

Moment Distribution method: Application to the analysis of portal frames with inclined legs, gable frames

UNIT – II

Influence lines for Indeterminate structures : Muller -Breslau Influence theorem for statically Indeterminate beams , Influence line diagrams for Reaction, Shearing force and Bending moment in case of Indeterminate beams and Influence line diagrams for member forces in statically Indeterminate trusses – application of influence line diagrams.

UNIT – III

Flexibility Method: Determination of static indeterminacy-Flexibility matrix formation-Application to continuous beams, Plane frames and Plane Trusses.

UNIT – IV

Stiffness method: Determination of kinematic indeterminacy-Stiffness matrix formation-Application to continuous beams, Plane frames and Plane Trusses.

UNIT – V

Plastic Analysis: Introduction – Idealized stress – Strain diagram – shape factors for various sections – Moment curvature relationship – ultimate moment – Plastic hinge – lower and upper bound theorems – ultimate strength of fixed and continuous beams-portal frames with single bay and single storey

TEXT BOOKS

1. Matrix methods of Structural Analysis by Pandit and Gupta – Tata Mc.Graw Hill
2. Analysis of structures Vol. I and II by Vazrani and Ratwani. Khanna publications.
3. Comprehensive Structural Analysis Vol.1 and 2 by Dr. Vaidyanathan and Dr. P.Perumal - by Laxmi, publications Pvt. Ltd., New Delhi

REFERENCES

1. Structural Analysis by D.S.Prakash Rao - Sagar books
2. Structural Analysis Vol. I and II by Bhavi Katti Vikas Publications.
3. Matrix structural analysis by T.N.Gayl; Tata Mc.Graw Hill company

(R11CED1206) GEOTECHNICAL ENGINEERING LAB

Course Objectives:

- Introduce traditional program consisting mostly of practical courses related to geotechnical engineering.
- To apply the knowledge of science, mathematics and engineering with the context of applications in geotechnical engineering.
- Design and conduct experiments, analyze and interpret data related to the various laboratory tests studied in geotechnical engineering.

Course outcomes:

- Use the techniques, skills, and modern engineering tools necessary for engineering practice.
- An opportunity to work in groups
- Identify, formulate and practice the various soil identification and classification tests.
- The students would develop an ability to work in groups, coordinate, communicate and improve report writing skills..

LIST OF EXPERIMENTS

1. Field Density Test by Core cutter Method and Specific Gravity of Soils
2. Grain Size Analysis
 - A. Sieve Analysis
 - B. Hydrometer Analysis
3. Determination of Consistency Limits
4. Permeability Test
 - A. Constant Head Method
 - B. Falling Head Method
5. CBR Test
6. Proctor Compaction Test
 - a) Light Compaction
 - b) Heavy Compaction

7. Vane Shear Test
8. Direct Shear Test
9. Field Density by Sand Replacement Method
10. Unconfined Compression Test
11. Demonstration of Undrained Triaxial Test
12. Demonstration of Consolidation Test

(R11CED1207) CONCRETE LAB / HIGHWAY MATERIALS LAB

CONCRETE LAB

Course Objectives

- Understand the test procedures to find Physical properties of Cement
- Learn test procedures to find Specific Gravity, Bulking of Aggregates.
- Learn test procedures to find properties of Fresh Concrete
- Learn the test procedures to find properties of Hardened Concrete

Course Outcomes

- Test Fineness, Specific Gravity, Setting Time, Soundness and Compressive Strength of Cement
- Test Specific Gravity of Coarse Aggregate and Fine Aggregate, Bulking of Fine Aggregate.
- Design Concrete Mix Proportioning by Using Indian Standard Method.
- Test Workability of Fresh Concrete and Compressive strength, Split Tensile Strength of Hardened Concrete

Cycle - I

- 1) Specific gravity of Cement and Fineness of Cement
- 2) a) Normal Consistency of Cement
b) Initial and final Setting times of Cement
- 3) Soundness of Cement
- 4) Compressive Strength of Cement
- 5) Sieve Analysis-Gradation(Fine Aggregate and Coarse Aggregate)

Cycle – II

- 6) Bulking of Sand
- 7) Workability test on Concrete - Slump and Compacting factor test
- 8) Vee-Bee Consistency Test.
- 9) Compressive Strength of Concrete
- 10) Young's modulus of Concrete
- 11) Non- Destructive testing of concrete (for Demonstration)

HIGHWAY MATERIALS LAB

Course Objectives:

- Learn pavement management systems at Network level and project level.
- Learn Functional and Structural Evaluation of pavement.
- Learn Alternate design strategies of pavement and Economic Evaluation.

Course Outcomes:

- Identify the aggregate used and quality and design sizes of each layers used for construction of pavement.
- Identify and select the various Design strategies of pavement using Lab Equipment.
- Evaluate the pavement condition using Functional and Structural Evaluation pavement.
- Evaluate and Estimate the life cycle cost of Pavement.

Test on Road Aggregates

1. Aggregate Crushing Value
2. Aggregate Impact Value
3. Los Angle's Abrasion Test.
4. Shape Tests a) Elongation Index, b) Flakiness Index, c) Angularity Number.
5. Stripping Value

Test on Bitumen

1. Penetration Test
2. Softening Point test
3. Ductility Test
4. Bitumen Extraction Tests
5. Viscosity Test (with Brookfeild Viscometer)

Test on Mix Design

1. Design Mix of Bituminous Concrete
2. Design Mix of Dense Bituminous Concrete

REFERENCE BOOKS

1. **"Hot Mix Asphalt Paving Hand book"** - National Asphalt Pavement Association - 5100 Forbes Boulevard, Lanham, Maryland, USA
2. MoRTH **"Specifications for Roads and Bridge Works"**- 2001, fourth revision, Indian Roads Congress
3. MoRTH **"Manual for Construction and Supervision of Bituminous Works"**- 2001, Indian Roads Congress

Note: All tests are as per IS, ASTM, AASHTO, TRL, IRC, BS procedures / specifications and guidelines

(R11CED1131) REMOTE SENSING and GIS

Course Objectives

- The remote sensing serves the purpose of accurate mapping of all features under different spatial and temporal scales of all kinds of terrain and land under water bodies.
- The remote sensing is advantageous comparatively to traditional surveying techniques in terms of time, accuracy and output.
- Remote sensing serves the purpose of predictions of all scales.
- GIS is software which can be used for collecting, storing and analyzing of data which is useful for real world applications.

Course Outcomes:

- Based on the objective of study a student should have thorough knowledge to choose the remote sensing image from different sensors, resolutions, spatial and temporal scales.
- Remote sensing gives the provision of understanding and to comprehend large tracks of earth surface with less time and cost but more accuracy.
- In case of dam construction, for a civil engineer it is must to have knowledge of resource richness of an area, flow rates in stream, channel geometry with respect to time, magnitudes of movement in crust, habitations etc.
- By GIS the student can communicate to the common man his analysis of different problems developments, benefits by preparing different thematic maps.

UNIT – I

Introduction to Remote Sensing:

Basic concepts and foundation of remote sensing- elements involved in remote sensing, electromagnetic spectrum, remote sensing terminology and units, energy resources, energy interactions with earth surface features and atmosphere.

UNIT – II

Remote Sensing Platforms and Sensors:

Resolution, types of sensors, IRS satellites, visual interpretation techniques, basic elements, converging evidence, interpretation for terrain evaluation, spectral properties of soil, water and vegetation.

