Founder Chairman

LBRCE-A Bird's eye view

CENTRAL LIBRARY

Indoor sports facility **Outdoor sports facility**

Transportation

CHAIRMAN'S PROFILE :

Sri. Lakireddy Bali Reddy was born in Velvadam village, Mylavaram Mandal, Krishna District, Andhra Pradesh. After completing his B.Sc, and B. Tech. with gold medalist, from Osmania University, he went to the University of California at Berkeley on a scholarship in 1960 and completed MS in Chemical Engineering. He settled in the United States of America. After working for a private industry for some years, he went into business for himself in restaurant sector and real estate and became well established. As his business prospered, Mr. Lakireddy Bali. Reddy carried out philanthropic activities in and around his native place, contributing to the educational and economic development of the region of Krishna District. He strived to improve the living conditions of the poor. To channel his philanthropic activities, he later registered the well known Lakireddy Bali Reddy Charitable Trust, a non-profit organization fully funded by him and his family. The Trust promoted the Lakireddy Bali Reddy College of Engineering which is built with a vision to serve the region for generations to come and to be among the premier institutions in the state in the sphere of technical education. In the short span of fifteen years of its existence, the College earned a respectable position among its peers in the state for its quality teaching-learning process, professional ambience, promising R&D environment, spacious and serene environment, well designed and well ventilated buildings, fully equipped and state of the art laboratories, enthusiastic and well qualified faculty and student discipline and care. Mr. Lakireddy Bali Reddy holds this institution dear to his heart and is committed towards making it a deemed University.

Activities of Lakireddy Bali Reddy Charitable Trust

The activities of the trust are:

1. Construction of school buildings & Temples.
2. Construction of public utility structures/ projects (Bus shelters, Parks, Cement Roads
3. Donation to other Institutions (Kondaveedu Academy for Kalyanamandapams, Scholarships to Siddhartha academy, Rotary community Trust).
4. Health Care (Construction of Attendants rest rooms at Govt. Hospital, Eye Camp satellite centre).
5. Old age pensions.
6. Scholarships to poor students
7. Rural water supply.
8. Sports & Games (Construction of stadium).
9. Construction of a Secondary School on the outskirts of Velvadam and handed it over to Zilla Parishad, Krishna. This School now serves 260 students from several neighboring villages.
10. Construction of a three story building at Velvadam for housing the Upper Primary School and handed it over to the Government Authorities. This School currently serves 400 students. The Trust provides for the maintenance and upkeep of the above two structures..

LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING came into existence under the aegis of Lakireddy Bali Reddy Charitable Trust, as the brainchild of eminent philanthropist Sri. Lakireddy Bali Reddy in the year 1998 with an avowed vision to provide world class education in Engineering and Technology in the rural hinterland of Mylavaram. In this mission of developing a coming- of- age Institute of excellence, the architect, Sri. Lakireddy Balireddy has been ably supported by his brother Lakireddy Jaya Prakash Reddy. The institution, over a period of time, has taken giant leaps in scaling higher echelons of academic excellence, both quantitatively as well as qualitatively. At present, the institution offers 8 B.Tech programmes in CSE, IT, ECE, EEE, ME, CE, ASE & EIE, 5 M.Tech programmes in Computer Science and Engineering, Thermal Engineering, Software Engineering, Power Electronics and Drives & Systems and Signal Processing, in addition to M.B.A and M.C.A programmes. The state-of-the art laboratories, workshops, computer centers, seminar halls, lecture halls, and a world class library are hallmarks of the college.A large pool of well qualified and experienced faculty are engaged in carrying out various academic assignments as well as research .The institution attained AUTONOMOUS status as approved by UGC, New Delhi in 2010, and has been accredited by coveted academic bodies like NAAC & NBA, apart from ISO:2001-2008 certification. The institution is located on Vijaywada- Bhadrachalam highway at Mylavaram, Krishna District at a distance of 40 KMs from Vijayawada and 35 KMs from Gannavaram airport.

VISION

To empower the students to become technologically vibrant, innovative and emotionally matured and to train them to face the challenges of the quality conscious globalized world economy.

MISSION

- To provide an environment most conducive to learning and to create a stimulating intellectual atmosphere on the campus.
- To achieve Academic Excellence.
- To ensure a holistic development of personality.
- To spread education to rural areas.
- To establish partnership between Institution & Industry.

ACADEMIC REGULATIONS (R14) FOR B.Tech. (REGULAR)

Applicable to the students of B.Tech.(Regular) course admitted from the Academic Year 2014-15.

1. Award of B.Tech. Degree

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

I A student shall be declared eligible for the award of the B.Tech. Degree, if he/she pursues a course of study in not less than four academic years and not more than eight academic years

II The candidate shall register for 182 credits and secure all the 182 credits.

2. Course of study

The following courses of study are offered in the college at present for theB.Tech.programs.

S.No	Branch
1	Aerospace Engineering
2	Civil Engineering
3	Computer Science and Engineering
4	Electronics and Communication Engineering
5	Electrical and Electronics Engineering
6	Electronics and Instrumentation Engineering
7	Information Technology
8	Mechanical Engineering

3. Distribution and Weightage of Marks

(i) In each semester, the course of study consists of 5 or 6 theory subjects and 2 to 4 laboratories. However, in the VIII semester, there shall be only 3 theory subjects in addition to the project work and comprehensive viva-voce.

(ii) The performance of the students in each semester shall be evaluated subject wise for a maximum of 100 marks for theory and 75 marks for practical subjects. In addition, seminar, mini project, internship, project work and comprehensive viva shall be evaluated for 75,75, 75, 200 and 75 marks respectively.

(iii) For each theory subject the distribution shall be 25 marks (20 marks for internal tests and 5 marks for assignments, tutorials, objective test conducted for each unit) for Continues Internal Evaluation (CIE) and 75 marks for the Semester End Examination (SEE).

(iv) For each theory subject, during every semester there shall be two tests for a duration of 90 minutes each. First descriptive test to be conducted in 1&2 units and the second test be conducted in 3, 4 & 5 units. However, 75% weightage for the better of the two and 25% for the other test shall be consideredfor awarding sessional marks.

(v) The question paper for internal examinations shall contain four questions. The question 1 (PART - A) is compulsory and consists of 6 sub questions (Short / Objective / Multiple choice type) each carry 1 mark, from 1st and 2nd units of syllabus for I-Mid and 3rd , 4th& 5th units of syllabus for II-Mid examinations. The remaining three questions (PART - B) be set from first two units for I-Mid and the remaining three units for II-Mid examinations (at least 1 question from each unit) and student is required to answer any 2 questions and each question carrying 7 marks.

The question paper for external examination contains 8 questions covering all the units. The question1 (PART-A) is compulsory and consists of 10/15 sub questions, at least one from each unit of the syllabus. The remaining 7 questions (PART -B) be set from all the units (at least 1 question from each unit) and the student is required to answer any 4 questions. All questions carry equal marks.

(vi) For practical subjects there shall be a continuous evaluation during the semester for 25 marks (10 marks for day-to-day work, 10 marks for the internal test and 5 marks for record) and 50 marks for end examination. The end examination shall be jointly conducted by one internal faculty and one external examiner.

(vii) For the subjectslike design and / or drawing (such as Engineering Graphics, Machine Drawing etc.) and estimation, the distribution shall be 25 marks for internal evaluation (15 marks for day-to-day work and10 marks for internal tests) and 75 marks for end examination. There shall be two internal tests in a semester.

(viii) The mini project shall be evaluated both internally and externally by a committee. The internal committee consists of head of the department, the supervisor of mini project and a senior faculty member of the department. The external committee consists of head of the department, the supervisor of mini project and a duly appointed external examiner.

(ix) The students shall undertake the internship for a duration 4 weeks in vacation after VI semester of the course and shall be evaluated at the end of VII semester of the course. The internship shall be evaluated by the committee consisting of head of the department and two senior faculty members of the department.

(x) There shall be seminar in the V semester for which the student shall collect the information on a specialized topic and prepare a technical report, indicating his/her understanding over the topic, and submit to the department, which shall be evaluated by the Department committee consisting of Head of the department, seminar supervisor and a senior faculty member. The seminar report shall be evaluated for 75 marks. There shall be no external examination for seminar.

(x) Out of a total 200 marks for the project work, 50 marks shall be for internal evaluation and 150 marks for the end semester examination. The internal evaluation shall be on the basis of two seminars delivered by each student on the topic of his project and evaluated by the committee consisting of head of the department, supervisor of the project and a senior faculty. The end semester examination (viva-voce) shall be conducted by the committee consisting of external examiner, head of the department and supervisor of the project. The evaluation of project work is carried out at the end of the VIII Semester.

(xi) The comprehensive viva-voce shall be conducted for 75 marks at the end of VIII Semester. The comprehensive viva shall be evaluated in the subjects

covering entire course. The comprehensive viva-voce shall be evaluated by the committee consisting of head of the department and two senior faculty members of the department.

4. Attendance Requirements

(i) A student is eligible to write the end semester examinations if he/she acquires a minimum of 75% of attendance in aggregate of all the subjects.

(ii) Condonation for shortage of attendance in aggregate up to 10% on medical grounds (65% and above and below 75%) in each semester may be granted by the college academic committee.

(iii) Shortage of attendance below 65% in aggregate shall not be condoned.

(iv) A student who is short of attendance in a semester may seek re-admission into the same semester when offered next within 4 weeks from the date of the commencement of class work.

(v) Students whose shortage of attendance is not condoned in any semester are not eligible to write their end semester examination of that class.

(vi) A stipulated fee shall be payable towards condonation of shortage of attendance.

(vii) A student will be promoted to the next semester if he/she satisfies the (a) attendance requirement of the present semester and (b) credits.

(viii) If any candidate fulfills the attendance requirement in the present semester, he/she shall not be eligible for readmission into the same class.

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 if he has earned the credits allotted to each theory/practical design/drawing subject/project and secures not less than a minimum of 40% of marks exclusively at the end semester examinations in each of the subjects in which candidate had appeared. However, the candidate should have secured minimum of 40% marks in both external and internal components put together to be eligible for passing in the subject.

(ii) A student shall be promoted to next semester, if he satisfies the minimum attendance requirement.

(iii) A student shall be promoted to V semester if he/she fulfills the academic requirement of 40% of the credits (27credits) up to III semester from all the examinations.

(iv) A student shall be promoted to VII semester if he/she fulfills the academic requirement of 40% of the credits (45 credits) up to V semester from all the examinations.

(v) There shall be supplementary examinations along with the regular semester examinations to give a fair chance to the student to appear in the subject if failed in any.

6. Course Pattern

(i) The entire course of study is of four academic years, all the years are on semester pattern.

(ii) A student eligible to appear for the end examination in a subject, but absent from it or has failed in the end semester examination, may write the exam in that subject when conducted next.

(v) When a student is detained for lack of credits / shortage of attendance, he may be re-admitted into the same semester / year in which he has been detained. However, the academic regulations under which he was first admitted shall continue to be applicable to him.

7. The result processing and award of class is carried out on 10-point scale grading system as described below.

A. Conversion of marks obtained by the students to letter grades &grade points – B.Tech programme.

Absolute Marks	Grade	Grade Points
90 and above	S	10
80 – 89	A	9
70 – 79	B	8
60 – 69	C	7
50 – 59	D	6
40 – 49	E	5
Less than 40	F	Fails, 0

B. Calculation of SGPA and CGPA:

The performance of every student at the end of each semester is indicated by Semester Grade Point Average (SGPA) and is calculated for the candidates who pass all the courses in that semester.

$$\mathbf{SGPA} = \frac{\sum(\mathbf{CR} \times \mathbf{GP})}{\sum \mathbf{CR}}$$

The Cumulative Grade Point Average (CGPA) for entire programme is

$$\mathbf{CGPA} = \frac{\sum(\mathbf{CR} \times \mathbf{GP})}{\sum \mathbf{CR}}$$

Where CR = Credits assigned to a course
GP = Grade points awarded to each course

8. Award of Class

After a student has satisfied the requirement 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:

Range	Class awarded
7.75 and above	First Class with Distinction
6.75 to < 7.75	First Class
5.75 to < 6.75	Second Class
4.75 to < 5.75	Pass Class
Below 4.75	Fails

9. Minimum Instruction Days

The minimum instruction days for each semester shall be 90 working days.

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

11. With Holding of Results

If the student has not paid the dues, if any, to the institution or if any case of indiscipline is pending against him, the result of the student will be withheld. His degree will be withheld in such cases.

12. Transitory regulations

As recommended by the different Boards of Studies and as approved by the academic council, the following regulations governthe cases of students for re-admission in to another scheme of course in the college.

A student in one scheme (Say R10, R11 &JNTUK), detained due to lack of required no of credits or percentage of attendance at the end of any year/semester is permitted to take re-admission at appropriate level in any other scheme prevailing in the college subject to the following rules and regulations.

a) He shall pass his backlog subjects if any by appearing for supplementary examinations conducted by the college/JNTUK from time to time.
b) After readmission, the student is required to study the subjects (theory, practical, seminar, internship, miniproject, etc…) as prescribed for the re-admitted course at that level and thereafter.
c) However if the student has already passed any subjects (theory, practical/ others) of readmitted course in the previous scheme, such subjects are exempted.
d) If the student has not studied any subjects (theory, practical/ others) of readmitted course of previous years/ semesters in R10/ R11/JNTUK scheme till the stage of readmission, such subjects will be included as additional subjects in the readmitted course in place of exempted subjects.
e) In general, after transition, there shall be balance in course composition and no of credits/semester.

13. General

(i) Wherever the words “he”, “him”, “his”, occur in the regulations, they include “she”, “her”, “hers”.
(ii) The academic regulation should be read as a whole for the purpose of any interpretation.
(iii) In case of any doubt or ambiguity in the interpretation of the above rules, the decision of the Chairman, Academic council is final.
(iv) The college may change or amend the academic regulations or syllabi at any time and the changes or amendments made shall be applicable to all the students with effect from the dates notified by the college as decided by the college academic council.

ACADEMIC REGULATIONS (R14) FOR B.Tech (LATERAL ENTRY SCHEME)

Applicable for the students admitted into II year B.Tech from the Academic Year 2015-16 onwards.

1. Award of B.Tech Degree

A student will be declared eligible for the award of B.Tech Degree if he fulfills the following academic regulations.

(i) A student shall be declared eligible for the award of the B.Tech Degree, if he pursues a course of study in not less than three academic years and not more than six academic years.

(ii) The candidate shall register for 136 credits and secure all the 136 credits.

2. The attendance regulations of B.Tech (Regular) shall be applicable to B.Tech lateral entry scheme.

3. Promotion Rule

A student shall be promoted to VII semester if he/she fulfills the academic requirement of 40% of the credits (27 credits) up to V semester from all the examinations, whether or not the candidate takes the examinations and secures prescribed minimum attendance in VI semester.

4. Award of class

After a student has satisfied the requirement 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.

Range	Class awarded
7.75 and above	First Class with Distinction
6.75 to < 7.75	First Class
5.75 to < 6.75	Second Class
4.75 to < 5.75	Pass Class
Below 4.75	Fails

5. All the other regulations as applicable to B.Tech. 4-year degree course (Regular) will hold good for B.Tech (Lateral Entry Scheme)

MALPRACTICES RULES

The examination related malpractices will be dealt with as per the provisions contained in the scale of punishment notified by the JNTUK, Kakinada from time to time.

RAGGING

Ragging is cognisible offence and is prohibited in the college campus, Hostels and in all places. Those students indulged in this criminal act will be punished as per the provisions of Act 26 of 1997 enacted by the Govt. of A.P.