UNIT – III

Digital Image Processing:

Digital Image Processing: Pre-processing of digital data – Digital image histogram, Line banding correction, Line dropout correction, Geometric correction, Atmospheric correction, Solar illumination correction; Image enhancement – Contrast stretching, Thresholding and density slicing, Spatial filtering, Band ratioing.

UNIT – IV

Geographic Information System:

Introduction, GIS definition and terminology, GIS categories, components of GIS, fundamental operations of GIS, A theoretical framework for GIS, Data collection and input overview, data input and output, keyboard entry and co-ordinate geometry procedure, manual digitizing and scanning, Raster GIS, Vector GIS-File management, Spatial data-Layer based GIS, Feature based GIS mapping

UNIT – V

Applications Of Remote Sensing And Gis:

Land Use Land Cover mapping, agricultural applications, oceanographic applications, urban and regional planning applications.

TEXT BOOKS

1. Remote sensing and its applications by LRA Narayana University Press 1999
2. Principals of Geophysical Information Systems by Peter A.Burrough and Rachael A.Mc.Donnell, Oxford Publishers 2004.
3. Concepts and Techniques of GIS by C.P.Lo Albert, K.W.Young, Prentice Hall (India) Publications

REFERENCES

1. Remote Sensing and Geographical Information systems by M.Anji Reddy JNTU Hyderabad 2001, B.S.Publications.
2. GIS by Kang-tsung chang, TMH Publications and Co.
3. Basics of Remote Sensing and GIS by S.Kumar, Laxmi Publications

(R11CED1132) ENVIRONMENTAL ENGINEERING

Course Objectives:

- an understanding of sources of water and water supply
- an understanding of water treatment process
- an understanding of Distribution of water
- an understanding of air pollution concepts

Course Outcomes:

- the knowledge of the water borne diseases
- the knowledge of sources of water
- Learn skills in designing the water treatment plant.
- Develop skills in control of Air pollution

UNIT – I

Introduction: Importance and Necessity of Protected Water Supply systems, Objectives of Protected water supply system, Flow chart of public water supply system, Role of Environmental Engineer, Agency activities. Water Demand and Quantity studies : Estimation of water demand for a town or city, Types of water demands, Per capita Demand, Factors affecting the Per Capita Demand, Variations in the Demand, Design Period, Factors affecting the Design period, Population Studies, Population Forecasting Studies. Quality Analysis of Water: Characteristics of water, Impurities in water, Water borne diseases, Drinking water quality standards.

UNIT - II

Sources of water, Capacity of storage reservoirs, Infiltration galleries, confined and unconfined aquifers, Intakes-Types, Conveyance of Water, Types of Pipes, Pipe Materials, Pipe joints, Valves and water meters

UNIT - III

Treatment of Water: Flowchart of water treatment plant, Treatment methods (Theory and Design) - Sedimentation, Coagulation, Sedimentation with Coagulation, Filtration, Chlorination and other Disinfection methods

UNIT-IV

Distribution systems-types and layouts of distribution systems-design of distribution systems –Hardy cross and equivalent pipe methods, laying and testing of pipe lines –pump house

UNIT-V

Solid waste Management: Sources, Various types of solid wastes, composition, properties, separation and processing –disposal methods, special treatment methods

TEXT BOOKS:

1. Environmental Engineering by Peavy, Rowe, Tchenobolus
2. Water Supply and Sanitary Engineering by G.S.Birdie and J.S.Birdie
3. Water Supply Engineering and Waste water Engineering by Dr. P.N.Modi

References:

1. Wastewater Engineering Treatment and Reuse by Metcalf and Eddy, Tata McGraw-Hill edition.
2. Environmental Engineering –I : Water supply Engineering, by Garg , S.K. Khanna Publishers
3. Environmental Engineering –II: Sewage disposal and Air Pollution Engineering, by Garg, S.K. Khanna Publishers.

(R11CED1133) ESTIMATING AND COSTING

Course Objectives:

- Learn the terms of estimation.
- calculate detailed estimate of buildings
- Perform rate analysis of quantities
- understand the types of valuating the property

Course Outcomes:

- Evaluate the detailed estimate of RC building
- Evaluate the detailed estimate of roads, doors, irrigation works
- Understands the importance of valuation
- Understands what type of contract is used for a specific Work

UNIT I

General items of work in building – Standard units – Principles of working out quantities for detailed and abstract estimates – Approximate method of estimating.

UNIT II

Detailed Estimates of Buildings.

UNIT III

Earthwork for roads and canals.

UNIT IV

Rate Analysis – Working out data for various items of work – overhead and contingent charges – Reinforcement bar bending and bar requirement schedules.

UNIT V

Contracts – Types of contracts – Contract Documents – Conditions of contract – Valuation of buildings – Standard specifications for different items of building construction.

TEXT BOOKS :

1. Estimating and Costing by B.N.Dutta, UBS Publishers, 2000
2. Estimating and Costing by G.S.Birdie, Dhanpat Rai Publishers

3. Estimation, costing and Specifications by M.Chakraborti; Laxmi Publications.

REFERENCES :

1. Standard schedule of rates and standard data book by public works department.
2. I.S – 1200(Part I to XXV – 1974/ method of measurement of building and civil engineering works – B.I.S)
3. National Building Code

IV Year B. Tech CE – I Sem

L	T/P/D	C
3	1	3

(R11CED1134) FINITE ELEMENT METHODS

Course objectives

- Learn the general steps of finite element methods.
- The basic finite element formulation techniques.
- Understand Finite Element Analysis fundamentals.
- Use of Finite Element Analysis software (ANSYS)

Course Outcomes:

- solve multi-disciplinary problems
- Derive equations in finite element methods for 1D and 2D problems.
- Ability to formulate and solve basic problems in structural mechanics using different elements.
- Apply knowledge of mathematics and Engineering.

UNIT -I

Introduction: Concepts of FEM – Steps involved – merits and demerits – energy principles – Discretization – Rayleigh –Ritz method of functional approximation.

Principles of Elasticity: Equilibrium equations – strain displacement relationships in matrix form – Constitutive relationships for plane stress, plane strain and Axi-symmetric bodies of revolution with axi-symmetric loading.

UNIT -II

One Dimensional FEM : Stiffness matrix for bar element - shape functions for one dimensional elements – one dimensional problems.

UNIT –III

Two Dimensional FEM : Different types of elements for plane stress and plane strain analysis – Displacement models – generalized coordinates – shape functions – convergent and compatibility requirements – Geometric invariance – Natural coordinate system – area and volume coordinates

UNIT –IV

Isoparametric formulation – Concepts of, isoparametric elements for 2D analysis - formulation of CST element, 4 –noded and 8-noded iso-parametric quadrilateral elements –

Lagrangian and Serendipity elements.

UNIT-V

Solution Techniques: Numerical Integration, Static condensation, assembly of elements and solution techniques for static loads.