(A) The following precautions are taken by the college to prevent RAGGING in the campus

- Ragging within or outside any educational institution is prohibited.
- Ragging means doing an act which causes or is likely to cause Insult or Annoyance of Fear or Apprehension or Threat or Intimidation or outrage of modesty or Injury to a student.

	Imprisonment up to		Fine Up to
Teasing, Embarrassing and Humiliation	6 Months	+	Rs. 1,000/-
Assaulting or Using Criminal force or criminal intimidation	1 Year	+	Rs. 2,000/-
Wrongfully restraining or confining or causing hurt	2 Years	+	Rs. 5,000/-
Causing grievous hurt, kidnapping or Abducts or rape or committing unnatural offence	5 Years	+	Rs. 10,000/-
Causing death or abetting suicide	10 Years	+	Rs. 50,000/-

(A)

1. Ragging is prohibited as per Act 26 of A.P. Legislative Assembly, 1997.
2. Ragging entails heavy fines and/or imprisonment.
3. Ragging invokes suspension and dismissal from the college.
4. Outsiders are prohibited from entering the college and Hostel without permission.
5. Girl students must be in their hostel rooms by 7.00 p.m.
6. All the students must carry their Identity Card and show them when demanded.
7. The Principal and the Wardens may visit the Hostels and inspect the rooms any time.

DEPARTMENT VISION:

To make the students strong in both technical and practical aspects to meet the national and international requirements

DEPARTMENT MISSION:

- To provide innovative approaches in teaching–learning process so as to bridge the gap between theory and practice and make the students suitable for meeting national and international requirements
- To establish interaction between industry and institution for improvements in teaching, research and consultancy aspects for continuous development of students, faculty and institution.
- To guide the students for developing ethical and social values besides technical and professional skills leading to their all round development.

PROGRAM EDUCATIONAL OBJECTIVES:

1. To possess knowledge in both fundamental and application aspects of mathematical, scientific, engineering principles to analyze complex engineering problems for meeting the national and international requirements and demonstrating the need for sustainable development.
2. To adapt to the modern engineering tools for planning, analysis, design, implementation of analytical data and assess their relevant significance in societal and legal issues necessary in their professional career.
3. To exhibit professionalism, ethical attitude, communication, managerial skills, team work and social responsibility in their profession and adapt to current trends by engaging in continuous learning.

PROGRAM OUTCOMES:

At the end of the programme, the students will possess-

a. An ability to apply knowledge of mathematics, science, and engineering for engineering applications of national and international requirements.
b. An ability to identify-, formulate-, and analyze- complex engineering problems
c. An ability to design the experiments, analyze and interpret the data
d. An ability to use the techniques, skills, resources and modern engineering tools necessary to solve civil engineering problems
e. An ability to assess reasoning informed by contextual knowledge to assess health, safety, legal and cultural issues relevant to professional engineering practice
f. An ability to demonstrate the knowledge needed for sustainable development
g. An ability to apply ethical principles and responsibilities in engineering practice
h. An ability to function effectively as an individual and as a team member or leader in multi disciplinary settings
i. An ability to communicate effectively
j. An ability to demonstrate knowledge of engineering and management principles and apply to one's own work either as a member or as a team leader in managing projects
k. An ability to engage in life-long learning to keep abreast with technological changes

PROGRAM SPECIFIC OUTCOMES FOR CIVIL ENGINEERING

PSO1: Possesses necessary skill set to analyze and design various systems using analytical and software tools related to civil engineering

PSO2:Possesses ability to plan, examine and analyse the various laboratory tests required for the professional demands

PSO3: Possesses basic technical skills to pursue higher studies and professional practice in civil engineeringdomain

I-SEMESTER

S. No	Subject Code	Name Of The Subject	Contact Hours/ Week		Credits	Scheme Of Valuation		Total Marks
			L+T	P		Internal (CIE)	External (SEE)	
1	S239	English - I	4		3	25	75	100
2	S132	Applied Mathematics - I	4+1		3	25	75	100
3	S232	Engineering Chemistry	4+1		3	25	75	100
4	S170	Computer Programming	4+1		3	25	75	100
5	S235	Engineering Graphics	4+1		3	25	75	100
6	L144	English Communication Lab		3	2	25	50	75
7	L126	Computer Programming Lab		3	2	25	50	75
8	L140	Engineering Chemistry Lab		3	2	25	50	75
9	L124	Computer Aided Engineering Graphics Lab		3	2	25	50	75
		Total			**23**	**225**	**575**	**800**

II -SEMESTER

S. No	Subject Code	Name Of The Subject	Contact Hours/ Week		Credits	Scheme Of Valuation		Total
			L+T	P		Internal (CIE)	External (SEE)	
1	S240	English – II	4		3	25	75	100
2	S133	Applied Mathematics - II	4+1		3	25	75	100
3	S238	Engineering Physics	4		3	25	75	100
4	S150	Building Materials and Construction	4		3	25	75	100
5	S135	Applied Mechanics	4+1		3	25	75	100
6	L142	Engineering Physics Lab		3	2	25	50	75
7	L115	Building Planning and Computer Aided Drawing		3	2	25	50	75
8	L143	Engineering Workshop		3	2	25	50	75
9	L154	IT workshop		3	2	25	50	75
		Total			**23**	**225**	**575**	**800**

III-SEMESTER

S. No	Code No.	Name Of The Subject	Contact Hours/ Week		Credits	Scheme Of Valuation		Total
			L+T	P		Internal (CIE)	External (SEE)	
1	S391	Strength of Materials-I	4+1		3	25	75	100
2	S304	Mechanics of Fluids	4+1		3	25	75	100
3	S396	Surveying	4+1		3	25	75	100
4	S171	Concrete Technology	4+1		3	25	75	100
5	S134	Applied Mathematics - III	4+1		3	25	75	100
6	S208	Electrical and Electronics Engineering	4+1		3	25	75	100
7	**S243**	Environmental Studies	3			25	75	100
8	L179	Survey Field Work Lab		3	2	25	50	75
9	L178	Strength of Materials Lab		3	2	25	50	75
		TOTAL			**22**	**225**	**625**	**850**

Note : The Subject with Code S243 is Mandatory Course

IV SEMESTER

S. No	Code No.	Name of The Subject	Contact Hours/ Week		Credits	Scheme Of Valuation		Total
			L+T	P		Internal (CIE)	External (SEE)	
1	S112	Advanced Surveying	4+1		3	25	75	100
2	S392	Strength of Materials-II	4+1		3	25	75	100
3	S264	Hydraulics and Hydraulic Machinery	4+1		3	25	75	100
4	S234	Engineering Geology	4+1		3	25	75	100
5	S295	Managerial Economics and Financial Analysis	4+1		3	25	75	100
6	S393	Structural Analysis-I	4+1		3	25	75	100
7	**S355**	Professional Ethics and Human Values	3			25	75	100
8	L141	Engineering Geology Lab		3	2	25	50	75
9	L146	Fluid Mechanics and Hydraulics Machine Lab		3	2	25	50	75
		TOTAL			**22**	**225**	**625**	**850**

Note: The Subject with Code S355 is Mandatory Course

V-SEMESTER

S. No.	Subject Code	Name of the Subject	Contact Hours/ Week		Credits	Scheme of Valuation		Total Marks
			L+T	P		Internal (CIE)	External (SEE)	
1	S394	Structural Analysis - II	4+1		3	25	75	100
2	S183	Design of Reinforced Concrete Structures – I	4+1		3	25	75	100
3	S255	Geo Technical Engineering - I	4+1		3	25	75	100
4	S265	Hydrology	4+1		3	25	75	100
5	S423	Water Supply Engineering	4+1		3	25	75	100
6	S412	Transportation Engineering - I	4+1		3	25	75	100
7	L113	Advanced Survey Field Work		3	2	25	50	75
8	L119	Communication and Presentation Skills Lab		3	2	25	50	75
9	L176	Seminar			2	75		75
		TOTAL			**24**	**275**	**550**	**825**

VI – SEMESTER

S. No	Subject Code	Name of the Subject	Contact Hours/ Week		Credits	Scheme of Valuation		Total Marks
			L+T	P		Internal (CIE)	External (SEE)	
1	S185	Design of Steel Structures	4+1		3	25	75	100
2	S420	Waste Water Engineering	4+1		3	25	75	100
3	S421	Water Resources Engineering	4+1		3	25	75	100
4	S256	Geo Technical Engineering–II	4+1		3	25	75	100
5		**Program Elective – I**	4+1		3	25	75	100
	S413	Transportation Engineering-II						
	S251	Finite Element Methods in Civil Engineering						
	S431	Construction Techniques, Equipment and Practice						
6		**Programme Elective – II**	4+1		3	25	75	100
	S435	Matrix Methods of Structural Analysis						
	S437	Repair and Rehabilitation of Structures						
	S434	Ground Water Development and Management						
7	L149	Geotechnical Engineering Lab		3	2	25	50	75
8	L145	Environmental Engineering Lab		3	2	25	50	75
9	L164	Mini Project			2	25	50	75
		TOTAL			**24**	**225**	**600**	**825**

VII-SEMESTER

S. No	Subject Code	Name of the Subject	Contact Hours/ Week		Credits	Scheme of Valuation		Total Marks
			L+T	P		Internal (CIE)	External (SEE)	
1	S244	Estimation and Quantity Surveying	4+1		3	25	75	100
2	S348	Prestressed Concrete Structures	4+1		3	25	75	100
3	S184	Design of Reinforced Concrete Structures - II	4+1		3	25	75	100
4		**Program Elective – III**	4+1		3	25	75	100
	S432	Environmental Pollution Control						
	S258	Ground Improvement Techniques						
	S439	Traffic Engineering and Transport Planning						
5	S172	Construction Management	4+1		3	25	75	100
6		**Open Elective – I**	4+1		3	25	75	100
	S196	Disaster Management						
	S424	Watershed Management						
	S369	Remote Sensing and Geographical Information System						
7	L122	Computer Aided Analysis and Design Lab		3	2	25	50	75
8	L151	Highway and Concrete Technology Lab		3	2	25	50	75
9	L153	Internship			2	75		75
		TOTAL			**24**	**275**	**550**	**825**

VIII – SEMESTER

S. No	Subject Code	Name of the Subject	Contact Hours/ Week		Credits	Scheme of Valuation		Total Marks
			L+T	P		Internal (CIE)	External (SEE)	
1		**Program Elective –IV**	4+1		3	25	75	100
	S111	Advanced Structural Design						
	S430	Advanced Foundation Engineering						
	S438	Rural Road Technology						
2	S338	Pavement Analysis and Design Engineering	4+1		3	25	75	100
3		**Open Elective – II**	4+1		3	25	75	100
	S433	Green Buildings						
	S151	Building Technology						
	S436	Modern Construction Systems and Techniques						
4	L157	Main Project		3	9	50	150	200
5	L121	Comprehensive Viva-voce			2	75		75
		TOTAL			**20**	**200**	**375**	**575**

Note: A few courses as notified in the respective departments are offered to the students on electives under Massive Open Online Courses (MOOCs).

S239 - ENGLISH – I **ISEMESTER**

(Common to all branches)

Prerequisite: None

Course Educational Objectives

In this course, the students will learn

1. The standard vocabulary along with the meaning and usage of the words
2. The concepts of functional grammar and syntax for better writing and speaking skills
3. The concepts of skimming, scanning and critical reading for better comprehension abilities.
4. The effective pronunciation, language usage through extensive reading
5. The concepts of writing reports, resume, statement of purpose, memos and e-mails etc.

Course Outcomes

After the completion of this course, students will have the ability to

1. Read, write and understand what ever is written and spoken in English
2. Speak fluently with acceptable pronunciation and write using appropriate words, spellings, grammar and syntax
3. Read the lines, between lines and beyond lines excelling in comprehension skills
4. Speak grammatically error free English
5. Draft reports, memos, mails & letters as part of their work.

UNIT – I

Astronomy (Learning English)
Grammar: Parts of Speech
Vocabulary: Antonyms
Analytical Writing: Unscrambling words in a sentence; Un-jumbling the sentences into a paragraph; Types of sentences; Paragraph writing

UNIT – II

Travel and Transport (Learning English)
The Trailblazers - **Jagadis Chandra Bose**(Masterminds)
Grammar: prepositions; word plurals; sentence completion
Vocabulary: Synonyms
Analytical Writing: Drafting E-Mails; Letter writing (Formal & Informal)

UNIT - III

Humour (Learning English)
The Trailblazers – **Prafulla Chandra Ray** (Masterminds)
Grammar: Active & Passive Voices
Vocabulary: Pre-fixes & Suffixes
Analytical Writing: Note-making

UNIT - IV

Health and Medicine (Learning English)
The Trailblazers – **Srinivasa Ramanujam** (Masterminds)
Grammar: Tenses
Vocabulary: Deriving words
Analytical Writing: Abstract writing/Synopsis writing

UNIT - V

The World of Figures and Physics – **Chandra Sekhara Venkata Raman** (Masterminds)
Grammar: Articles
Vocabulary: One-Word substitutes
Analytical Writing: Essay writing; Dialogue writing (Formal & Informal)

TEXT BOOKS

1. "Learning English", Orient Longman Private Limited. 2008 JNTU edition
2. Enakshi Chatterjee, "Masterminds", Orient Longman Private Limited. 2002 (Reprint)

REFERENCES

1. Andrea J Rutherford, "Basic Communication Skills for Technology", Pearson Education, New Delhi,1st edition, 2009
2. Murphy, "English Grammar with CD", Cambridge University Press, New Delhi, 2004
3. Rizvi & M. Ashraf, " Effective Technical Communication", Tata McGraw Hill, New Delhi,2008.
4. Blum Rosen, "Word Power", Cambridge University Press, New Delhi, 2009.

ISEMESTER

S132 - APPLIED MATHEMATICS-I

(Common to AE, CE, CSE, EEE, EIE, IT, ME)

Prerequisite: None

Course Educational Objectives

In this course, the students will learn about

1. The concepts of Differential Equations and solving the first order and the first degree differential equations.
2. The concepts of Higher Order Differential Equations and solving such equations with constant and variable coefficients.
3. The concepts of theory of Matrices which are used to solve linear simultaneous equations.
4. The concept of Eigen Values and Eigen Vectors and solving an Eigen Value Problem.
5. The concepts of partial differentiation and formation of partial differential equations

Course Outcomes

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

1. Know fundamental mathematical skills required to form a necessary base to analyze first order differential equations.
2. Know the Higher Order Differential Equations, Procedures to solve them and their physical applications.
3. Find the solutions of System of Homogeneous and Non Homogeneous Linear equations using matrices for different physical applications.
4. Find Eigen values and Eigen vectors, higher powers and inverse of a given matrix, and can apply it in the concept of free vibrations of two- mass systems.
5. Find the solutions of linear partial differential equations.

UNIT – I

Differential Equations of First Order and First Degree

Differential equations of first order and first degree – Exact, Linear and Bernoulli. Applications to Orthogonal trajectories, applications to LCR circuits.

UNIT – II

Higher Order Differential Equations

Linear differential equations of second and higher order with constant coefficients and with variable coefficients, method of variation of parameters , Linear differential equations of second and higher order with variable coefficients – Cauchy's Equation and Legendre's Equations.

UNIT – III

Functions of Several variables

Generalized Mean Value Theorem(without proof), Maclaurin's series, Functions of several variables, Jacobians (polar, cylindrical, spherical coordinates), Functional dependence, Maxima and Minima of functions of two variables with constraints and without constraints – Lagrangian Multiplier Method. Formation of Partial Differential Equations by the elimination of arbitrary constants and arbitrary functions. Solution of first order and first degree linear partial differential equation – Lagranze's method

UNIT –IV

System of Linear Equations.

Matrices - Rank- Echelon form, Normal form , PAQ form– Solution of Linear Systems – Homogeneous system of equations and Non Homogeneous System of Equations, Gauss Elimination, Gauss - Seidal and Jacobi Methods.

UNIT – V

Eigen Values and Eigen Vectors
Eigen values – Eigen Vectors – Properties – Cayley Hamilton Theorem – Inverse and Powers of a matrix by using Cayley Hamilton Theorem.

TEXT BOOKS

1. Dr. B.S. Grewal, "Higher Engineering Mathematics", Khanna Publishers, 42nd Edition,2012.
2. Dr. B. V. Ramana, "Higher Engineering Mathematics", TMGHPublications, 1st Edition,2010.

REFERENCES

1. M. D. Greenberg , "Advanced Engineering Mathematics", TMGH Publications, 2nd Edition,2011.
2. Erwin Krezig, "Advanced Engineering Mathematics", John Wiley &Sons , 8th Edition,2011.
3. W. E. Boyce and R. C. Diprima, " Elementary Differential equations", John Wiley & sons, 7th Edition,2001.

S232 - ENGINEERING CHEMISTRY
(Common to all branches)

ISEMESTER

Prerequisite: None

Course Educational Objectives:

Through this course the student will learn

1. The concept of water technology with special focus on hardness & softness of water, methods of softening and desalination of brackish water.
2. The concept of conventional and alternative fuels and working of petrol and diesel engines.
3. The concept of corrosion and control measures.
4. The concept of polymers and polymerization.
5. The concept of green chemistry and applications of liquid crystals.

Course Outcomes:

After completion of the course the students will acquire the ability to:

1. Analyze the quality of water and its maintenance for industrial purposes.
2. Analyze issues related to fuels and their synthesis and able to understand working of IC and Diesel engines.
3. Realize the principles of corrosion and make use of the principles for maintenance of various equipments more effectively.
4. Get hands on experience in various processes like polymerization, preparation, properties and applications of plastics and rubbers.
5. Realize the use of liquid crystals in various technological applications.

UNIT - I

WATER TECHNOLOGY: Sources of water and quality. Hardness of Water - Temporary and Permanent hardness. Units and their interrelation. Problems on Temporary and Permanent hardness.Disadvantages of hard water in various industries.

Boiler troubles – scale & sludge formation, Caustic Embrittlement, boiler corrosion, priming & foaming (carryover).

Internal Treatment–Colloidal Phosphate, Calgon, Carbonate, Sodium aluminate Conditioning of Water.

External Treatment - Lime-Soda Process, Zeolite process , Ion- Exchange Process merits and demerits. (Note-Problems on lime-soda process are not included)

Desalination of brackish water-Electrodialysis, reverse osmosis

UNIT - II

Fuel Technology: Definition and classification of Fuels, merits and demerits of solid liquid and gaseous fuels.Gross and net calorific values – (definition only).

Solid fuels- coal - analysis, Proximate and ultimate analyses of coal – significances.

Liquid Fuels – petroleum-origin and refining of petroleum- cracking- fixed bed and moving bed methods, synthetic petrol – Bergius and Fischer Tropsch's methods.

Working of I.C and C.I engines –Knocking in I.C and C.I engines, antiknocking agents Octane number , Cetane number(Definitions only)

Gaseous fuels- Natural gas, CNG Advantages of CNG, Flue gas analysis – Orsat's apparatus.

UNIT - III

CORROSION: Definition, Examples.

Dry Corrosion(Direct Chemical corrosion), Types of dry corrosion-oxidative corrosion, Pilling Bed worth rule, corrosion by other gases, liquid metal corrosion.

Wet Corrosion (Electro Chemical corrosion) Mechanism- Oxygen absorption Hydrogen evolution type, Types of wet corrosion, Galvanic Corrosion, passivity, Galvanic Series Concentration Cell Corrosion, intergranular corrosion, stress corrosion, Soil corrosion.

Factors Influencing Corrosion- Nature of metal and nature of environment.

Control of Corrosion - Proper Design, Use of pure metals and metal alloys, Cathodic Protection - Sacrificial anode and Impressed Current, Modifying the Environment and use of Inhibitors.

UNIT - IV

Polymer Science and Technology: Definition, classification of polymers, Functionality, Types of polymerization-addition, condensation, copolymerization

Plastics preparation, properties and engineering applications of, PVC, Teflon, Bakelite,PMMA.

Conducting polymers: Polyacetylene, Polyaniline, conduction, doping, application.

Rubbers Natural rubber and it's processing, disadvantages of Natural rubber , Vulcanization and significance.

Elastomers- preparation, properties and engineering applications of Buna S, Buna N, Thiokol.

Fibers- preparation, properties and engineering applications of Polyester, fiber reinforced plastics (FRP).

UNIT – V

(a) Green chemistry-Goals and significance of green chemistry. Basic components (alternative starting materials, reagents, reaction conditions, final products) of green chemistry research.

(b) Liquid crystals –Classification of liquid crystals (Thermo tropic, lyotropic) and applications.

TEXT BOOKS

1. Jain & Jain, A text book of Engineering Chemistry by DhanpatRai Publishing Company, New Delhi (15^{th} Edition) (2006).
2. Dr. S.S Dara, Dr.S.S Umare A Text book of Engineering Chemistry by S.Chand Publications, 12th Edition, 2010.
3 . ShashiChawla, A Text book of Engineering Chemistry by DhanpatRai Publishing Company, Third Edition, 2003.

REFERENCES

1. Dr. Y. Bharathi Kumari and Dr. JyotsnaCherukuri, A Text book of Engineering Chemistry by VGS Publications, First Edition, 2009
2. R.V. Gadag, A.Nityananda Shetty, I.K. International publishing house 1^{st} edition 2006
3. Dr. M. R. Senapati, Advanced Engineering Chemistry by University Science Press (Impart from Laxmi Publications), 3^{rd} Edition 2009.

S170 - COMPUTER PROGRAMMING

(Common to all branches)

ISEMESTER

Course Educational Objectives:

The Students will learn

1. The basic elements C programming structures like data types, expressions, control statements, various I/O functions and how to solve simple mathematical problems using control structures.
2. Modular programming using functions.
3. The derived data types like arrays, strings, various operations and Memory management using pointers.
4. User defined structures and various operations on it.
5. The basics of files and its i/o operations.

Course Outcomes:

After undergoing the training in this course the students will acquire the ability to:

- Identify basic elements of C programming structures like datatypes, expressions, control statements, various I/O functions and Evaluation of simple mathematical problems using control structures.
- Implementation of derived data types like arrays, strings and various operations.
- Understanding of memory management using pointers and designing of modular programming.
- Construct user defined structures and implements various applications.
- Create text & binary type files and understanding of various file I/O operations.

Pre Requisite: The students should have basic knowledge in Maths & computers

UNIT – I

Algorithm / pseudo code, flowchart, example flow charts, structure of C program, identifiers, basic data types and sizes, Constants, variables, Input-output statements, A sample c program, operators: arithmetic, relational and logical operators, increment and decrement operators, conditional operator, bit-wise operators, assignment operators, expressions, type conversions, conditional expressions, precedence of operators and order of evaluation. Conditional statements: if, ifelse, else if ladder and switch statements, continue, go to and labels. Loops: while, do-while and for statements, break, programming examples.

UNIT – II

Arrays- one dimensional arrays-concept, declaration, definition, accessing elements, storing elements, two dimensional and multi-dimensional arrays.**Character Strings:** declaration, initialization, reading, writing strings, arithmetic operations on characters, string handling functions programming examples

UNIT – III

Pointers- concepts, declaring &initialization of pointer variables, pointer expressions, address arithmetic, pointers and arrays, pointers and character strings, pointers to pointers,Pre-processor Directives and macros. **Functions:** basics, category of functions, parameter passing techniques, recursive functions, Functions with arrays, storage classes-extern, auto, and register, static, scope rules, Standard library functions., dynamic memory management functions, command line arguments, c program examples.

UNIT – IV

Derived types- structures- declaration, definition and initialization of structures, accessing structures, nested structures, arrays of structures, structures and functions, pointers to structures, self-referential structures, unions, typedef, C program examples.

UNIT - V

Files – concept of a file, text files and binary files, streams, standard I/O, Formatted I/O, file I/O operations, error handling, C program examples.

TEXT BOOKS

1. B.W. Kernighan, Dennis M.Ritchie, The C Programming Language, , PHI/Pearson Education.
2. N.B.Venkateswarlu and E.V.Prasad, C and Data Structures.

REFERENCES

1. Reema Thareja, Programming in C , Oxford Publications.
2. Stephen G. Kochan, Programming in C, 3rd, Pearson Eductaion
3. Pradeep Dey, Programming in C, Oxford Publications.

ISEMESTER

S235 - ENGINEERING GRAPHICS

(Common to AE, CE, ME)

Course Educational Objectives:

1. To understand the basics of engineering graphics and BIS conventions
2. To draw the various profiles/curves used in engineering practice
3. To understand the basics of orthographic projections in different axis.
4. To familiarize with the basic concept of isometric views, lines and planes

Course Outcomes:

1. Get familiarized with the BIS conventions and curves used in engineering practice
2. Draw the orthographic projections of a given object
3. Draw the projections of planes
4. Draw the projections of solids and their sectioning
5. Draw the isometric projections of a given object

UNIT - I

INTRODUCTION TO ENGINEERING DRAWING: Principles of Engineering Graphics and their significance - Drawing Instruments and their use-Conventions in Drawing-Lettering and Dimensioning – BIS conventions –Geometrical Constructions.

Curves:

a) Conic Sections- Ellipse, Parabola, Hyperbola and rectangular hyperbola- General method and other methods.
b) Cycloid, Epi-Cycloid and Hypo-Cycloid.
c) Involutes.

UNIT - II

ORTHOGRAPHIC PROJECTIONS:

Principle of orthographic projection-Method of Projection – First and third angle projection methods- Projections of Points –Projection of straight lines-True lengths and traces.

UNIT – III

PROJECTIONS OF PLANES: Planes parallel to one of the reference planes-Inclined to one reference plane and perpendicular to other-Oblique planes.

UNIT – IV

PROJECTIONS OF SOLIDS: Projection of solids in simple position - Axis inclined to one of the reference planes and parallel to the other-Axis inclined to both H.P and V.P.

UNIT - V

ISOMETRIC PROJECTIONS: Introduction-theory of isometric projection, isometric axes, scale, lines & planes-Isometric drawing of prisms, cylinders & cones-non isometric lines-conversion of isometric views to orthographic views and orthographic views to isometric views.

TEXT BOOK

N. D. Bhatt, Engineering Drawing, 51th Revised and Enlarged Edition, Charotar publishers, 2012

REFERENCES

1. Narayana K L, Kannaiah P, Textbook on Engineering Drawing, 2nd Edition, Scitechpublishers.
2. R.K.Dhawan, Engineering Drawing, S.Chand Company LTD.
3. Venugopal, Engineering Drawing and Graphics, New Age publishers
4. Dhananjay A. Jolhe, Engineering Drawing, Tata McGraw Hill Publishers

L144 - ENGLISH COMMUNICATION LAB
(Common to all branches)

ISEMESTER

Prerequisite: English-I

Course Educational Objectives

In this course, the students will learn to

1. Better pronunciation through emphasis on word accent.
2. Use language effectively to face interviews, group discussions and public Speaking
3. Possess Positive attitude and inculcate group behavior
4. Negotiate well with inter personal skills and intra personal skills
5. Speak spontaneously on any topic given

Course Outcomes

After the completion of this course, students will have the ability to

1. Withstand the global competition in the job market with proficiency in English communication.
2. Articulate English with good pronunciation.
3. Face competitive exams like GRE, TOEFL, IELTS etc.
4. Face interviews and skillfully manage themselves in group discussions
5. Communicate with the people effectively.

The following course content is prescribed for English Language Communication Skills Laboratory sessions:

1. Introduction to English Phonemes; Phonetic Transcription, Stress.
2. JAM
3. Role Play
4. Information Transfer
5. Group Discussions

SUGGESTED SOFTWARE

1. Digital Mentor: Globarena,Hyderabad,2005
2. Sky Pronunciation Suite: Young India Films, Chennai, 2009
3. Mastering English in Vocabulary, Grammar, Spelling, Composition, Dorling Kindersley,USA,2001
4. Dorling Kindersley Series of Grammar, Punctuation, Composition, USA, 2001
5. Oxford Talking Dictionary, The Learning Company, USA, 2002
6. Learning to Speak English - 4 CDs. The Learning Company,USA,2002
7. Cambridge Advanced Learners English Dictionary (CD). Cambridge University Press, New Delhi, 2008

L126 - COMPUTER PROGRAMMING LAB **ISEMESTER**

(Common to all branches)

Course Educational Objectives:

1. Basic programming concepts and skills
2. Understand the syntax and logical sequencing of a programme
3. Analyze the given problem for converting it into a code
4. Develop a programme using various operations involved in the syntax

Course Outcomes:

1. Develop programming skills for coding a given problem using C language
2. Distinguish between the logical sequencing and syntax of the given code
3. Prove how a good program design can reduce coding and debugging time by using appropriate utilities in coding

LIST OF LAB PROGRAMS:

I) write a programme in 'C' language to cover the following problems.

a) Example program which shows the usage of various preliminary Data types available in C Language.

b) Example program which shows the usage of various Operators available in C Language.

c) Example programs to illustrate the *order of evaluation*.

II) WRITE EXAMPLE PROGRAMS:

a) To check whether the given year is leap year (or) not

b) Roots of Quadratic Equation.

c) Finding smallest& biggest number from the given set of 4 numbers using 'if' statement.

d) Calculate the student grade in the examination – assume suitable constraints.

e) Prepare electricity bill for the consumed units – assume suitable Constraints.

f) Converting given two digit number into words using switch statement

g) To illustrate the usage of 'goto' statement.

III) EXAMPLE PROGRAMS:

a) To Display first N natural numbers

b) To find whether the given number is Armstrong (or) not

c) To find reverse of the given number and to check whether it is palindrome (or) not.

d) To find whether given number is strong number (or) not.

e) To check whether given number is Prime (or) not

f) To display prime numbers with in the given range(Nesting of Loops).

g) To display the following structure(Nesting of Loops)

i)

```
1
1 2
1 2 3
1 2 3 4
1 2 3 4 5
```

ii)

```
5 4 3 2
4 3 2 1
3 2 1
2 1
1
```

IV) Write example programs in C Language to perform following operations:

a) Finding the sum and average of given numbers using Arrays.

b) To display elements of array in reverse order

c) To search whether the given element is in the array (or) not using linear search & binary search.

d) Write a C program to perform the following operations

i) Addition, subtraction and multiplication of Matrices

ii) Transpose of given matrix

(The above operations are to be exercised using functions also bypassing arguments)

e) Write a C program to find whether the given string is palindrome (or) not.

f) To accept line of text and find the number of characters, number of vowels and number of blank spaces in it.

g) Write an example program to illustrate the use of any 5 stringhandling functions.

V) a) Example program to bring clarity on pointer declaration &initialization and Pointer arithmetic.
b) Write an example program to describe the usage of *call by reference*.
c) Write a program to find sum of the elements of the array using functions.