TEXT BOOK

1. Finite Elements Methods in Engineering by Tirupati.R. Chandrepatla and Ashok D. Belegundu - Pearson Education Publications.
2. Finite element analysis by S.S. Bhavakatti-New age international publishers
3. .Finite element analysis by David V Hutton, Tata Mcgraw Hill, New Delhi

REFERENCES

1. Concepts and Applications of Finite Element Analysis by Robert D.Cook, David S. Malkus and Michael E.Plesha. Jhon Wiley and Sons.
2. Finite Element analysis – Theory and Programming by C.S.Krishna Murthy- Tata Mc.Graw Hill Publishers.
3. Finite Element methods by Daryl logar

IV Year B. Tech CE – I Sem	L	T/P/D	C
Elective- III	3	1	3
(R11CED1135) GROUND WATER DEVELOPMENT AND MANAGEMENT			

Course Objectives:

- Concepts of Groundwater Development and Management.
- understand the basic equations used in Groundwater
- solve analytical problems
- conduct basic ground water studies

Course Outcomes:

- Use Darcy's law
- Derive differential equation governing groundwater flow in three dimensions
- analysis of pumping tests in steady and non steady flow cases
- learn the saline water intrusion problem in groundwater

UNIT-I

Ground Water Occurrence: Ground water hydrologic cycle, origin of ground water, rock properties effecting 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. Ground Water Movement-Permeability, Darcy's law, storage coefficient, Transmissivity, Differential equation governing ground water flow in three dimensions derivation, ground water flow equation in polar coordinate system, ground water flow contours and their applications.

UNIT-II

Analysis of Pumping Test Data-I: Steady flow ground water flow towards a well in confined and unconfined aquifers-Dupit's and Theism's equations, assumptions, formation constants, yield of an open well interface and well tests.

UNIT-III

Analysis of Pumping Test Data-II: Unsteady flow towards well-Non Equilibrium equations, Thesis solution, Jacob and Chow's simplifications, Leak aquifers.

UNIT-IV

Surface and sub-surface Investigation: surface methods of exploration-Electrical resistivity method and Seismic refraction methods. Subsurface methods geophysical logging

and resistivity logging. Concept of artificial recharge of ground water, recharge methods, Applications of GIS and RS in artificial recharge of ground water along with case studies.

UNIT-V

Saline water intrusion in aquifer: Occurrence of saline water intrusion, Ghyben-Herzberg relation, Shape of interface, control of water intrusion. Ground water basin management-case studies.

TEXT BOOKS

1. Ground water Hydrology by David Keith Todd, John Wiley and Son, New York.
2. Ground water by H.M.Raghunath, Wiley Eastern Ltd.
3. Ground water by Bower, John Wiley and Sons.

REFERENCES

1. Applied Hydrogeology by C.W.Fetta, CBS Publishers and Distributors.
2. Groundwater System Planning and Management by R.Wills and W.W.G. Yeh, Printice Hall
3. The Flow of Homogeneous Fluids Through Porous Media by Muskat. M, McGraw Hill, New York

IV Year B. Tech CE – I Sem	L	T/P/D	C
Elective- III	3	1	3
(R11CED1136) INTELLECTUAL PROPERTY RIGHTS			

Course Objectives:

Student will be able to

- Importance of Intellectual property.
- understand the law of copy rights
- understand the trade secrets
- know the importance of trade mark law, copy right law, patent law

Course Outcomes:

Student will be able to

- List the types of Intellectual property.
- Understand the functions of trade marks
- Understand & explains the law of copy rights
- learn new developments in on intellectual property

UNIT – I

Introduction to Intellectual property: Introduction, types of intellectual property, international organizations, agencies and treaties, importance of intellectual property rights.

UNIT – II

Trade Marks : purpose and function of trade marks, acquisition of trade mark rights, protectable matter, selecting and evaluating trade mark, trade mark registration processes.

UNIT – III

Law of copy rights : Fundamental of copy right law, originality of material, rights of reproduction, rights to perform the work publicity, the right ownership issues, copy right registration, notice of copy right, international copy right law.

Law of patents : Foundation of patent law, patent searching process, ownership rights and transfer.

UNIT – IV

Trade Secrets : Trade secret law, determination of trade secrete status, liability for misappropriations of trade secrets, protection for submission, trade secrete litigation.

Unfair competition : Misappropriation right of publicity, False advertising.

UNIT – V

New development of intellectual property : new developments in trade mark law; copy right law, patent law, intellectual property audits.

International overview on intellectual property, international – trade mark law, copy right law, international patent law, international development in trade secrets law.

TEXT BOOKS

1. Intellectual property right by Deborah. E. Bouchoux, Cengage learning.
2. Intellectual property right by Nileshmy the knowledge economy, Prabudda Ganguli, Tate Mc Graw Hill Publishing company Ltd.
3. Intellectual Property Rights By Lionel Bently, Oxford University Press

REFERENCE BOOKS

1. Intellectual Property Law by P Narayan, Eastern Law House Publication
2. Intellectual Property by David Bainbridge, Longman Publishers
3. World Intellectual Property Organizations (WIPO) Hand book

IV Year B. Tech CE – I Sem	L	T/P/D	C
Elective- III	3	1	3
(R11CED1137) ELEMENTS OF EARTHQUAKE ENGINEERING			

Course Objectives

Student will be able to

- Understand Engineering Seismology
- able to understand single degree of freedom systems subjected to free and forced vibrations
- able to understand the principles of earthquake resistant designs
- able to understand importance of ductile detailing of RC structures

Course Outcomes

At the end of the course student will be able to

- Understand magnitude and intensity of earthquakes
- Evaluate the natural frequency and forced frequency of SDOF
- Evaluate base shear using IS methods
- Detail the reinforcement as per ductility requirements

UNIT-I

Engineering seismology: Earthquake phenomenon-causes of earthquakes-Theories on earthquake causes-Plate tectonics-Seismic waves -Magnitude and Intensity of earthquake-Energy released-Earthquake measuring Instruments-Seismograph-Accelerograph-Seismic zones of India

UNIT-II

Theory of Vibrations: Elements of vibrating system-Degrees of freedom-Continuous system-Lumped mass idealization-Oscillatory motion-Free vibrations of Single degree of freedom system-undamped, damped and critical damping-logarithmic decrement-Forced vibrations of SDOF

UNIT-III

Conceptual design: Introduction to functional planning-Continuous load path-Overall form-simplicity and symmetry-elongated shapes-stiffness and strength-Horizontal and vertical

members-Twisting of buildings-flexible buildings-framing systems-unconfined concrete and confined concrete-reinforcing steel-lateral load resisting systems

Basic assumptions in earthquake resistant designs-permissible stresses-seismic methods of analysis-equivalent lateral force method-Dynamic analysis-Response spectrum method-Time history method

UNIT-IV

Reinforce concrete buildings: Principles of earthquake resistant design of RC members-IS:1893 code base methods for seismic design-irregularities in buildings-Determination of lateral force –lateral distribution of base shear

UNIT-V

Ductility considerations: Earthquake resistant design of RC buildings-Impact of ductility-requirements for ductility-Assesment of ductility-Factors affecting ductility-Ductile detailing considerations as per IS:13920-Behaviour of beams, columns and joints in RC buildings during earthquake-Vulnerability of Open ground storey and short columns during earthquakes

Text Books :

1. Earthquake Resistant Design of Structures by S.K.Duggal, Oxford University Press
2. Earthquake Resistant Design of Structures by Pankaj Agarwal and Manish Shrikhande, Prentice Hall of India Pvt.Ltd
3. Dynamics of Structures :Theory and Applications to Earthquake Engineering by A K Chopra, Prentice Hall of India Pvt.Ltd

References :

1. Seismic Design of Reinforced Concrete and Masonry buildings by T.Paulay and M.J.N Pristly,John Wiley andSons
2. Earthquake Tips-Learning Earthquake Design and Construction by C.V.R.Murthy
3. Structural Dynamics by Clough and Penzin,Tata Mc-Graw Hill Publishers

Reference Codes :

1. IS:1893(Part-1)-2002,"Criteria for Earthquake Resistant Design of structures", B.I.S.,New Delhi

2. IS :4326-1993,"Earthquake Resistant Design and Construction of Building:Code of Practice, B.I.S, New Delhi

3. IS :13920-1993, "Ductile detailing of Concrete structures subjected to seismic force"-guidelines,B.I.S. New Delhi

IV Year B. Tech CE – I Sem

L T/P/D

C

Elective- III

3

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(R11CED1138) WATERSHED MANAGEMENT

Course Objectives:

- develop an understanding of the processes and fluxes of mass and energy within a watershed and how land use changes potentially affect these processes.
- learn how science-based management principles may be applied to watershed systems.
- develop/improve critical problem solving, quantitative and data analysis skills commonly used by natural resource managers.
- Understand potential environmental effects of various land and water uses and how these resources can benefit from integrated watershed management.

Course Outcomes:

- Learn the physical, biological and environmental aspects and their interrelations within a watershed; choose and apply available system tools for system intervention.
- Understand the participatory decision making processes; comprehend the interdependencies between natural resources and management at different locations in land and water management.
- Formulate a vision and design a sustainable watershed management plan that shows an integrated approach towards multiple use of land- and water resources and social equity and economic viability.
- Work in multidisciplinary and multicultural groups (with respect for different views, expertise and culture); reflect on own contribution to group work and on group processes.

UNIT-I

Introduction

Concept of watershed development, objectives of watershed development, need for watershed development in India, Integrated and multidisciplinary approach for watershed management.

UNIT-II

Characteristics of Watershed

Size, shape, physiography, slope, climate, drainage, land use, vegetation, geology and soils, hydrology and hydrogeology, socio-economic characteristics, basic data on watersheds.

UNIT-III

Principles and Measures To Control Erosion

Types of erosion, factors affecting erosion, effects of erosion on land fertility and land capability, estimation of soil loss due to erosion, Universal soil loss equation. Contour techniques, ploughing, furrowing, trenching, bunding, terracing, gully control, brushwood dam, Gabion.

UNIT-IV

Water Harvesting

Rainwater Harvesting, catchment harvesting, harvesting structures, soil moisture conservation, check dams, artificial recharge, farm ponds, and percolation tanks.

UNIT-V

Land and Ecosystem Management

Land use and Land capability classification, management of forest, agricultural, grassland and wild land. Reclamation of saline and alkaline soils. Role of Ecosystem, crop husbandry, soil enrichment, inter, mixed and strip cropping, cropping pattern, sustainable agriculture, bio-mass management, dry land agriculture, Silvi pasture, horticulture, social forestry and afforestation.

TEXT BOOKS

1. Watershed Management by JVS Murthy, - New Age International Publishers.
2. Water Resource Engineering by R. Awurbs and WP James, - Prentice Hall Publishers.
3. Handbook of Applied Hydrology by V.T.Chow, McGraw Hill, New York

REFERENCES

1. Land and Water Management by VVN Murthy, - Kalyani Publications.
2. Irrigation and Water Management by D.K.Majumdar, Printice Hall of India
3. Hydrology and Soil Conservation Engineering by Ghanshyam Das, PHI Learning Pvt. Ltd.

IV Year B. Tech CE – I Sem	L	T/P/D	C
Elective- IV	3	1	3
(R11CED1139) GROUND IMPROVEMENT TECHNIQUES			

Course Objectives:

- Learn and understand various ground improvement technique.
- Learn various method of compaction for ground improvement in it strength.
- learn various physical and chemical modification for ground improvement

Course Outcomes:

- Select the ground improvement technique which is suitable and economical for soil strengthening.
- Select different techniques based on the various types of soils in-situ.
- Design reinforced earth structures.

UNIT – I

Introduction to Ground Modification

Need and objectives of Ground Improvement, Classification of Ground Modification Techniques – suitability and feasibility, Emerging Trends in ground improvement.

UNIT – II

Mechanical and Hydraulic Modification

In-situ densification methods in granular soils, Vibration at the ground surface, Impact at the Ground surface, Vibration at depth, Impact at depth. In-situ densification methods in Cohesive soils, Preloading, Dewatering, Drain wells, Sand drains, Sandwich geodrains, Stone columns, Lime columns, Thermal methods.

UNIT – III

Physical and Chemical modification

Mechanical stabilization: Soil aggregate mixtures, Properties and proportioning techniques, soft aggregate stabilization, compaction, Field compaction control.

Cement stabilization: Factors affecting and properties, Uses of additives, Construction techniques. Lime and Bituminous stabilization: Types of admixtures, Factors affecting, Design of mixtures, Construction methods.

UNIT – IV

Reinforced Earth Technology and Geo textiles

Reinforced earth principles, Components of reinforced earth walls, Factors governing design of reinforced earth walls, Design principles of reinforced earth walls

Geotextiles: Introduction, Type of geotextiles, Function and their application, tests for geotextile materials, Geogrids, Functions of geogrids. Expansive soils and its Problems
Foundation techniques in Expansive soils.

UNIT – V

Soil Confinement Systems: Concept of confinement, Gabion walls, Crib walls, Sand bags, Evergreen systems and fabric Formwork; Miscellaneous Techniques: Design, Construction and applications of stone columns, lime columns

TEXT BOOKS

1. Ground Improvement Techniques By Dr. G.V.R. Purshotham Raj, Laxmi Publications, New Delhi.

2. Engineering Principles of Ground Modification by M.R Hausmann (1990), Mc Graw-Hill International Edition

REFERENCES

1. Ground Improvement By Moseley M.P. (1993), Blackie Academic and Professional, Boca Taton, Florida, USA
2. Ground Control and Improvement By Xanthakos P.P., Abramson L.W. and Brucwe D.A. (1994), John Wiley and Sons
3. Designing with Geosynthetics by Robert M.Koerner, Prentice Hall New Jercy, USA.

IV Year B. Tech CE – I Sem	L	T/P/D	C
Elective- IV	3	1	3
(R11CED1140) ADVANCED FOUNDATION ENGINEERING			

Course Objectives:

- solve foundation engineering problems.
- understanding of sampling techniques in soils.
- Understanding the impact of engineering solutions related to the ground stability.
- To create an understanding to design shallow and deep foundations.

Course Outcomes:

- Apply knowledge of foundation engineering to improve stability of the slopes.
- Design an effective foundation system for economic and safe aspects.
- An understanding of the various problems related to the different types of foundations and their adoption to site conditions.

UNIT – I

Bearing Capacity: Introduction-Bearing capacity of footings subjected to Eccentric and inclined loading – Meyerhof's, Hansen's, Vesic theories – Foundations on layered soils.

Settlement Analysis: Elastic settlement of footings embedded in sands and clays of infinite thickness – Footings on soils of Finite thickness- Janbu method, Schmertmann's method.