VI) Write example programs in C Language:
a) To find factorial of a given number using functions.
b) Swap two numbers using functions.
c) To find GCD of two numbers using recursion
d) Write a recursive function to solve Towers of Honai problem.
e) Write an example program to illustrate use of external & static storage classes.
f) Write an example program to illustrate the usage of command linearguments.
g) Program to illustrate the usage of dynamic memory managementfunctions.

VII) a) Write an example program using structures to process the studentrecord. Assume suitable fields for student structures (Different kinds of initialization of structure variables are to be exercised)
b) Write a program to read records of 10 employees and find theiraverage salary (exercise array of structures & Nested structures concepts through this program).
c) Write a program to handle a structure variable using pointers and implement self referential structure(i.e. A structure variable having a pointer to itself)

VIII) Write an example program on file to perform following operations:
a) Accessing content from files and writing content in to it.
(Exercise different file operation modes)
b) Copy the contents of one file into another (Exercise different file operation modes)

L140 - ENGINEERING CHEMISTRY LAB
(Common to all branches)

ISEMESTER

Prerequisite: None

Course Educational Objectives:
Through this course the student will learn
1. To analyze water for its quality and to determine the important parameters like alkalinity and hardness.
2. To distinguish types of titrations used in volumetric analysis.
3. To gain hands on experience in practical aspects of preparation of polymers.

Course Outcomes:
After undergoing the training in this course the students will acquire the ability to:
1. Assess quality of water based on the procedures given.
2. Distinguish different types of titrations in volumetric analysis after performing the experiments listed in the syllabus**.**
3. Acquire practical knowledge related to preparation of polymers.
4. Exhibit skills in performing experiments based on theoretical fundamentals.

Model experiment
1. Estimation of sodium hydroxide by using hydrochloric acid.

Water analysis
2. Determination of alkalinity of water sample
3. Determination of total Hardness of water by EDTA method
4. Determination of permanent hardness of water by EDTA method.
5. Determination of Dissolved Oxygen (D.O) content by Winkler's method

Preparation of polymers
6. Preparation of Urea formaldehyde resin.
7. Preparation of Phenol formaldehyde resin.

Redox titrations
8. Determination of amount of potassium dichromate in given solution by using sodium thiosulphate.
9. Determination of the amount of Oxalic acid and Sulphuric acid in 1 liter solution by Using given standard Sodium Hydroxide and Potassium Permanganate solution.
10. Estimation of Mohr's salt by using potassium permanganate.
11. Estimation of Mohr's salt by using potassium dichromate.
12. Estimation of Mohr's salt by using Oxalic acid.

Estimation of Vitamin content

13. Estimation of Vitamin-C

REFERENCES
Lab manual

L124 - COMPUTER AIDED ENGINEERING GRAPHICS L **ISEMESTER**

(Common to AE, CE, ME)

Course Educational Objectives:

1. To learn the basic commands necessary for professional 2D drawings, design, and drafting using AutoCAD essentials.
2. To develop orthographic projections and isometric drawings using Auto-CAD.
3. To draw the solids by developing the surfaces without any complexity.

Course Outcomes:

1. Understand the Auto-CAD basics and apply to solve practical problems used in industries where the speed and accuracy can be achieved.
2. Apply this idea and make design and modifications as required.
3. Draw 2-dimensional drawings of conventional engineering objects using Auto-CAD

At least 10 Exercises are to be conducted using Auto Cad software:

BASIC AUTO CAD COMMANDS:

1. Basic drawing commands (line, circle, arc, ellipse, polygon, and rectangle).
2. Edit commands (copy, move, erase, zoom).
3. Array commands (polar array, rectangular array, P-edit, divide aline, offset).
4. Hatching &line commands (hatching with different angles& different types of lines).
5. Mirror & trim commands (mirror an object, trim, extend a line, chamfer &fillet, explode).
6. Dimensioning & text commands (linear, angular, radius, diameter& text).

PROJECTION OF POINTS AND LINES:

1. Projection of points (I, II, III, & IV quadrants).
2. Projection of lines parallel to both reference planes.
3. Projection of lines parallel to one reference plane & inclined to other reference plane.

PROJECTION OF PLANES AND SOLIDS:

1. Projection of planes parallel to one reference plane & perpendicular to other reference plane.
2. Projection of planes inclined to one reference plane& perpendicular to other reference plane.
3. Projection of solids in simple position.
4. Projection of solids with axes inclined to one reference plane & parallel to other.

ORTHOGRAPHIC PROJECTIONS:

5. Conversion of plane figures.
6. Conversion of circular figures.
7. Conversion of both combination of plane figures and circular figures.

ISOMETRIC PROJECTIONS:

8. Conversion of plane figures.
9. Conversion of circular figures.
10. Conversion of both combination of plane figures and circular figures.

REFERENCES

1. Bethune, Engineering Graphics with AutoCAD, PHI Learning Private Limited, New Delhi, 2009.
2. D.M. Kulkarni, A.P Rastogi, and A.K. Sarkar, Engineering Graphics with AutoCAD, PHI Learning Private Limited, New Delhi, 2009.
3. N. D. Bhatt, Engineering Drawing, 51th Revised and Enlarged Edition, Charotar Publishers, 2012.

CYCLE: 1

SNO	SHEETS	EXERCISE	COMMANDS TO BE COVERED	REFERENCES	PAGE NUMBER
1	SHEET-1	Basic drawing commands	line, circle, arc, ellipse, polygon, and rectangle	PLATE 2.1& 2.2	26
2	SHEET-2	Edit commands	copy, move, erase, zoom, measure, divide, pan, change properties	PLATE 2.3& 2.4	27
3	SHEET-3	Array commands	polar array, rectangular array, P-edit, divide aline, offset	PLATE 2.5& 2.6	28&29
4	SHEET-4	Hatching &line commands	hatching with different angles& different types of lines	PLATE 2.8& 2.9	31&32
5	SHEET-5	Mirror & trim commands	mirror an object, trim, extend a line, chamfer &fillet, explode	PLATE 2.7& 2.13	30&35
6	SHEET-6	Dimensioning & text commands	linear, angular, radius, diameter& text	PLATE 4.1	69
7	SHEET-7	Projection of points	Points & lines	Case-1,2,3,4	171
8	SHEET-8	Projection of lines(parallel to both reference planes)	line	Fig:9.4(a & b)	172&173
9	SHEET-9	Projection of lines (parallel to one reference plane & inclined to other reference plane)	lines	Fig:9.4(c)	173
10	SHEET-10	Projection of planes(inclined to one plane)	polygons	EX:10.2&10.3	198&199
11	SHEET-11	Projection of solids	Line, polygon, rectangle	EX:12.42&12.44	234&235

CYCLE: 2

SNO	SHEETS	EXERCISES	REFERENCE	PAGE NUMBER
Orthographicprojections				
	SHEET-12	Conversion of plane figures	PLATE 5.1& 5.3	82&83
13	SHEET-13	Conversion of circular figures	PLATE 5.9& 5.13	86&88
14	SHEET-14	Conversion of both combination of plane figures and circular figures	PLATE 5.25,5.26 PLATE5.27,5.28	94&95
Isometric projections				
15	SHEET-15	Conversion of plane figures	PLATE 6.3	122
16	SHEET-16	Conversion of circular figures	PLATE 6.4	123
17	SHEET-17	Conversion of both combination of plane figures and circular figures	PLATE 6.8&6.10	125&126

IISEMESTER

S240 - ENGLISH – II

(Common to all branches)

Prerequisite: ENGLISH-I

Course Educational Objectives

In this course, the students will learn

1. English with emphasis on LSRW skills.
2. To make decisions, while thinking logically analyzing situations carefully.
3. To read speedily and meaningfully.
4. Both active and passive vocabulary.
5. To write letters and reports effectively in formal and professional situations.

Course Outcomes

After the completion of this course, prospective engineers will have the ability to

1. Use English language effectively.
2. Express right ideas in right context
3. Manage the situation and negotiate business with good English communication
4. Think and analyze the situations and make good presentations of their work and decisions
5. prepare themselves to face interviews and also to participate in group discussions

1.

UNIT - I

Environment (Learning English)
The World of Figures and Physics – **Satyendranath Bose** (Master Minds)
Grammar: Correction of sentences
Analytical Writing: Report Writing

UNIT - II

Inspiration (Learning English)
The Institution Builders– **Santi Swarup Bhatnagar** (Masterminds)
Grammar: If-clause; Question tags
Vocabulary: Idioms and Phrases
Analytical Writing: Resume'; Statement of Purpose

UNIT - III

Human Interest (Learning English)
The institution builders – **Meghanadh Saha** (Master Minds)
Grammar: Direct & Indirect Speeches
Vocabulary: Phrasal Verbs
Analytical Writing: Memo Drafting

UNIT – IV

Media (Learning English)
The New Age – **Homi Jehangir Bhabha** (Master Minds)
Grammar: Concord
Vocabulary: Analogy
Analytical Writing: Information Transfer/ Data Interpretation (Tables, Pie charts, Bar graphs, Tree diagrams, Pictograms, etc.)

UNIT – V

The New Age – **Vikram Sarabhai** (Master Minds)
Grammar: Gerunds & Infinitives; Correction of Sentences
Vocabulary: Words often confused

Analytical writing – Comprehension, Expansions (of a given topic/ proverbs)

TEXT BOOKS

1. "Learning English", Orient Longman Private Limited.JNTU edition,2008
2. EnakshiChatterjee, "Masterminds", Orient Longman Private Limited ,Reprint-2002

REFERENCES

1. KoneruAruna, "Professional Communication", Tata McGraw-Hill, New Delhi, 2007.
2. Rizvi, "Effective Technical Communication", Tata McGraw-Hills, New Delhi, 2009.
3. Andrea J. Rutherford, "Basic Communication Skills for Technology", Pearson Education., 1st edition, 2009
4. Kaplan and Baron's, "GRE and TOEFL', Latest editions.2008

S133 - APPLIED MATHEMATICS – II

(Common to AE, CE, CSE, EEE, EIE, IT, ME)

IISEMESTER

Prerequisite: None

Course Educational Objectives:

In this course student will learn about

1. The basic concepts of Laplace Transforms and their applications in solving the Differential Equations.
2. The expansion of function in an infinite series of sine and cosines.
3. Fourier Integral Theorem, Fourier Integral Transforms along with their properties and applications.
4. Z-transform and its role in discrete analysis and in solving Difference equations.
5. The concepts of multiple integrals and changing of order of integration

Course outcomes:

At the end of this course student will be able to

1. Understand the importance of mathematics and its techniques to solve real life problems.
2. Apply the concepts of Laplace Transforms on Operational Calculus and solve Differential Equations of any order.
3. Express most of the single valued functions in the form of Fourier series and extend the ideas and techniques to non-periodic functions also.
4. Express a function as a continuous frequency resolution using Fourier Transforms.
5. Understand the analogy between Laplace Transform and Z-Transform and apply it wherever necessary & apply Multiple Integrals in various coordinate systems.

UNIT – I

Laplace Transforms

Laplace transforms of standard functions –Shifting Theorems, Transforms of derivatives and integrals – Unit step function –Dirac's delta function. Inverse Laplace transforms– Convolution theorem - Applications of Laplace transforms to ordinary differential equations.

UNIT – II

Fourier Series

Determination of Fourier coefficients – Fourier series – even and odd functions – Fourier series in an arbitrary interval– Half-range sine and cosine series

UNIT – III

Fourier Transforms

Fourier integral theorem (only statement) – Fourier sine and cosine integrals – Fouriertransform – sine and cosine transforms – properties – inverse transforms – Finite Fourier transforms.

UNIT – IV

Z-Transforms

Z-transform – properties – Damping rule – Shifting rule – Initial and final value theorems - Inverse Z –transform - Convolution theorem – Solution of difference equation by z-transforms.

UNIT – V

Multiple Integrals

Multiple integrals - double and triple integrals (Cartesian, polar, spherical coordinates) – Changing of order of Integration and applications to areas and volumes.

TEXT BOOKS

1. Dr. B.S. Grewal, "Higher Engineering Mathematics", Khanna Publishers,42nd Edition,2012.
2. Dr. B. V. Ramana, "Higher Engineering Mathematics", The McGraw Hill Companies, 1st Edition,2010.

REFERNCES

1. Michael D. Greenberg , "Advanced Engineering Mathematics",The McGraw Hill Companies, 2nd Edition,2011.
2. Erwin Krezig, "Advanced Engineering Mathematics", John Wiley & sons,8th Edition,2011.

S238 - ENGINEERING PHYSICS
(Common to all branches)

IISEMESTER

Pre-requisite course: NONE

Course Educational Objectives:

In this course student will learn about

- The basic concepts of Optics such as Interference, Diffraction and Polarization.
- The principle of quantum mechanics,dual nature of matter waves.
- The principle and working of different Lasers.
- The principle and classification of optical fibers
- classification of magnetic materials and their properties.
- Concept of Superconductivity, types and their applications

Course Outcomes:

At the end of this course student will be able to

CO1: Understand the nature of polarization, Diffraction and interference.

CO2: Understand the dual nature of particle and significance of the wave function .

CO3: Understand the principle of LASER and optical fibers. Types of lasers and optical fibers and their applications.

CO4: Understand the different types of magnetic materials and their uses.

CO5: Understand the phenomenon of superconductivity, critical parameters, types of super conductors and their applications

UNIT – I

INTERFERENCE, DIFFRACTION, POLARIZATION

INTERFERENCE: Introduction, super position principle, coherent sources, thin films, Newton's rings (in reflected system only).

DIFFRACTION:

Introduction, Fresnel and Fraunhofer diffractions – comparsion between Fresnel's and fraunhofer's diffraction-Difference between interference and diffraction-Fraunhofer diffraction at single slit - Fraunhofer diffraction at Double slit –Diffraction Grating- Grating spectrum.

POLARIZATION:

Introduction-plane of vibration and plane of polarization -Polarization by reflection Brewster's law –geometry of calcite crystal- Double refraction -nicol prism construction,Quarter wave plate- Half wave plate.

UNIT - II

PRINCIPLES OF QUANTUM MECHANICS:

De Broglie hypothesis- Matter waves- Davison and Germer experiment- GP Thomson experiment , Heisenberg Uncertainty principle-Schrodinger time independent wave equation-Physical significance of the wave function-particle in a box.

UNIT – III

LASERS AND FIBER OPTICS

LASERS:

Introduction – Characteristics of Lasers- Principle of laser (Absorption, Spontaneous and stimulated emission of Radiation), Population Inversion- Einstein Coefficients ,three and four level pumping schemes, block diagram of laser. Ruby Laser- Helium Neon Laser, Applications of Lasers.

FIBER OPTICS

Introduction- Principle of optical Fiber- Acceptance angle and Acceptance cone- Numerical aperture – Types of optical fibers-refractive index profile- Application of optical fibers.

UNIT – IV

MAGNETIC MATERIALS:

Magnetic properties -Origin of magnetic moments-Classification of magnetic materials- Dia, Para, Ferro magnetic , Antiferromagnetic , Ferrimagnetic materials- Domain theory of ferromagnetism(qualitative), Hysteresis curve- Soft and Hard magnetic materials. Applications of magnetic materials.

UNIT – V

SUPER CONDUCTORS

Phenomenon, critical parameters, Meissner effect, Type-I, Type-II Super conductors, BCS theory of super conductivity,Flux Quantization,London Eqs., Penetration depth, Josephson Effects- Applications of Super conductors.