UNIT – II

Design of Shallow Foundations: Types of foundations, Depth of footings, Principles of design of footings, Design of spread footings, Eccentrically loaded spread footings, Combined footings, Trapezoidal footings, Strap footings, Principle design of mat foundations, Conventional design of raft foundations, Design of combined footings by elastic line method, Finite differences method for combined footing, Co-efficient of subgrade reaction.

UNIT – III

Pile Foundations: Types, Construction, load carrying capacity of single pile – Dynamic Formula, Static formula, Pile load tests, Load carrying capacity of pile groups, settlement of pile groups, Negative skin friction. Ultimate lateral capacity – Broms method – Reese and Matlock approach.

Well Foundations: Caissons-Types of Caissons, Well Foundations, Types of Wells-Different shapes of wells, Components of Well, Functions and Design Criteria-Sinking of Wells-Tilts and Shifts

UNIT- IV

Machine Foundations: Elements of soil Dynamics and Machine Foundations - Introduction- Fundamentals of vibration – single degree of freedom system of free vibrations – determination of dynamic properties of soils – block resonance test – cyclic plate load test-wave propagation test such as seismic cross hole, up hole and down hole tests – types of machine foundations – general requirements of machine foundations in design – permissible amplitudes and stresses – vibration isolation.

Unit – V

Foundations in Expansive Soils: Problems in expansive soils – mechanism of swelling – swell pressure and swelling potential – heave – foundation practices – sand cushion – CNS technique – under reamed pile foundations – granular pile anchor technique, stabilization of expansive soils.

TEXT BOOKS

1. Soil Mechanics and Foundation Engineering by VNS Murthy, CBS Publishers
2. Foundation Analysis and Design – J. E. Bowles, Tata Mc-Graw Hill Publishers
3. Soil Mechanics and Foundation Engineering – By K.R. Arora, Standard Publishers

REFERENCE BOOKS

1. Geotechnical Engineering by C. Venkataramiah, New Age international publisher
2. Analysis and Design of Sub Structures by Swami Saran, IBH Publishers
3. Basic and applied Soil Mechanics by Gopal Ranjan and A.S. Rao, New Age international publisher

IV Year B. Tech CE – I Sem	L	T/P/D	C
Elective- IV	3	1	3
(R11CED1141) DISASTER MANAGEMENT AND MITIGATION			

Course Objectives:

- Learn the difference between a hazard and disaster
- Learn about various disasters and their impacts
- Understand Different approaches of disaster risk reduction
- Know Disaster risks in India

Course Outcomes:

- The concept of disaster Management
- Understand the vulnerability of ecosystem and infrastructure due to a disaster
- Understand Disaster Management Phases
- Understand the hazard and vulnerability profile of India

UNIT – I

Environmental Hazards and Disasters (Endogenous) : Volcanic eruption, Earthquakes, Landslides.

Volcanic hazards/disasters – Causes and distribution of volcanoes, Hazardous effects of volcanic eruptions, Environmental impacts of volcanic eruptions.

Earthquake hazards/disasters – Causes of earthquakes, Distribution of earthquakes, Hazardous effects of earthquakes, Earthquake hazards in india, human adjustment, perception and mitigation of earthquake

UNIT – II

Environmental Hazards and Disasters (Exogenous) : Infrequent events, Cumulative atmospheric hazards/disasters.

Infrequent events : Cyclones, Lightning, Hailstorms.

Cyclones – Tropical cyclones and local storms, causes, distribution, human adjustment, perception and mitigation.

Cumulative atmospheric hazards / disasters – Floods, Droughts, Cold waves, Heat waves

Tsunamis-Causes, Distribution, Hazards/Disasters

Floods – Causes of floods, Flood hazards in India, Flood control measures, human adjustment, perception and mitigation

Droughts – Impacts of droughts, Drought hazards in india, Drought control measures

Extra planetary hazards/disasters, Man induced hazards/disasters, Physical hazards/disasters – Soil erosion

Soil erosion – Mechanics and forms of soil erosion, Factors and causes of soil erosion, Conservation measures of soil erosion

Chemical hazards/disasters – Release of toxic chemicals, Nuclear explosion

Sedimentation processes – Global sedimentation problems, Regional sedimentation problems, Environmental problems, Corrective measures of erosion and sedimentation

Biological hazards/disasters – Population explosion

UNIT – III

Emerging approaches in Disaster Management – Pre disaster stage (Preparedness), Emergency stage, Post disaster stage (Rehabilitation)

Natural Disaster Reduction and Management – Provision of immediate relief measures to disaster affected people, Prediction of hazards and disasters, Measures of adjustment to natural hazards

UNIT – IV

Disaster Management – An integrated approach for disaster preparedness, mitigation and awareness, Mitigation – work of the important institutions

Integrated Planning – Contingency management preparedness, Education on disasters, Community involvement, adjustment of human population to natural hazards and disasters, Role of media

Monitoring management – Programs of disaster research and mitigation of disaster of the important organizations

UNIT – V

A regional survey of land subsidence, Coastal disaster, Cyclonic disaster and Disaster in hills with particular reference to India

Ecological planning for sustainability and Sustainable development in India, Sustainable rural development – A remedy to disasters, Role of Panchayats in disaster mitigation

Environmental policies and Programs in India – Institutions and National centres for natural disaster reduction, Environmental legislations in India, Awareness, Conservation movement, Education and Training.

Text Books :

1. Disaster Mitigation – Experiences and Reflections by Pradeep Sahni, Alka Dhameja and Uma Madhuri, PHI.
2. Disaster Management – R B Singh, Rawat Publications, NewDelhi
3. Disaster Management – H K Gupta, Universities Press

REFERENCES :

1. A S Arya Action Plan for Earthquake, Disaster, Mitigation – V K Sharma, Disaster Management IIPA Publication, NewDelhi
2. An Overview on Natural and Man made Disasters and their reduction – R K Bhandani, CSIR, NewDelhi
3. Manuals on Natural Disaster Management in India – M C Gupta , National Centre for Disaster Management, IIPA, NewDelhi.

IV Year B. Tech CE – I Sem
Elective- IV

L	T/P/D	C
3	1	3

(R11CED1142) REHABILITATION AND RETROFITTING OF STRUCTURES

Course objectives:

Students will be able to

- Understand the fundamentals deterioration of structures and their causes
- Learn about the types of damages in structures
- Understand the common types of repairs in structures.
- Learn about the strengthening methods of structures.

Course Outcomes:

On successful completion of this course, it is expected that students should be able to

- Explain the mechanisms of damages
- Diagnose the symptoms and assesses damages
- Understand different types of repairs
- Explain different strengthening & retrofitting techniques

UNIT – I

Introduction – Deterioration of Structures – Distress in Structures – Causes and Prevention

UNIT – II

Mechanism of Damage – Types of Damage – Types of Damage

Corrosion of Steel Reinforcement – Causes – Mechanism and Prevention

Damage of Structures due to Fire – Fire Rating of Structures – Phenomena of Desiccation.

UNIT – III

Inspection and Testing – Symptoms and Diagnosis of Distress – Damage assessment – NDT.Repair of Structure

UNIT – IV

Common Types of Repairs – Repair in Concrete Structures – Repairs in under Water Structures – Guniting – Shot Create – Underpinning.

UNIT – V

Strengthening of Structures – Strengthening Methods – Retrofitting – Jacketing Health Monitoring of Structures – Use of Sensors Building Instrumentation.