TEXT BOOKS

1. V Rajendran, Engineering Physics, Tata McGraw Hill
2. P K Palani Samy, Engineering Physics, Scitech Publications

REFERENCES

1. M R Srinivasan,Engineering Physics, New age international,2014.
2. M.N.Avadhanulu and P.G.Kshirsagar Engineering physics, S.Chand, New Delhi.
3. RK Gaur& SL Gupta,Engineering Physics, Dhanpat Rai Publication, 2008.
4. Dr. P. Srinivasa Rao & Dr. K. Muralidhar,Basic Engineering Physics, Himalaya Publishing House.

S150 - BUILDING MATERIALS AND CONSTRUCTION **IISEMESTER**

Course Educational Objectives

1. To learn about basic civil engineering materials such as stones, bricks, tiles.
2. To learn the properties and proportions of lime and cement used for construction and their importance
3. To learn about different types of masonry in brick and stone construction
4. To learn about building components
5. To learn about building laws and finishing.

Course outcomes

1. Assess the several properties of stones, bricks, cement and tiles used in construction.
2. Understand different types of brick and stone masonry in building construction
3. Gain knowledge on building components.
4. Know the various finishing's in building construction.

UNIT – I

STONES, BRICKS AND TILES

Properties of building stones – relation to their structural requirements.Classification of stones – Stone quarrying – Dressing of stone, Composition of good brick earth, various methods of manufacture of bricks.Qualities of a good brick.Characteristics of good tile – manufacturing methods, Types of tiles.Use of Materials like aluminium, gypsum, glass and bituminous materials – their quality.

UNIT – II

LIME AND CEMENT

Various ingredients of lime – Constituents of lime stone – classification of lime and importance–Various types of cement and its importance in construction field.

UNIT – III

WOOD: Structure – properties – Seasoning of timber. Classification of various types of woods used in buildings – Defects in timber.Alternative materials for wood, Galvanized Iron, Fiber-reinforced plastics, steel, Aluminum.

MASONARY:

Types of masonry, English and Flemish bonds, Rubble and Ashlar masonry, cavity and partition walls.

UNIT – IV

BUILDING COMPONENTS: Lintels, Arches, and Vaults-stair cases – Types. Different types of floors-Concrete, Mosaic, and Terrazzo floors, pitched, flat and curved Roofs. Lean-to-Roof, Coupled Roofs, Trussed roofs- King and Queen Post Trusses. RCC Roofs, Madras Terrace/Shell Roofs.

UNIT – V

FINISHINGS: Proofing Damp and water proofing- materials used. Plastering, pointing, white washing and distempering – Painting – Constituents of a paint – Types of paints – Painting of new/old Wood –Varnish – Form work and scaffolding.

GEOSYNTHETICS:

Introduction, Function and their Applications-tests on geo-textiles, geo-grids, geo-membranes and geocomposites

TEXT BOOKS

1. S K Duggal -Building material– New Age International Publishers; Fourth Edition -2012
2. B.C.Punmia, Ashok Kumar Jain and Arun Kumar Jain -Building Construction - Laxmi Publications(P) ltd., New Delhi -2008
3. P.C. Varghese -Building Construction, Prentice-Hall of India private Ltd, New Delhi-2009

REFERENCES

1. R.Chudly "Construction Technology "– Volumes I and II" 2nd Edition, Longman,UK, 1987.

S135 - APPLIED MECHANICS

IISEMESTER

Course Educational Objectives:

1. To understand the principles of statics and acquire the ability to analyze problems using static equilibrium equations
2. To introduce the basic principles of mechanics applicable to rigid bodies in equilibrium
3. To develop the fundamentals of engineering mechanics and problem solving skills essential for civil engineering
4. To introduce the basic principles of mechanics applicable in friction.
5. To understand the fundamentals of projectile motion for engineering application

Course Outcomes:

1. Simplify the system of forces and moments to equivalent systems and determine the resultant of a system
2. Construct free body diagrams and develop appropriate equilibrium equations
3. Locate centroid and determine moment of inertia for composite areas
4. Analyze systems with friction.
5. Determine the relations of particles under projectile motion

UNIT – I

Introduction to Engineering Mechanics: Laws of Mechanics-Force- characteristics of a force-system of forces.

Concurrent Forces in a Plane: Principles of statics-Addition of two forces- Parallelogram Law of Forces – Composition and Resolution of Forces- Types of supports and support reactions. Free body diagram. Lami's Theorem- Equilibrium of concurrent forces in a plane – Resultant of forces- Analysis of simple plane Trusses by**Method** of joints.

UNIT –II

Non-concurrent Forces in a Plane:

Introduction-Types of parallel forces- Resultant- Couple- Resolution of Force into force and a couple. General case of parallel forces in a plane- Moment of a force- Varignon's Theorem - Non-concurrent forces in a plane – Equilibrium and Resultant of non-concurrent forces in a plane

UNIT – III

Centroid: Introduction- Determination of centroid : Moment area method- Integration method- Centroid of plane and composite figures.

Moment of Inertia of Plane Figures: Radius ofgyration – Parallel Axis theorem its plane – Perpendicular Axis Theorem – Parallel Axis Theorem.

UNIT – IV

Friction: Introduction- Classification of friction- Laws of dry friction. Co-efficient of friction- Angle of friction- Static friction- Sliding friction- Rolling friction- Ladder friction- Wedge friction.

UNIT – V

Motion of projectile: Equation of the path- Trajectory- Time of flight- Height- Range and angle of projection- Motion of projectile thrown horizontally- Motion of projectile up an inclined plane

TEXT BOOKS

1. A.K.Tayal -Engineering Mechanics Statics and dynamics Umesh Publication -2012
2. Bhavikatti and KG Rajasekharappa Engineering Mechanics second editionnew age international publications-2004

REFERENCE

1. Beer and Johnston Vector Mechanics for Engineers Statics and Dynamics - Tata McGraw Hill Publishing Company- New Delhi.2008
2. Singer Engineering Mechanics - Prentice Hall India.1998
3. J.L. Meriam John Engineering Mechanics Wiley & SonsPublication1966
4. I.B. Prasad Applied Mechanics- Khanna Publishers- Delhi- Tenth edition 1984
5. S.Timoshenko & D.H.Young Engineering Mechanics - McGraw Hill International 5th Edition. 2007

L142 - ENGINEERING PHYSICS LAB

IISEMESTER

(Common to all branches)

Pre-requisite course: NONE

Course Educational Objectives:

In this course student will learn about

- The scientific method of experiments in the laboratory.
- The procedures and observational skills for appropriate use of simple and complex apparatus.
- Analytical techniques, statistical analysis and graphical analysis.
- The theoretical ideas and concepts covered in lecture by completing a host of experiments.
- The radius of curvature of a Plano-convex lens by forming Newton's rings.

Course Outcomes:

At the end of this course, student will be able to

CO1: Understand to calculate the radius of curvature of a plano-convex lens by forming Newton's Rings.

CO2: Understand the concept of diffraction and also find wavelengths of different spectral lines of the grating.

CO3: Estimate the wavelength of layer radiation.

CO4 : Study the magnetic field along the axis of a current carrying coil and to verify Biot –savart's law .

CO5 : Estimate the Refractions index of the given prism

CO6 : Find the thickness of a thin material using a wedge shaped film.

CO7 : Estimate the width of the slit by forming diffraction pattern.

CO8 : Understand the phenomenon of optical – activity

CO9 : Study the characteristics of LCR circuit

CO10: Understand the Phenomenon of resonance

CO11: Determine the rigidity modules of given material

CO12 : Understand the longitudinal and transverse vibrations of tuning fork.

List of Experiments: (Any 8 Experiments)

1. Determine the Radius of Curvature of Plano - Convex lens by forming Newton's Rings.
2. Determine the Wavelengths of various spectral lines using grating with the normal incidence method.
3. Determination of wavelength of laser radiation.
4. Study the magnetic field along the axis of a current carrying coil and to verify Biot –Savart's law.
5. Determine the Refractive index of a given prism.
6. Determine the thickness of a thin material using wedge shaped film.
7. Determine the width of the slit by using laser source by forming diffraction pattern.
8. Determine the specific rotation of an optically active substance.
9. Study the characteristics of L.C.R Circuit.
10. Determine the frequency of AC supply by using Sonometer.
11. Determine the rigidity modulus of a given material using Torsional pendulum.
12. Determine the frequency of a vibrating bar or electrical tuning fork using Meldy's apparatus.

REFERENCES:

Lab Manual prepared by the LBRCE.

L115 - BUILDING PLANNING AND COMPUTER AIDED DRAWING **II SEMESTER**

Course Educational Objectives:

1. Understand the different sign conventions in building drawing
2. Plot the layout of building and its parts for a given details
3. Create 3-D view drawings and section views of building components.

Course objectives:

1. Draw different components of buildings with appropriate sign conventions
2. Understand the terminology used in building drawing

List of Experiments

To draw any 12 plates

1. Conventional symbols
2. English bond and Flemish bond
3. Fully Panelled Window
4. Fully Panelled Door with wooden panel
5. Fully Panelled Door with RCC frame
6. Panelled and glazed door with wooden panel
7. Steel roof truss
8. King post and Queen post trusses
9. Foundations
10. Single floor residential building - Plan, Elevation and Cross section
11. Storied residential building- Plan, Elevation and Cross section
12. Framed office building- Plan, Elevation and Cross section
13. Institution building- Plan, Elevation and Cross section
14. 3D view of a single floor residential building
15. 3D view of a dog legged stair case
16. 3D view of a spiral stair case

REFERENCES

1. Building Planning and Drawing by K. Kumaraswamy and A. Kameswara Rao, Charotar Publications, 2014.
2. Sikka V.B., "**A Course in Civil Engineering Drawing**", 4th edition, S.K.Kataria & Sons, New Delhi – 1998.
3. Shah M.G. Kale C.M. & Patki S.Y., "**Building Drawing with an Integrated Approach to Built Environment**", 4th edition, Tata McGraw Hill Publishing Co. Ltd. New Delhi – 2002.

IS Codes

1. IS: 962 – 1967 Code of Practical for Architectural and Building Drawing
2. IS: 4021 – 1983 Specification for Timber Door, Window and Ventilator Frames
3. IS: 6523 – 1983 Specification for Precast Reinforced Concrete Door and Window Frames
4. IS: 1003 – 1977 Part I, II Specification for Timber Panelled and Glazed Shutters
5. IS: 2191 – 1983 Part I, II Specification for Wooden Flush Door Shutters
6. IS: 6198 – 1983 Specification for Ledged, Braced and Battened Door and Window Frame.

L143 - ENGINEERING WORKSHOP **II SEMESTER**

(Common to EIE, AE, CE, ECE, EEE, ME)

Course Educational Objectives:

1. To get familiarize with various trades used in Engineering workshop .
2. The understand the concept of various tools used in different trades.
3. To learn the safety pre-cautions to be followed in the workshops, while working with the different tools.

Course outcomes:

1. Acquire manufacturing skills.
2. Use the tools effectively in making a product.

At least **four trades** with **two exercises** from each trade:

1. Carpentry
2. Fitting
3. House – Wiring
4. Plumbing
5 Tin - Smithy
6. Black - Smithy

REFERENCE BOOK

1. P. Kannaiah, K.L. Narayana, Workshop manual, Scitech Publications, India Pvt Ltd

L154 - IT WORKSHOP

IISEMESTER

(Common to CE, CSE, IT)

Course Objectives

1. To learn fundamentals of computer and its parts
2. Assembly and dissembling of computer and its peripheral devices
3. Installation of operating systems
4. Trouble shooting of hardware and software
5. Exposure to internet, MS office and Photoshop packages

Course Outcomes

1. Identify the various components and peripheral devices of a computer
2. Gain confidence in assembling disassembling of computer and its peripherals
3. Install different operating systems
4. Handle the trouble shooting problems of hardware and software
5. Use the Internet, MS office and Photoshop packages with ease

Week 1 - PC Hardware

Task 1: Identify the peripherals of a computer, components in a CPU and its functions. Draw the block diagram of the CPU along with the configuration of each peripheral and submit to your instructor.

Task 2: Every student should disassemble and assemble the PC back to working condition. Lab instructors should verify the work and follow it up with a Viva. Also students need to go through the video which shows the process of assembling a PC. A video would be given as part of the course content.

Week2

Task 1: Every student should individually install MS windows on the personal computer. Lab instructor should verify the installation and follow it up with a Viva.

Week 3

Task 1: Hardware Troubleshooting: Students have to be given a PC which does not boot due to improper assembly or defective peripherals. They should identify the problem and fix it to get the computer back to working condition. The work done should be verified by the instructor and followed up with a Viva

Task 2: Software Troubleshooting: Students have to be given a malfunctioning CPU due to system software problems. They should identify the problem and fix it to get the computer back to working condition. The work done should be verified by the instructor and followed up with a Viva

Week 4

Task 1: Orientation & Connectivity Boot Camp: Students should get connected to their Local Area Network and access the Internet. In the process they configure the TCP/IP setting. Finally students should demonstrate, to the instructor, how to access the websites and email

Task 2: Web Browsers, Surfing the Web: Students customize their web browsers with the LAN proxy settings, bookmarks, and search toolbars. Also, plug-ins like Macromedia Flash and you tube downloader should be configured.

Task 3: Search Engines: Students should know what search engines are and how to use the search engines. A few topics would be given to the students for which they need to search on Google. This should be demonstrated to the instructors.

Task 4: Cyber Hygiene: Students would be exposed to the various threats on the internet and would be asked to configure their computer to be safe on the internet. They need to first install an anti-virus software, configure their personal firewall

Week 5

Task 1:Word Orientation: The mentor needs to give an overview Microsoft word: Importance of word tool, Details of toolbars, saving files, Using help and resources, rulers.

Task 2: Using word to create project certificate. Features to be covered:-Formatting Fonts in word, Applying Text effects, Using Character Spacing, Borders and Colours, Inserting Header and Footer, Using Date and Time option in Word.

Week 6

Task 3: Creating project abstract Features to be covered:-Formatting Styles, Inserting table, Bullets and Numbering, Changing Text Direction, Cell alignment, Footnote, Hyperlink, Symbols, Spell Check.

Task 4: Creating a Newsletter: Features to be covered: - Table of Content, Newspaper columns, Images from files and clipart, Drawing toolbar and Word Art, Formatting Images, Textboxes and Paragraphs

Week 7

Task 1: **Excel Orientation**: The mentor needs to tell the importance of MS Excel as a Spreadsheet tool, give the details of the four tasks and features that would be covered in each. Using Excel-Accessing, overview of toolbars, saving excel files, Using help and resources

Task 2: Calculating GPA - Features to be covered:- Cell Referencing, Formulae in excel - average, std.deviation, Charts,Split cells, Sorting, Boolean and logical operators, Conditional formatting

Week 8

Task1: power pointOrientation Students will be working on basic utilities and tools which help them create basic power point presentation. Topic covered during this week includes:- PPT Orientation, Slide Layouts, Inserting Text, Word Art, Formatting Text, Bullets and Numbering, Lines and Arrows in Powerpoint.

Task 2: Topic covered during this task includes: Hyperlinks, Inserting -Images, Clip Art, Audio, Video, Objects, Tables and Charts

Week 9

Task 1: photo shop Orientation Students will be working on Basic utilities and tools which help them to edit aphotograph. Topic Covered during this week includes: -Details of toolbars, saving files, Using help and resources.

Week 10

Task 1: Students will be working on ***www.blogspot.com*** to create aown free blog with Blogger.

Week 11

Task 1: Tips and tricks. Keyboard shortcuts, taskbar,screen shot, Taking advantage of search, Task Manager, Power option, schedule tasks, user accounts, disk management, device manager, shared folders and folder options

REFERENCES

1. Vikas Gupta,Comdex Information Technology course tool kit, WILEY Dreamtech
2. Cheryl A Schmidt, The Complete Computer upgrade and repair book,3rdedition, WILEY Dreamtech
3. Introduction to Information Technology, ITL Education Solutions limited, Pearson Education.
4. Kate J. Chase, PC Hardware and A+Handbook - PHI (Microsoft)
5. Leslie Lamport,LaTeX Companion, PHI/Pearson.

S391 - STRENGTH OF MATERIALS – I **IIISEMESTER**

Course Educational Objective:

1. To learn the method of calculating stresses and strains in a member subjected to different loadings
2. To draw the shear force and bending moment diagrams of various beams subjected todifferent types of loads and to know location and magnitude of maximum bending moment and shear force.
3. To calculate bending and shear stresses at any location along the beam.
4. To analyze the shear stress distribution in solid and hollow members under transverse loading conditions.
5. To understand the stresses in thick and thin cylindrical and spherical shells under different loads and directions

Course Outcome:

1. Calculate the stresses and strains in a member subjected to different loadings
2. Analyze the various beams subjected to different loads using shear force and bending moment diagrams
3. Analyze the shear and bending stress distribution in several members of different sections
4. Estimate the deflections of different beams under various loads
5. Calculate the stresses in thick and thin cylindrical and spherical shells under different loads and directions

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 betweenThem – Bars of varying section – composite bars – Temperature stresses.

STRAIN ENERGY – Resilience – Gradual, sudden, impact and shock loadings –Simple applications.

UNIT – II

SHEAR FORCE AND BENDING MOMENT :

Definition of beam – Types of beams – Concept of shear force and bending moment– S.F and B.M diagrams for cantilever, simply supported and overhanging beams subjected to point loads, U.D.L., uniformly varying loads and combination of theseLoads – Point of contra flexure – Relation between S.F., B.M and rate of loading at aSection of a beam.

UNIT – III

FLEXURAL STRESSES:

Theory of simple bending – Assumptions – Derivation of bending equation: $M/I = f/y = E/R$ Neutral axis – Determination bending stresses – section modulus ofRectangular and circular sections (Solid and Hollow), I,T,Angle and Channel sections– Design of simple beam sections.

SHEAR STRESSES:

Derivation of formula – Shear stress distribution across various beam sections likeRectangular, circular, triangular, I, T angle sections.

UNIT – IV

DEFLECTION OF BEAMS:

Bending into a circular arc – slope, deflection and radius of curvature – DifferentialEquation for the elastic line of a beam – Double integration and Macaulay's methods– Determination of slope and deflection for cantilever and simply supported beams subjected to point loads, - U.D.L. uniformly varying load.-Mohr's theorems – MomentArea method – application to simple cases including overhanging beams.

UNIT – V

THIN CYLINDERS

Thin seamless cylindrical shells – Derivation of formula for longitudinal andcircumferential stresses – hoop, longitudinal and Volumetric strains – changes india, and volume of thin cylinders – Thin spherical shells.

THICK CYLINDERS

Introduction Lame's theory for thick cylinders – Derivation of Lame's formulae –distribution of hoop and radial stresses across thickness – design of thick cylinders– compound cylinders – Necessary difference of radii for shrinkage – Thick sphericalshells.

TEXT BOOKS

1. Bhavikatti. S. S., Strength of Materials, Vikas Publishing House (P) Ltd., New Delhi, Second Edition, 2002.
2. Punmia. B. C., Jain, A. K., and Jain, A. K., Strength of Materials and Theory of Structures, Vols. I & II, XI Edition, Laxmi Publications (P) Ltd, New Delhi, 2002.
3. Hearn, E. J., Strength of Materials, Pergamon Press, Oxford, 1997.
4. R.K.Bansal, Introduction to text book of Strength of materials, Laxmipublications 2004.
5. U.C. Jindal Introduction to text book of Strength of Material Galgotia publications.Second Edition 2001

REFERENCE

1. Beer and Johnston, Mechanics of Materials, McGraw Hill, 4th Edition, 2005.
2. Gere and Timoshenko, Mechanics of Materials, PWS Publishing Company,4th Edition, 1997.
3. S.B.Junarkar and H.J. Shah, Mechanics of Structures, 27th Revised and Enlarged, Charotar PublishingHouse, 2008.
4. R.K.Rajput, Strength of materials, S.Chand & Co revised edition, New Delhi-2007

S304 - MECHANICS OF FLUIDS **IIISEMESTER**

Course Educational Objectives:

1. Learn the fundamental principles of fluid properties and pressure measurement
2. Study the laws of conservation of mass, energy and momentum and their applications in fluid mechanics
3. Understand the various energy losses occurring in pipes
4. Learn basics of flows in closed channels.
5. Study of the boundary layer theory

Course Outcomes:

1. Understand basic principles of fluid properties and pressure measurement
2. Apply the principles of conservation of mass, momentum and energy to fluid mechanics problems
3. Compute the energy losses and determine the energy gradient in pipe flows
4. Compute the various properties of fluid in closed channels.
5. Understand basics of boundary layer theory

UNIT – I

PROPERTIES OF FLUIDS: specific mass, specific weight, specific volume, specific gravity, compressibility, viscosity, surface tension, capillarity, vapour pressure and their influences on fluid motion.

PRESSURE MEASUREMENT: Pressure at a point, Pascal's law, Hydrostatic law - atmospheric, gauge and vacuum pressure- Measurement of pressure. Manometers, Simple and Differential Manometers.

UNIT – II

HYDROSTATIC FORCES ON SURFACES: Total pressure, Centre of pressure, Hydrostatic forces on submerged plane, Horizontal, Vertical, inclined and curved surfaces – Derivations and problems.

FLUID KINEMATICS: Description of fluid flow, Stream line, path line and streak lines and stream tube. Classification of flows: Steady, unsteady, uniform, non-uniform, laminar, turbulent, rotational and irrotational flows – Equation of continuity for one, two , three dimensional flows – stream and velocity potential functions, flow net analysis.

UNIT- III

FLUID DYNAMICS: Euler's equation of motion, Bernoulli's equation, simple applications of Bernoulli's equation, Momentum equation. Kinetic energy and Momentum correction factors.

MEASUREMENT OF FLOW: Pitot tube, Venturi meter and Orifice meter – classification of orifices, classification of mouthpieces, flow over rectangular, triangular and trapezoidal and Stepped notches - Broad crested weirs

UNIT – IV

LAMINAR FLOW: Reynold's experiment - Laminar Flow through pipes – Hagen – Poiseuille equation for viscous flow – Laminar Flow between parallel stationary and moving plates.

CLOSED CONDUIT FLOW: Laws of Fluid friction – Darcy's equation, Minor losses – pipes in series – pipes in parallel – Total energy line and hydraulic gradient line.Pipe network problems, variation of friction factor with Reynold's number – Moody's Chart.

UNIT–V

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.

BOUNDARY LAYER THEORY: Boundary Layer thickness, Displacement thickness, Momentum thickness, Energy thickness, Boundary layer growth and separation.

TEXT BOOKS

1. Dr. R.K. Bansal, A Text book of Fluid Mechanics and Hydraulic Machines, Laxmi Publications (p) Ltd.
2. Rajput,R.K., Text Book of Fluid Mechanics and Hydraulic Machinery revised edition, S.Chand & Company, Ltd., New Delhi, 2005.

REFERENCES

1. Douglas, J.F., Gasiorek, J.M and Swaffield, J.A., Fluid Mechanics 4th Edn. Pearson Education India, 2002.revised edition
2. Das M.M Fluid Mechanics and Turbimachines revised edition , Prentice Hall of India (P) Ltd New Delhi, 2008.
3. Arora, K.R Fluid Mechanics, Hydraulic and Hydraulic Machines , Standard Publishersand Distributors , New Delhi , 2005.
4. A.K. Jain, Fluid Mechanics 2nd edition, Khanna Publishers, Delhi.2001
5. Modi, P.N., and Seth, S.M., Hydraulics, Fluid Mechanics and Hydraulic Machines revised edition, Standard Book Home, New Delhi, 2005.

S396 - SURVEYING **IIISEMESTER**

Course Educational Objectives

1. To know the principles and practices of taking linear measurements.
2. To know the angular measurements using chain and compass
3. To plot a given area using plane table in the field
4. Learn the principles and practices of determining elevations of points in the field and plot the contours
5. To calculate the area and volume of survey works using fundamental principles

Course Outcomes

1. Understand the principles and practices of taking linear measurements.
2. Understand the angular measurements using chain and compass.
3. Plot a given area using plane table in the field
4. Understand and plot the elevations of different points in the field
5. Perform the calculations for computing the area and volume of survey works using fundamental principles

UNIT – I

Linear Measurements

Principles - Ranging and Chaining - Errors in chaining-overcoming obstacles in ranging and chaining - uses of cross staff and optical squares - Traversing - Plotting.

UNIT – II

Compass Survey

Prismatic compass - Surveyor's compass - Bearings - Whole circle and Reduced Bearing - traversing - Local attraction - Magnetic declination.

UNIT- III

Plane Table Survey

Plane table survey-accessories - Methods - Intersection - Radiation - Resection - Traversing – Two point and three point problems - Bowditch's Correction.

Study of Minor Instruments

Planimeter - Sextant - Pentograph - Ceylon Ghat Tracer.

UNIT- IV

Levelling

Principles - Levels and Staves - Bench Marks - Temporary and permanent adjustments – Booking - Reduction - Arithmetic checks - Fly levelling – Reciprocal levelling – check levelling - longitudinal and cross sectioning - Plotting.

UNIT- V

Contouring, Areas and Volumes

Contouring - Characteristics and uses - Interpolation - Calculation of areas and volumes field notes and plan - Earth work - Capacity of reservoirs - alignment of hill roads.

TEXT BOOKS

1. Agor R "**Text Book of Surveying and Leveling**", Khanna Publishers,2Edition 2BNath Market, Nai Sarak, Delhi, 1998.
2. Punmia B.C., "**Surveying Vol I and II**", Laxmi Publications 9th / 10th Edition, 1987.
3. Basak N.N., "**Surveying and Leveling**",4Edition Tata McGraw Hill Publishing Company Ltd., New Delhi, 1994.
4. Kanetkar T.P and Kulkarni S.V., "**Surveying and leveling part I and II**", Vidyarthi Prakasam,Pune, 1997
5. R.Subramanya –surveying and leveling- Oxford Publication RevisedEdition -1989

REFERENCES

1. Arthur R Benton and Philip J Taety, Elements of Plane Surying, McGraw Hill – 2000
2. Arora K R "Surveying Vol 1, 2 & 3), Standard Book House, Delhi, 2004
3. Chandra A M, "Plane Surveying", Image International Pvt. Ltd., Publishers, New Delhi, 2002.
4. Chandra A M, "Higher Surveying", Image International Pvt. Ltd., Publishers, New Delhi, 2002.
5. Venkataramaiah "Surveying", New-Age publications.Revised Edition --2012

S171 - CONCRETE TECHNOLOGY **IIISEMESTER**

Course objective

1. Learn the basic properties of concrete making materials
2. To study various tests on concrete.
3. Study the different admixtures to be used in concrete and the related tests
4. Get awareness on various types of special concrete and their usage.
5. Determination of mix proportions as per IS codes.

OUTCOMES:

1. Understand the concept of concrete and the component materials
2. Assess the required properties of concrete.
3. Know the importance of various tests to determine strength of concrete.
4. Understand the various types special concrete
5. Compute the mix proportions for design as per IS code

UNIT –I

Concrete Making Materials

Cement –raw materials –manufacture- compound –composition- hydration of cement – types of cement-tests and specifications. Aggregates –size and shape –gradation of aggregate – fineness modulus – bulking of sand-tests and specifications – alkali aggregate reaction-quality of water for concreting and curing.

UNIT – II

Properties of Concrete

Properties of fresh concrete –workability –slump test –compaction factor test –flow test – segregation – bleeding Properties of hardened concrete –strength development –elastic properties of concrete-durability – impermeability - shrinkage and creep- thermal properties – fire resistance-resistance to abrasion.

UNIT- III

Quality Control and Admixtures in Concrete

Control techniques –storing –batching –mixing – transporting –placing –compacting – finishingcuring– tests and specifications for fresh and hardened concrete –acceptance and rejection criteria – introduction to nondestructive testing. Accelerators – retarders –water proofing compounds - air entraining agents–workability agents –bonding admixtures – pozzolanic admixtures – silica fume –fly ash –blast furnace slag-hyper plasticizer.

UNIT – IV

Special Concrete

Light weight concrete – light weight aggregate concrete –no fines concrete –high density concrete –sulphur infiltrated concrete –fibre reinforced concrete –polymer concrete –ready mixed concrete –high strength concrete –High performance concrete- Self compacting concrete-Bacterial concrete –gunite – shotcrete –vacuum concrete – pre packed concrete-ferro cement.

UNIT- V

Concreting Plant and Mix Design

Batching plant –mixer –distributing plant –vibrators – repairs in concrete –control of cracks inmass concrete – surface treatment of concrete Concept of mix design –ACI method, Road note method (concepts only)- Indian Standard method.

TEXT BOOKS

1. Shetty. M.S, "**Concrete Technology**" S.Chand & Co., Ltd.,Revised Edition - New Delhi, 2003
2. Gambhir. M.L, "**Concrete Technology**", Revised Edition -Tata McGraw Hill Publishing Co.,NewDelhi 1998.

REFERENCES

1. Orchard .D.F "**Concrete Technology**", Vol & II, Applied Science Publishers Ltd,London, 1979
2. Neville , A. M, "**Properties of Concrete**",4th Edition Pitman Publishing Ltd,London, 1995.
3. Rofat Siddique "**Special structural Concrete**" Galgotiya Publishing Pvt. Ltd., New Delhi, 199

S134 - APPLIED MATHEMATICS – III **IIISEMESTER**

(Common to AE, CE, CSE, EEE, EIE, IT, ME)

Prerequisite: Applied Mathematics-II, Applied Mathematics-II

Course Educational Objectives:

In this course student will learn about

1. The methodology of interpolation and extrapolation to common problems using different formulae
2. The application of Numerical Techniques in Integration; solving the algebraic and transcendental equations.
3. Solving Differential equations by using Numerical Methods..
4. The concepts of Vector Calculus Vector Differentiation and Conservative Fields.
5. The concepts of line integrals, surface and volume integrals, vector integral theorems and their applications

Course outcomes:

At the end of this course student will be able to

1. Apply the knowledge acquired to identify, formulate and solve problems in engineering using Numerical Techniques.
2. Apply the techniques of numerical interpolation and approximation of functions with ease.
3. Perform integration of functions when the actual function is not given and solve algebraic and transcendental equations.
4. Solve Ordinary Differential Equations with given initial conditions.
5. Apply Integration to find length, area and volume of any given surface.

UNIT – I

Solution of Algebraic and Transcendental Equations and Numerical Integration

Solutions of Algebraic and Transcendental Equations – Regula False Position method and Newtons Raphson Method in one variable.Numerical Integration – Trapezoidal rule – Simpson's 1/3 Rule –Simpson's 3/8 Rule.

UNIT – II

Interpolation and Finite Differences

Interpolation: Introduction – Finite differences- Forward Differences- Backward Differences- Backward differences –Central differences – Symbolic relations and separation of symbols-Differences of a polynomial- Newton's formulae for interpolation – Lagrange's Interpolation formula.