TEXT BOOKS:

1. Rehabilitation and Retrofitting of Structures by K B Rajora and Ashok Bara, Macmillan Publishers
2. Concrete Repair and Maintenance illustrated by W.H.Ransom, RS Means Company Inc
3. Defects and Deterioration in Buildings by B.A .Richardson, EF and Spon,London

REFERENCE:

1. Concrete Technology by A.R.Shantakumar, Oxford University press
2. Hand book on Testing of Concrete in Structures by John H Bungey ,Millard ,M.G. Grantham,Taylor andFrancis Publishers
3. Maintenance and Repair of Civil Structures by B.L.Gupta and Amit Gupta, Standard Publications.

IV Year B. Tech CE – I Sem

L T/P/D C

Elective- IV

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(R11CED1143) URBAN AND REGIONAL TRANSPORT PLANNING

Course objectives:

Students will be able to

- Understand the fundamentals of traffic demand and the evaluating its present capacity.
- Learn methods of procuring the available data for the designing, using different types of Surveys and Interviews.
- Design and forecast various traffic patterns using four step travel demand forecasting approach.
- Predict a plan for an intensive traffic management system by optimizing the available networks.

Course Outcomes:

On successful completion of this course, it is expected that students should be able to

- Access and evaluate the current situation and the problems related to existing transportation networks in a locality.
- Learn the various possible methods of obtaining the required input data for designing a network.
- Develop a capability of forecasting the future requirements and its corresponding remedial measures.
- Design a transportation network providing least stress to the driver in the form of comfort and safety, as well as providing a best possible route with least distance.

UNIT I

Travel Demand Concept Demand function: Independent variables: Travel attributes; Assumptions in Travel demand estimation.

UNIT II

Data Collection and Inventories; Study area definition; Zoning principles; Travel data collection - Road side interview, Home interview; IPT surveys; Sampling techniques; Expansion factors; Use of Secondary sources in data collection.

UNIT III

Travel Demand Estimation; Four step Travel Demand Forecasting approach; Trip generation Analysis; Zonal models Category analysis; Household models; Trip attraction of work centers.

UNIT IV

Trip Distribution; Mode Factor methods; Gravity model; opportunity model. Mode Split Analysis; Mode choice behavior

UNIT V

Traffic Assignment Traffic network and coding; Minimum path trees; All or nothing assignment; Capacity restraint assignment; Corridor Identification; Plan preparation and Evaluation

TEXT BOOKS

1. Introduction to Transportation Planning by M.J.Bruton; Hutchinson of London Ltd.
2. Introduction to Urban System Planning by B.G.Hutchinson; Mc Graw Hill Publications.
3. Urban Transportation Planning Guide - Roads and Transportation Association of Canada; University of Toronto Press.

REFERENCES

1. G.E. Gray and CA Hoel: Public Transport Planning Operation and Management, Prentice Hall
2. White PR, Planning for Public Transport, UCL Press Ltd.
3. Traffic Engineering and Transport Planning - Kadiyali L.R. Khanna Publishers

IV Year B. Tech CE – I Sem

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(R11CED1208) CAD / GIS LAB

Course Objectives

- the GUI of the analysis package
- Learn the geometric modeling
- Learn about pre and post processors
- Learn to interpret the results

Course Outcomes

- model a geometry
- represent the physical model of s structural element/structure
- do post processing
- design the structural elements

CAD LAB

Software: STAAD. Pro or Equivalent

1. 2-D RC frame analysis and Design
2. Steel Truss analysis and Design
3. 3-D RC frame analysis and Design
4. Determination of base shears for earthquake forces for a 3-D frame
5. Analysis and Design of a simple tower

REMOTE SENSING:

1. Arial photograph interpretation
2. Visual interpretation of multispectral and panchromatic image
3. Image classification, supervised and unsupervised classifications
4. Change detection from multi-date imagery

GIS:

Course Objectives

- Interpret Aerial photograph
- Understand analog to digital conversions
- Learn data creation and editing
- Learn buffering techniques

Learning Outcomes

- Interpret Aerial photographs
 - classify images and detect the changes from imageries
 - create database
 - interpret data
1. Analog to Digital Conversion – Scanning methods
 2. Introduction to software
 3. Digital database creation – Point features, Line features, Polygon features
 4. Data Editing-Removal of errors – Overshoot and Undershoot, Snapping
 5. Data Collection and Integration, Non-spatial data attachment working with tables
 6. Dissolving and Merging
 7. Clipping, Intersection and Union
 8. Buffering techniques
 9. Spatial and Attribute query and Analysis
 10. DEM

Remote Sensing and GIS Software:

1. Arc GIS 9.0
2. ERDAS 8.7
3. Mapinfo 6.5

IV Year B. Tech CE – I Sem

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(R11CE1209)ENVIRONMENTAL ENGINEERING LAB

Course Objectives

- Learn the test to determine pH and conductivity of water
- Learn procedures to test water and waste water
- Learn procedures to determine BOD and COD of water
- Learn the procedure to find chloride content in water

Course Outcomes

- test water and waste water samples to determine pH and conductivity
- determine BOD and COD of water
- Determine chloride content in water

List of the Experiments

- 1.pH and Conductivity.
- 2.Turbidity and Jar Test .
- 3.Hardness.
- 4.Acidity estimation.
- 5.Alkalinity estimation.
- 6.Residual Chlorine.
- 7.Fluorides.
- 8.Optimum dosage of coagulant by jar test.
- 9.Estimation of Total Solids : Settleable Solids : Suspended solids, dissolved solids.
- 10.D.O.
11. B. O. D.
12. C. O. D.
- 13.Chlorides.

IV Year B. Tech CE – II Sem

L	T/P/D	C
3	1	3

(R11CED1144) PAVEMENT ANALYSIS and DESIGN

Course Objectives:

- Learn the basic modeling concepts used to analyze flexible and rigid pavements.
- Learn pavement management concepts to better manage road pavement.
- Apply the various types of highway appurtenance to enhance the safety of motorists.
- Learn to estimate traffic noise and the effect of noise attenuation measures.

Course Outcomes:

At the end of the course, students will be able to:

- Design flexible and rigid pavements
- Propose a pavement management system framework
- Design highway appurtenance and highway drainage
- Design mitigation measures to attenuate traffic noise

UNIT – I

Fundamentals of Pavements:

Functions and Desirable characteristics of Pavements, Types of pavements, Comparison of Flexible and rigid pavements, Functions of Individual Layers, Factors affecting design of pavements – wheel loads –ESWL Concept- tyre pressure – contact pressure, Material characteristics – Environmental and other factors.

UNIT –II

Analysis and Design Of Flexible Pavements:

Stresses in Flexible pavements – Visco elastic theory and assumptions, Layered system concepts, Stress solution for one and two layered systems, Methods of design of flexible pavements, AASHTO and IRC method of Pavement design.

UNIT –III

Analysis and Design Of Rigid Pavement:

Stresses in Rigid pavements - relative stiffness of slab, modulus of sub-grade reaction – stresses due to warping, stresses due to loads, stresses due to friction, Westergard's theory

and assumptions, IRC method of Rigid pavement design – Importance of Joints in Rigid Pavements- Types of Joints – Use of Tie Bars and Dowell Bars, AASHTO method of Design.