UNIT – III

Numerical solution of Ordinary Differential Equations

Numerical solution of Ordinary Differential equations, Solution by Taylor's series - Picard's Method of successive Approximations - Euler's Method - Runge- Kutta Methods.

UNIT – IV

Vector Differentiation

Vector Differentiation: Gradient- Directional Derivatives -Divergence – Solenoidal fields- Curl –Irrotation fields-potential surfaces - Laplacian and second order operators and related properties of sums and products

UNIT – V

Vector Integration

Vector Integration - Line integral – work done –area - surface and volume integrals Vector integral theorems: Greens, Stokes and Gauss Divergence Theorems (Without proof) and related problems.

TEXT BOOKS

1. S. S. Sastry, "Introductory Methods of Numerical Analysis". Prentice Hall of India, 5th Edition,2005.
2. Dr. B. V. Ramana, "Higher Engineering Mathematics", The McGraw Hill Companies, 1st Edition,2010.

REFERNCES

1. Dr. B.S. Grewal , "Higher Engineering Mathematics", Khanna Publishers, 42ndEdition,2012.
2. Steven .C. Chopra and Ra. P. Canale, "Numerical Methods for Engineers with programming and software application", The McGraw Hill Companies, 4th Edition,2002.
3. M. K. Jain, S. R. K. Iyengar, R.K. Jain, "Numerical Methods for Scientific and Engineering Computation", New Age International Publishers., 5th Edition,2007.

S208 - ELECTRICAL AND ELECTRONICS ENGINEERING

(Common to CE, ME)

IIISEMESTER

Course Objectives:

1. To study the basic concepts of different electrical & electronic devices
2. To study about resistive, inductive & capacitive networks
3. To study the basics of various electrical machines
4. To learn the concepts of electronic devices for real-time applications
5. To understand the functions and usage of various electrical & electronics measuring instruments

Course outcomes:

1. Understand the concepts of different electrical & electronic devices.
2. Analyze resistive, inductive & capacitive networks
3. Analyze and differentiate various electrical machines
4. Apply concepts of electronic devices for real-time applications
5. Understand and differentiate various electrical & electronics measuring instruments.

UNIT – I
ELECTRICAL CIRCUITS

Basic definitions, Types of elements-active and passive, Ohm's Law, Kirchhoff's Laws-Network reduction techniques-series, parallel, star to delta ,delta to star transformations, source transformations(for resistive networks).

UNIT – II
TRANSFORMERS

Principle of operation of single phase transformers, Ideal transformer, Practical transformer – Emf equation-Losses- efficiency-O.C and S.C Test.

UNIT – III
A.C MACHINES

Alternators: Fundamentals of Alternating Current-Principle of operation of alternators – Salient pole and Non-Salient pole rotors, Voltage Regulation by synchronous impedance method only.

Induction motor: Principle of operation of induction motors –Slip ring and Squirrel cage motors –Slip-Torque characteristics.

UNIT – IV
DIODE AND TRANSISTORS

P-n junction diode, symbol, V-I Characteristics, Diode Applications, Rectifiers – Half wave, Full wave and Bridge rectifiers ,PNP and NPN Junction transistor & configurations, Application of transistor – amplifier.

UNIT – V
ELECTRICAL AND ELECTRONICS MEASURING INSTRUMENTS.

Basic Principles of indicating instruments – permanent magnet moving coil and moving iron instruments.Block diagram of CRO andCRT (Cathode Ray Tube), Applications of CRO - Voltage, Current and frequency measurements.

TEXT BOOKS

1. M.S Naidu and S. Kamakshaiah ,"Introduction to Electrical Engineering":-TMH Publication.
2. Millman and Halkias ," Electronic Devices and Circuits"- Tata McGraw Hill.

REFERENCES

1. Kothari and Nagarath –"Basic Electrical Engineering ", TMH Publications, 2nd Edition.
2. K.Lal Kishore , "Electronic Devices and Circuits ", B.S Publication.
3. WH Hayt, JE Kemmerly, SMDurbin, "Engineering Circuit Analysis ", Tata McGraw Hill Publication, 6th Edition.

S243 - ENVIRONMENTAL STUDIES
(Common to all branches)

IIISEMESTER

Prerequisite: None

Course Educational Objectives:

In this course the student will learn about

1. Environmental issues related to local, regional and global levels.
2. Concepts of ecosystems and threats to global biodiversity.
3. Environmental pollution problems.
4. Environmental issues in the society.
5. Problems associated with over population and burden on environment.

Course Outcomes:

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

1. Evaluate local, regional and global environmental issues related to resources and management.
2. Understand the implications of the ecosystems and identifythe threats to global biodiversity
3. Realige the problems related to pollution of air, water and soil.
4. Investigate and solve social issues of the environment.

5 Create awareness on the concept of sustainable population growth**.**

UNIT – I

Natural Resources: Definition, Scope and importance of Environmental Studies – Need for Public Awareness. Renewable and non-renewable resources –
Natural resources and associated problems – Forest resources, Water resources, Mineral resources, Food resources and Energy resources.

UNIT - II

Ecosystems: Concept of an ecosystem - Structure and functions of an ecosystem - Producers, consumers and decomposers. Energy flow in the ecosystem, Ecological succession, Food chains, Food webs and ecological pyramids.Bio-Geo Chemical Cycles.
Biodiversity and its conservation: **Introduction** – Definition & Levels of Measuring Biodiversity: Genetic, Species, Community and Ecosystem diversity.
Bio-geographical classification of India, India as a mega diversity nation, Values of Biodiversity: Direct and Indirect Values, Hot-spots of biodiversity, Threats to biodiversity, Man-wildlife conflicts, Endangered and endemic species of India. Conservation of biodiversity.

UNIT - III

Environmental Pollution: Definition, Sources, Effects and Control measures of

a) Air pollution
b) Water pollution
c) Soil pollution
d) Noise pollution
e) Radioactive Pollution

Solid waste Management: Sources of waste, Effects of improper handling of waste and measures to reduce the waste production and management methods of Municipal solid waste.
Disaster management: Floods, Earthquakes, Cyclones, Landslides and Tsunami.

F

UNIT - IV

Social Issues and the Environment: From Unsustainable to Sustainable development & Equitable use of resources for sustainable life style - Environment and human health - Resettlement and Rehabilitation of people, its problems and concern & Case Studies - Climate change : Global warming, Acid rains, Ozone layer depletion, Nuclear accidents and Holocaust & Case studies - Consumerism and waste products.

UNIT -V

Human Population and the Environment: Population growth & Variations among Nations, Population explosion – Family Welfare Program - Human Rights - Value Education - HIV/AIDS - Women and Child Welfare - Role of Information Technology in Environment and human health & Case Studies. Environmental legislation in India.

TEXT BOOKS

1 P.N.Palanisamy et al., "Environmental Science" 2nd edition, Dorling Kindersley (India) Pvt.Ltd. Licenses of Pearson Education in South Asia, 2013.

2 R. Rajagopalan, "Environmental Studies (From Crisis to Cure)", by Oxford University Press, 2011, Second Edition.

REFERENCE

1. M. Anji Reddy, "Textbook of Environmental Sciences and Technology" by BS Publications, 2011 Second Edition.

2. Erach Bharucha, "Textbook of Environmental Studies for Undergraduate Courses", by University Grants Commission, University Press (India) Private Limited, 2005. (2010 Reprinted).

L179 - SURVEY FIELD WORK LAB

IIISEMESTER

Course Educational Objectives

1. To know the principles and practices of taking linear and angular measurements using chain and compass under different conditions
2. Learn the principles of plotting a given area using plane table in the field
3. Learn the principles and practices of determining elevations of points in the field

Course Outcomes

1. Obtain linear and angular measurements in the field using chain and compass
2. Plot a given area using plane table in the field
3. Determine the elevations of different points in the field

CHAIN SURVEYING

1. (a) Pacing
   (b) Ranging
   (c) Spreading and Folding of Chain
   (d) Chaining of a line
2. (a) Determination of Area by taking Perpendicular Offsets

(b) Determination of Area by taking Oblique Offsets

3. Determination of Obstacle Length
4. Chain and Cross Staff Survey – Running a closed traverse around an existing building

COMPASS SURVEYING

5. Compass traverse – Plotting and Adjustments of Traverse
6. Compass Surveying – Distance between Two Inaccessible Points

PLANE TABLE SURVEYING

7(a) Radiation method of plane table survey

(b) Intersection method of plane table survey

8. Plane Table traverse
   (a) Two Point Problem (b) Three Points Problem – Trial and error method

LEVELING

9. Simple Leveling (Including an inverted staff reading)
10. Fly LEVELING
11. Check LEVELING
12. Longitudinal sectioning and Cross Sectioning

L178 - STRENGTH OF MATERIALS LAB

IIISEMESTER

Note: A minimum of 8 experiments from the following

Course Educational Objectives:

1. To determine the various mechanical properties of materials under different loading conditions.
2. Understand the importance of the properties for assessment of material strength

Course Outcomes:

1. Perform necessary experiments to determine the mechanical properties of materials under different loading conditions.
2. Analyze the experimental results for assessment of the strength of the given material

List of Experiments

1) Study of stress-strain characteristics of mild steel bars by UTM.
2) Study of stress-strain characteristics of HYSD bars by UTM.
3) Determination of modulus of elasticity of the material of the beam by conducting bending test on simply supported beam.
4) Determination of modulus of rigidity by conducting torsion test on solid circular shaft.
5) Determination of hardness of the given material by Brinnel's/Vicker's/ Rockwell hardness test.
6) Determination of impact strength of the given material by conducting Charpy/Izod test
7) Determination of ultimate shear strength of steel by conducting direct shear test.
8) Determination of modulus of rigidity of the material of closely coiled helical spring.
9) Determination of compressive strength of wood with grain parallel / perpendicular to loading.

S112 - ADVANCED SURVEYING

IVSEMESTER

Course Educational Objectives

1. To study the principles, working and applications of theodolite.
2. To study the principles of tachometry in civil engineering aspects
3. To study the principles of triangulation and trigonometry for its application in civil engineering
4. To learn the principles of setting the curves in civil engineering applications
5. To understand the concepts of GIS and advanced survey practices

Course Outcomes

1. Understand the principles and perform the calculations involved in the usage of theodolite
2. Perform the calculations involved in the Tachometry in civil engineering aspects
3. Perform the necessary calculations involved in using principles of triangulation and trigonometry for its application in civil engineering
4. Compute the calculations required for setting the curves in civil engineering applications
5. Understand the basic concepts of GIS and advanced surveying practices

UNIT- I

Theodolite

Parts - Temporary and permanent adjustments of vernier theodolite - optical and micro optic theodolites –- Trilateration – Traversing- Omitted measurements.

UNIT- II

Tacheometry

Principle of stadia and tangential tacheometry - Field procedure and different system - Heights and distances - Subtense bar.

UNIT- III

Curves

Simple, Compound, Transition and Vertical Curves.

Trignometrical leveling

Single and Reciprocal observations - Eye and Object Corrections

UNIT –IV

Triangulation survey

Principle of Triangulation - Types of Signals - Intervisibility of stations - Base line measurements and corrections - Extension of base line - Satellite stations - Problems - Adjustment of Triangulation by the method of equal shifts.

UNIT- V

Introduction to geodetic surveying, Total Station and Global positioning system, Introduction to Geographic information system (GIS).

Photographic surveying : Terrestrial and Aerial Photographs –

Hydrographic Surveying : Control - Shore line - River surveys - Soundings gauges - Signals - Sextant - Methods of locating soundings.

TEXT BOOKS

1. Agor, R, "**Text Book of Advanced Surveying**", Khanna Publishers, 1981
2. Punmia B.C., "**Surveying Vol. I, II & III**" Laxmi Publications 9th Edition, 1987

REFERENCES

1. Clark ,D,"**Plane & Geodetic Surveying Vol. I & II**", CBS Publishers and Distributors, Delhi 6th Edition.1971
2. Shahani,P.B,"**Advanced surveying**", Oxford and IBH Publishing Company. 1971
3. Natarajan,V, "**Advanced Surveying**" , BI Publications, 54, Janpath, New Delhi. 1976
4. Arora, K.R," **Surveying Vol II & III**", Standard Book House & SBH Publishers & Distributors,1705, A Nai Sarak, New Delhi,2nd Edition. 1993.
5. Kanetkar,T.P "**Surveying and Leveling Vol. I&II**",United Book Corporation, Pune,23rd Edition. 1997
6. Bannister and Raymond, S, "**Surveying**", Pitman Publishing Ltd., 5thEdition. 1987.

S392 - STRENGTH OF MATERIALS - II **IVSEMESTER**

Course Educational Objectives

1. To introduce the concept of principal stresses and strains.
2. To understand the concept of torsion.
3. To analyse the stresses in compression members.
4. To determine the various bending stresses in columns and struts
5. To know the principles involved in the analysis of pin jointed frames

Course Outcomes

1. Analyse the principal stresses and strains on planes
2. Compute stress in the case of torsion in springs and shafts.
3. Determine stress in compression members.
4. Compute bending stress on columns.
5. Analyse member forces in trusses.

UNIT - I

PRINCIPAL STRESSES AND STRAINS :

Introduction – Stresses on an inclined section of a bar under axial loading –compound stresses – Normal and tangential stresses on an inclined plane for biaxialstresses – Two perpendicular normal stresses accompanied by a state of simpleshear – Mohr's circle of stresses – Principal stresses and strains – Analytical andgraphical solutions.

THEORIES OF FAILURES :

Introduction – Various Theories of failures like Maximum Principal stress theory –Maximum Principal strain theory – Maximum shear stress theory – Maximum strainenergy theory – Maximum shear strain energy theory.

UNIT – II

TORSION OF CIRCULAR SHAFTS :

Theory of pure torsion – Derivation of Torsion equations : T/J = q/r = N?/L –Assumptions made in the theory of pure torsion – Torsional moment of resistance –Polar section modulus – Power transmitted by shafts – Combined bending andtorsion and end thrust –

SPRINGS

Introduction – Types of springs – deflection of close and open coiled helical springsunder axial pull and axial couple

UNIT – III

COLUMNS AND STRUTS:

Introduction – Types of columns – Short, medium and long columns – Axially loadedcompression members – Crushing load – Euler's theorm for long columnsassumptionsderivation of Euler's critical load formulae for various end conditions– Equivalent length of a column – slenderness ratio – Euler's critical stress –Limitations of Euler's theory – Rankine – Long columns subject edto eccentric loading –Empirical formulae

UNIT - IV

DIRECT AND BENDING STRESSES:

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

UNIT – V

UNSYMETRICAL BENDING:

Introduction – Centroidal principal axes of section – Graphical method for locating principal axes – 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.
supports

ANALYSIS OF PIN-JOINTED PLANE FRAMES :

Determination of Forces in members of plane, pin-jointed, perfect trusses by (i) method of joints and (ii) method of sections. Analysis of various types of cantilever and simply supported trusses.- by method of joints, method of sections.

TEXT BOOKS

1. Bhavikatti. S. S., Strength of Materials, Vikas Publishing House (P) Ltd., New Delhi, Second Edition, 2002.
2. Punmia. B. C., Jain, A. K., and Jain, A. K., Strength of Materials and Theory of Structures, Vols. I & II, XI Edition, Laxmi Publications (P) Ltd, New Delhi, 2002.
3. Hearn, E. J., Strength of Materials, Pergamon Press, Oxford,

REFERENCE

1. Gere and Timoshenko, Mechanics of Materials, 4th Edition, PWS Publishing Company, May 1997.
2. S. B. Junarkar and Dr. H. J. Shah, Mechanics of Structures, 27th Revised and Enlarged, CharotarPublishing House, 2008.
3. T. D. Gunneswara Rao, Strength of Materials, 1st Edition, SMS Publishers, 2012.