UNIT – IV

High Way Materials and Construction Aspects:

Highway Materials – Soil, Aggregate and Bitumen- Tests on aggregates – Aggregate Properties and their Importance - Tests on Bitumen – Bituminous Concrete- Requirements of Design Mix- Marshall's Method of Bituminous Mix design, Highway construction – Construction of Earth Roads- Gravel Roads – WBM Roads- Bituminous Pavements- Cement Concrete Roads- Steps in Construction- Reinforced Concrete Pavements.

UNIT – V

Pavement Maintenance and Evaluation:

Need for Highway Maintenance- Pavement Failures- Failures in Flexible Pavements-Types and Causes-Rigid Pavement Failures- Types and causes- Pavement Evaluation- Benkleman Beam method- Strengthening of Existing Pavements- Overlays, IRC method of Overlay design, Importance of profile correction course.

TEXT BOOKS

- 1.Pavement Analysis and Design by Yang H. Huang, Prentice Hall Inc.
- 2.Principles and Practices of Highway Engineering by Dr.L.R.Kadiyali and Dr.N.B.Lal – Khanna publishers – (2003).
- 3.Principles of Pavement design by Yoder.and Witzorac Mathew, John Wiley and Sons Inc.

REFERENCES

1. Highway Engineering by S.K.Khanna and C.J.Justo, Nemchand and Bros., 7th Edition (2000)
2. IRC – 37, 58 81 codes for Design Guidelines of Flexible and Rigid Pavements.
3. Design of Functional Pavements by Nai C. Yang, McGraw Hill Publications
4. Concrete Pavements by AF Stock, Elsevier, Applied Science Publishers

Course objectives

- Understand the principles, functions, theories and practices of different management areas and to provide them with practical exposure to cases of success/failure in business.
- Expose with a systematic and critical understanding of organizational theory, structures and design.
- Familiarize with the tools of operations and project management.
- Understand the role of human relations in the management of operations.
- Comprehend conceptual models of strategic management.
- Provide basic insights into contemporary management practices.

Course outcomes:

Upon completion of this course students should be able to:

- Use the tools of operations management.
- Practice good human relations in management.
- Apply theories to improve the practice of management.
- Function effectively in multidisciplinary teams to accomplish a common goal of organizations.
- Demonstrate knowledge of contemporary management practices.
- Use the project management techniques.
- Achieve new insights and refine skills of interpretation.
- Appreciate the management challenges associated with high levels of change in the organizations.
- Compare and contrast between different organization structures.

UNIT I

Introduction to management

Concepts of management - nature, importance, and functions of management; Taylor's scientific management theory; Fayol's principles of management; Mayo's Hawthorne

experiments; Maslow's theory of human needs; Douglas McGregor's theory X and theory Y; Herzberg's two-factor theory of motivation; System and contingency approach to management; Planning – meaning, significance, and types of plans; Decision making and steps in decision making process; Leadership styles; Social responsibilities of management.

Organizing - Meaning, and features; Process of organization; Principles of organization; Elements of organization; Organization chart; Span of control - Graicunas formulae; Centralisation and decentralization; Types of mechanistic and organic structures of organisation - line organization, line and staff organization, functional organization, committee organization, matrix organization, virtual organisation, cellular organisation, team structure, boundaryless organization, inverted pyramid structure, and lean and flat organization structure; Their merits, demerits and suitability.

UNIT II

Human resources management

Concepts of HRM;

Basic functions of HR manager - human resource planning (definition; objectives; process), recruitment (definition; sources; techniques), selection (definition; process), induction and orientation, training and development (definition; need; methods), employee exit process, employee relations management, employee compensation and benefits administration, job evaluation (objectives; process; methods), and performance appraisals (objectives; process; methods).

UNIT III

Strategic management

Mission; Goals; Objectives; Policy; Strategy; Programmes; Elements of corporate planning process - environmental scanning; value chain analysis, BCG matrix, generic strategy alternatives, SWOT analysis, and steps in strategy formulation and implementation; Balance score card; Capability maturity model (CMM)/ People capability maturity model (PCMM).

UNIT IV

Operations management

Plant location; Types of plant layout; Methods of production – job, batch, and mass production; Work study-basic procedure involved in method study and work measurement.

Materials management

Objectives; Need for inventory control; EOQ, ABC Analysis; Purchase procedure; Value analysis; JIT, Six sigma; TQM; Supply chain management; Stores management and stores records.

Marketing

Functions of marketing; Marketing mix, and marketing strategies based on product life cycle; Channels of distribution.

UNIT V

Project management – network analysis

Network analysis; Programme evaluation review technique - PERT (probability of completing the project within given time); Critical path method - CPM (Identifying critical path); Project cost analysis; Project crashing; Simple problems.

TEXT BOOK

1. Management Science by Aryasri; *Publisher: Tata McGraw Hill, 2009.*
2. Management by James Arthur, Finch Stoner, R. Edward Freeman, and Daniel R. Gilbert 6th Ed; *Publisher: Pearson Education/Prentice Hall.*
3. Principles and Practice of Management - L.M. Prasad; *Publisher: Sultan Chand Publications, New Delhi.*

REFERENCES

1. Principles of Marketing: A South Asian Perspective by Kotler Philip, Gary Armstrong, Prafulla Y. Agnihotri, and Eshan ul Haque , 2010, 13th Edition, *Publisher: Pearson Education/ Prentice Hall of India.*
2. A Handbook of Human Resource Management Practice by Michael Armstrong, 2010; *Publisher: Kogan Page Publishers.*
3. Quantitative Techniques in Management by N.D. Vohra, 4th edition, 2010; *Publisher: Tata McGraw Hill.*
4. Operations Management: Theory and Practice by B. Mahadevan, 2010; *Publisher: Pearson Education.*
5. Strategic Management by V.S.P. Rao and V. Hari Krishna, 2010; *Publisher: Excel Books.*

IV Year B. Tech CE – II Sem	L	T/P/D	C
Elective-V	3	1	3
(R11CED1145) ADVANCED STRUCTURAL DESIGN			

Course objectives

- Learn the basic concepts of design of combined footings and Retaining walls
- select the suitable types of water tanks
- Learn the design considerations of Concrete bridges under different loading classes.
- Familiarity with professional and contemporary design issues

Course outcomes

- design the Retaining walls
- Design the RCC water tanks and staircases
- Advantage of selecting the suitable bridges for certain applications.
- design gantry girders and steel bridges under different loading considerations

UNIT – I

Design of a Grid floor system, Flat slab

Design of Retaining walls, cantilever and counter fort

UNIT – II

Design of combined footings-rectangular, Trapezoidal

Design of RCC water tanks, Circular and rectangular types.

UNIT – III

Introduction to bunkers, silos and Chimney, concepts of loading and Design.

UNIT – IV

Introduction to concrete bridges, IRC loading, slab bridges and T - beam bridges design concepts.

UNIT – V

Design of steel truss bridges for railway loading ,Design of pressed steel water tanks

TEXT BOOKS

1. Advanced Reinforced concrete structures by Vargheesh, Pranties Hall of India Pvt. Ltd.

2. Design drawing of concrete and steel structures by N.Krishna Raju University Press 2005.
3. Reinforced concrete structures Vol-2 by by B.C.Punmia, Ashok Kumar Jain and Arun Kumar Jain, Laxmi, publications Pvt. Ltd., New Delhi

REFERENCES

1. Essentials of Bridge Engineering by D.John son Victor, Oxford and IBM publication Co., Pvt. Ltd.
2. Reinforced concrete design by S.U,Pillai and D.Menon, Tata Mc.Ghrawhill Publishing company
3. Advanced Reinforced Concrete Design by P.C. Varghese, Prentice Hall India. Codes: Relevant IS: codes.

IV Year B. Tech CE – II Sem
Elective- V

L	T/P/D	C
3	1	3

(R11CED1146) DESIGN AND DRAWING OF IRRIGATION STRUCTURES

Course Objectives:

- The basic aim is to understand and control of in open channels and canals for the benefit of society.
- To get hand-on experience in drawing of irrigation and environmental engineering structures

Course Outcomes:

- Analyze and design different weirs
- Analyze, design and draw different canal drops.
- Design and draw various siphon aqueducts.
- Design and draw of various canal regulator

Design and drawing of the following hydraulic structures.

Group - A

1. Surplus weir
2. Syphon Well Drop
3. Trapezoidal Notch Fall
4. Tank Sluice with tower head

Group - B

1. Sloping glacis weir
2. Canal regulator
3. Under Tunnel
4. Type-III Syphon Aqueduct

Final Examination Pattern:

The Question paper is divided into two parts with two questions in each part. The student has to answer ONE question from each part. Part I should cover the design and drawings from Group A for 40 marks and Part II should cover only designs from Group B carrying 30 marks.

The duration of examination will be FOUR hours.

However, the students are supposed to practice the drawings for Group B structures also for internal evaluation.

TEXT BOOKS:

1. Design of minor irrigation and canal structures by C.Satyanarayana murthy, Wiley Eastern Ltd.
2. Irrigation engineering and Hydraulic Structures by S.K.Garg, Standard Book House.
3. Water Resources Engineering – Principles and Practice by C.Satyanarayana Murthy, New Age International Publishers.

REFERENCES

1. Hydrology, Principles, Analysis and Design by H.M. Raghunath
2. Irrigation Engineering by G.L. Asawa, New Age International Publications

IV Year B. Tech CE – II Sem
Elective-V

L	T/P/D	C
3	1	3

(R11CED1147) AIRPORT PLANNING AND DESIGN

Course Objectives:

- understand the classification of airports and related aircraft characteristics
- understand the site selection for airport
- Learn the grading and drainage of airport
- Learn the air traffic control aids

Course Outcomes:

- Design the runway length and estimate the corrected runway length
- Planning and designing the terminal area
- Marking runway and taxiway areas

UNIT- I

Introduction and Aircraft Characteristics

General, Requirements of Aircraft Types, Field Length Regulations, Restrictions On Payload- Range Performance, Weight Components, Airplane Components Parts, Military And Civil Aircrafts, Civil Military Co-Ordination, Classification Of Flying Activity, Relation Of Aircraft To Landing Facility, Aircraft Characteristics, Future Trends In Aircraft Design

UNIT- II

Airport Obstructions and Runway Design

Zoning Laws, Classification of Obstructions, Turning Zone, Runway Orientation, Basic Runway Length, Correction for Elevation, Temperature and Gradient, Airport Classification Runway Geometric Design

UNIT- III

Taxiway Design and Terminal Area

Factors Controlling Taxiway Layout, Geometric Design Standards, Exit Taxiways, Fillets, Separation Clearance, Holding Apron, Turnaround or Bypass Taxiway Building and Building Area, Vehicular Circulation and Parking Area, Apron, Hangar, Blast Considerations, Typical Airport Layouts

UNIT- IV

Airport Planning

General, Airport Master Plan, Regional Planning, Data Required Before Site Selection, Airport Site Selection, Surveys For Site Selection, Drawings To Be Prepared, Estimation Of Future Air Traffic Needs

UNIT- V

Structural Design Of Airport Pavements and Visual Aids

Introduction, Various Design Factors, Design Methods For Flexible Pavements, Design Method For Air Field Rigid Pavements, Influence Chart For The Moment Mn In A Concrete Pavement Due To A Load In The Interior Of The Slab, LCN System Of Pavement Design, Joints In Cement Concrete Pavements, Special Consideration For Design Of Pavement Facilities For V/Stol Operations, Airport Marking, Airport Lighting.

TEXT BOOKS

1. Airport Planning and Design by Khanna, Arora and Jain, Nem Chand and Bros., Roorkee
2. Planning and Design of Airports by Robert Horenjeff, 2nd edition, McGraw Hill Book Co.

REFERENCES

1. Airport Engineering by G. Glushkov, V.Babkov, Mir Publishers, Moscow.
2. Drainage of Airfield pavements by Harry.R.Cedergern , John Wiley and Sons.
3. Airport Planning and Design by Virender Kumar and Satish Chandra, Galotia Publication press.

IV Year B. Tech CE – II Sem	L	T/P/D	C
Elective-V	3	1	3
(R11CED1148) PRESTRESSED CONCRETE STRUCTURES			

Course Objectives:

- Learn the necessity of prestressed concrete structures.
- Learn of various techniques of prestressing.
- Learn about various losses of prestress.
- Know the analysis of prestressed concrete members.

Course Outcomes:

- The knowledge of evolution of process of prestressing.
- The knowledge of various prestressing techniques.
- Skills in analysis of prestressed concrete beams, and slabs.
- Ability to satisfy the serviceability and strength provisions of the Indian Standards (IS: 1343-1980).

UNIT – I

Introduction: Historic development – General principles of prestressing pretensioning and post tensioning – Advantages and limitations of prestressed concrete – Materials – High strength concrete and high tensile steel their characteristics.

I.S.Code provisions, Methods and Systems of Prestressing; Pre-tensioning and post tensioning methods – Analysis of post tensioning - Different systems of prestressing like Hoyer System, Magnel System Freyssinet system and Gifford – Udall System.

UNIT – II

Losses Of Prestress: Loss of prestress in pre-tensioned and post-tensioned members due to various causes like elastic shortage of concrete, shrinkage of concrete, creep of concrete, Relaxation of steel, slip in anchorage bending of member and frictional losses.

UNIT – III

Analysis of sections for flexure; Elastic analysis of concrete beams prestressed with straight, concentric, eccentric, bent and parabolic tendons.

UNIT – IV

Design Of Sections For Flexure And Shear: Allowable stress, Design criteria as per I.S.Code – Elastic design of simple rectangular and I-section for flexure, shear, and principal

stresses – design for shear in beams – Kern – lines, cable profile.

UNIT – V

Composite Section: Introduction – Analysis of stress – Differential shrinkage – General designs considerations.

Deflections Of Prestressed Concrete Beams: Importance of control of deflections – factors influencing deflections – short term deflections of uncracked members prediction of long term deflections.

TEXT BOOKS

1. Pre stressed Concrete by Krishna Raju , Tata Mc.Graw Hill Publications.
2. Pre stressed Concrete by N.Rajasekharan, Narosa publications
3. Pre stress Concrete Structures by Dayaratnam, Pearson Education Publishers

REFERENCES

1. Prestressed Concrete by Ramamrutham, Dhanpatrai Publications.
2. Design of Prestressed concrete structures by T.Y. Lin and Ned H.Burns, John Wiley and Sons
3. Codes: BIS code on prestressed concrete, IS: 1343.