S264 - HYDRAULICS AND HYDRAULIC MACHINERY **IVSEMESTER**

Course Educational Objectives:

1. Understand the concepts of uniform flow in open channels
2. Understand the concepts of non uniform flows in open channels and occurrence of hydraulic jump
3. Study about hydrodynamic forces involved in impact of jets on different plates.
4. Learn the classification of turbines, work done and efficiency of the different types of turbines.
5. Learn the classification of pumps and their efficiency

Course Outcomes:

1. Design the most economical sections for open channel flow.
2. Estimate formation of hydraulic jump and subsequent energy losses
3. Compute the efficiency of jets and work done for different types of blades.
4. Identify the suitability of turbines based on fundamental principles for different field applications
5. Identify the suitability of pumps and calculate their efficiencies.

UNIT – I

OPEN CHANNEL FLOW I: Types of flows - Type of channels – Velocity distribution – Energy and momentum correction factors – Chezy's, Manning's; and Bazin formula 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 Gradually varied flow, Mild, Critical, Steep, horizontal and adverse slopes-surface profiles-direct step method-Rapidly varied flow, hydraulic jump, energy dissipation.

UNIT – III

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: Layout 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. 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 - Classification, work done, minimum starting speed, losses and efficiencies, specific speed, multistage pumps, specific speed, characteristic curves, NPSH, Cavitation in pumps.

RECIPROCATING PUMPS - Types, working, effects of acceleration and frictional resistance, separation, Air vessels, work saved by fitting air vessels.

TEXT BOOKS

1. Dr. R.K. Bansal, A Text book of Fluid Mechanics and Hydraulic Machines,Laxmi Publications (p) Ltd.
2. Rajput,R.K., Text Book of Fluid Mechanics and Hydraulic Machinery, S.Chand &Company, Ltd., New Delhi, 2005.

REFERENCES

1. A.K. Jain, Fluid Mechanics, Khanna Publishers, Delhi.
2. Modi, P.N., and Seth, S.M., Hydraulics, Fluid Mechanics and Hydraulic Machines, Standard Book Home, New Delhi, 2005.
3. D.S. Kumar Kataria & Sons, Fluid Mechanics & Fluid Power Engineering.
4. Douglas, J.F., Gasiorek, J.M and Swaffield, J.A., Fluid Mechanics 4th Edn. PearsonEducation India, 2002.
5. Das M.M Fluid Mechanics and Turbimachines , Prentice Hall of India (P) Ltd New Delhi, 2008.
6. Arora, K.R Fluid Mechanics, Hydraulic and Hydraulic Machines , Standard Publishersand Distributors , New Delhi , 2005

S234 - ENGINEERING GEOLOGY

IVSEMESTER

Course Educational Objective

1. To introduce the basic Mineralogy in civil engineering perspective.
2. To introduce the basic concept of Petrology in civil engineering perspective.
3. To introduce the different methods in the identification of minerals and rocks
4. To know about structural geology and different types of geological structures
5. To know the applications of geology in civil engineering

Course Out Comes

1. Know the geology and the earth strata.
2. Identify the physical properties of minerals.
3. Determine the various types of rocks and their properties.
4. Understand the structural patterns of various geological structures.
5. Understand the applications of geology in civil engineering.

UNIT - I

GENERAL GEOLOGY

Geology in Civil Engineering – Branches of geology – Earth structure and composition – Continental drift – Weathering – types and products – Geological work of Rivers, Wind and Sea – Seismic zones of India –

UNIT - II

MINEROLOGY

Physical properties of Minerals – Crystallographic system – Study of following rock forming minerals- Quartz, Felspar, Piroxene, Amphibole, Mica, Calcite, Gypsum and Clay

UNIT - III

PETROLOGY

Classification of Rocks – Igneous, Sedimentary and Metamorphic Rocks – Origin, Structure and Classification – Metamorphism – Engineering Properties – Distribution of Dolerite, Syenite, Gabbro, Basalt, Sandstone, Limestone, Conglomerate, Breccia, Quartzite, Marble, Gneiss, and Schist.

UNIT - IV

STRUCTURAL GEOLOGY

Civil Engineering Importance of Folds, Faults, Unconformity and Joints relevance to civil engineering –Prospect of ground water

UNIT - V

ENGINEERING APPLICATIONS IN GEOLOGY

Importance of Geophysical studies Principles of geophysical study by Gravity methods. Magnetic methods, Electrical methods. Seismic methods, Radio metric methods and Geothermal method.

Geological consideration in construction of Dam, Reservoirs, Tunnel,

TEXT BOOKS

1. Parbin Singh., "Engineering and General Geology", Katson Publication House, 2009.
2. Chenna Kesavulu N., "Text book of Engineering Geology", Macmillan India Ltd, 2003.

REFERENCES

1. Legget., "Geology and Engineering", 2nd Edition, McGraw Hill Book Company, 2006.
2. Blyth. "Geology for Engineers", 7th Edition, ELBS, 1995.
3 KVGK Gokhale, Principles of Engineering Geology by– B.S publications - 2005
4. F.G. Bell, Fundamental of Engineering Geology Butterworths, Publications,198 Aditya Books Pvt. Ltd., New Delhi, 1992.
5. Krynine & Judd, Principles of Engineering Geology & Geotechnics, CBS Publishers & Distribution, First Edition, 1998.

S295 - MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS

(Common to CE, CSE, EEE, EIE, IT)

IVSEMESTER

Course Educational Objectives:

In this course student will learn about

1. The concepts of economics and accounting to make them effective business decision makers;
2. To help to the students of engineering to understand the concepts of demand, production, cost, and market structures for various business decisions.
3. Fundamentals of Economics, which is an important social science subject helps to engineers to take certain business decisions in the processes of optimum utilization of resources:
4. An overview on capital investment appraisal methods and sources of raising capital to promote the students to start new enterprises
5. Fundamental skills about accounting and to explain the process of preparing accounting statements & analysis for effective business decisions.
6. Fundamentals of Balance sheet and financial accounting.

Course Outcomes:

After completion of the course, students will be able to

1. Capable of analyzing fundamentals of economics such as demand, production, price, supply and investment concepts which helps in effective business administration.
2. Choose the right type of business activity, establish the business unit and invest adequate amount of capital in order to get maximum return from select business activity.
3. Prepare and analyse accounting statements like income & expenditure statement, balance sheet apart from the fundamental knowledge, to understand financial performance of the business and to initiate the appropriate decisions to run the business profitably.
4. Take the effective business decision& analyze the accounting statements.
5. Prepare the Balance sheet and calculate the financial accounts.

UNIT - I

Introduction to Managerial Economics: Economics – Definitions, Micro, Macro & Welfare economics – Managerial Economics - Definition, Nature and Scope of Managerial Economics, Limitations –Demand Analysis: Demand Determinants, Law of Demand and its exceptions, Types of demand. Definition, Types Measurement and Significance & types of Elasticity of Demand. Demand Forecasting, Factors governing demand forecasting, methods of demand Forecasting.

UNIT - II

Theory of Production and Cost Analysis: Production Function – Isoquants and Isocosts, MRTS, Least Cost Combination of Inputs. Laws of Returns, Internal and External Economies of Scale.**Cost Analysis:** Cost concepts, Cost & output relationship in short run & long run, Break-even Analysis (BEA)-Determination of Break-Even Point (simple problems)-Managerial Significance and limitations of BEA.

UNIT - III

Introduction to Markets & Pricing Policies:

Market structures: Types of competition, Features of Perfect competition, Monopoly and Monopolistic Competition, oligopoly - Price-Output Determination in case of Perfect Competition and Monopoly, Monopolistic competition. Objectives and Policies of Pricing-Methods of Pricing

UNIT - IV

Capital and Capital Budgeting: Capital and its significance, Types of Capital, Estimation of Fixed and Working capital requirements, Components of working capital & Factors determining the need of working capital. 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, Profitability Index, Internal rate of return (simple problems)

UNIT - V

Introduction to Financial Accounting: Double-Entry Book Keeping, Journal, Ledger, Trial Balance- Final Accounts with simple adjustments. **Financial Analysis through ratios:** Importance, types: Liquidity Ratios, Activity Ratios, Capital structure Ratios and Profitability ratios

TEXT BOOK

Aryasri: Managerial Economics and Financial Analysis, 2/e, TMH, 2005.

REFERENCES

1. Varshney & Maheswari: Managerial Economics, Sultan Chand, 2003.
2. Ambrish Gupta,Financial Accounting for Management, Pearson Education, New Delhi.
3. Lipey &Chrystel, Economics, Oxford university Press.
4. Domnick Salvatore, Managerial Economics in a Global Economy,4thEdition,Thomson.

S393 - STRUCTURAL ANALYSIS-I **IVSEMESTER**

Course objectives:

1. Learn the fundamentals involved in the analysis of propped cantilevers,
2. Analysis of fixed beams and continuous beams.
3. Introduce the slope deflection method to analyze the deflection.
4. Understand the basics of strain energy for its application structural analysis
5. Learn the concept of slope deflection for analysing the structures subjected to different loads.

Course outcomes

1. Analyze propped cantilevers, fixed beams.
2. Analyze continuous beams subjected to different loads
3. Perform calculations using slope deflection method for structural analysis
4. Apply the concept of strain energy for analyzing different structural components.
5. Analyze the indeterminate beams.

UNIT – I

PROPPED CANTILEVERS: Analysis of propped cantilevers-shear force and bending moment diagrams-Deflection of propped cantilevers.

FIXED BEAMS – Introduction to statically indeterminate beams with U.D.load 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 – II

CONTINUOUS BEAMS : Introduction-Clapeyron's theorem of three moments-Analysis of continuous beams with constant moment of inertia with one or both ends fixed-continuous beams with overhang, continuous beams with different moment of inertia for different spans-Effects of sinking of supports-shear force and Bending moment diagrams.

UNIT – III

Slope-Deflection Method: Introduction, derivation of slope deflection equation, application to continuous beams with and without settlement of supports.

Moment Distribution method – Stiffness and carry over factors – Distribution factors – Analysis of continuous beams with and without sinking of supports – storey portal Frames – including Sway-Substitute frame analysis by two cycle.

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-Deflections of simple beams and pin jointed trusses.

UNIT -V

INDETERMINATE STRUCTURAL ANALYSIS: Indeterminate Structural Analysis –Determination of static and kinematic indeterminacies –Solution of trusses with upto two degrees of internal and external indeterminacies –Castigliano's theorem

TEXT BOOKS

1. Bhavikatti. S. S., Strength of Materials, Vikas Publishing House (P) Ltd., New Delhi,Second Edition, 2002.
2. Bhavikatti. S. S., Structural Analysis – I, Vikas Publishing House (P) Ltd., New Delhi,Second Edition, 2002.
3. Punmia. B. C., Jain, A. K., and Jain, A. K., Strength of Materials and Theory of Structures, Vols. I & II, XI Edition, Laxmi Publications (P) Ltd, New Delhi, 2002.
4. Analysis of Structures-Vol I & Vol II by V.N. Vazirani & M.M.Ratwani, KhannaPublications, New Delhi.
5. Structural Analysis by V.D.Prasad Galgotia publications, 2nd Editions

S355 - PROFESSIONAL ETHICS AND HUMAN VALUES **IVSEMESTER**

(Common to all branches)

COURSE EDUCATIONAL OBJECTIVES:

1. To create an awareness on engineering ethics and human values.
2. To adumbrate the inevitability of different intellectual property rights like patents, copyrights, trademarks, and trade secret.
3. To give an impetus on achieving higher positions in profession, with ethic and human values as a base and support for the growth.
4. To explicate the professional and societal responsibilities of the engineers.
5. To make the student realize the sensitiveness associated with experimentation process

COURSE OUTCOMES:

1. Acquires the basic concepts of Professional ethics and human values & Students also gain the connotations of ethical theories.
2. Knows the duties and rights towards the society in an engineering profession
3. Would realize the importance and necessity of intellectual property rights.
4. Can take all the necessary precautions while conducting the experiments, which may reduce the risk.
5. Understands the importance of risk evacuation system in reality and takes the utmost responsibility while handling the risky situations.

UNIT - I

ETHICS

Senses of 'Engineering Ethics' -Variety of moral issues - Types of inquiry -Moral dilemmas Moral autonomy -Kohlberg's theory Gilligan's theory -Consensus and controversy – Models of Professional Roles -Theories about right action- Self interest - Customs and religion -Uses of Ethical theories.

UNIT - II

HUMAN VALUES

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

UNIT – III

ENGINEERING AS SOCIAL EXPERIMENTATION

Engineering as experimentation - Engineering Projects VS. Standard Experiments - Engineers as responsible experimenters – Codes of ethics - Industrial Standards - A balanced outlook on law- The challenger case study.

UNIT - IV

SAFETY, RESPONSIBILITIES AND RIGHTS

Safety and risk- Assessment of safety and risk- Risk benefit analysis and reducing risk- Three Mile Island and Chernobyl case study - Collegiality and loyalty -Respect for authority - Collective bargaining – Confidentiality- Conflicts of interest - Occupational crime - Professional Rights- Employee rights- Intellectual Property Rights (IPR) discrimination.

UNIT - V

GLOBAL ISSUES

Multinational Corporation's -Environmental ethics-computer ethics -weapons development Engineers as managers - consulting engineers-engineers as expert witnesses and advisors Moral leadership - sample code of Ethics (Specific to a particular Engineering Discipline).

TEXT BOOKS

1. R.S.Nagarajan, a Textbook on "Professional Ethics and Human Values", New Age Publishers – 2006.
2. Mike Martin and Roland Schinzinger, "Ethics in engineering", McGraw Hill, New York 1996.

REFERENCES

1. Govindarajan M, Natarajan S, Senthil Kumar V. S, " Engineering Ethics", Prentice Hall of India, New Delhi, 2004.
2. Charles D. Fleddermann, "Engineering Ethics", Pearson Education/ Prentice Hall, New Jersey,2004 (Indian Reprint now available)
3. Charles E Harris, Michael S. Protchard and Michael J Rabins, "Engineering Ethics – Concepts and Cases", Wadsworth Thompson Leatning, United States, 2000 (Indian Reprint now available).
4. John R Boatright, "Ethics and the conduct of business", Pearson Education, New Delhi,2003.
5. Edmund G Seebauer and Robert L Barry, "Fundamentals of ethics for scientists and engineers", Oxford University Press, Oxford, 2001.

L141 - ENGINEERING GEOLOGY LAB

IVSEMESTER

Course Educational Objective

1. To introduce the basic Mineralogy and Petrology in civil engineering view
2. To introduce the different methods in the identification of minerals and rocks
3. To know about structural geology and different types of geological structures
4. To know how to extract the geological structures from geological maps and topographical maps.

Course Out Comes

1. Identify the various types of mineral and rocks based on the physical properties and some mere observations.
2. Draw the structural patterns of various geological structures.
3. Know the atomic structures minerals through microscopic observations
4. Know the different minerals present in a rock through microscopic observations.

LISTOF EXPERIMENTS

1) Description of Minerals by physical properties.
2) Description and Engineering uses of Rocks
3) Description and engineering consideration of Structural Models
4) Microscopic study of minerals
5) Microscopic study of rocks
6) Interpretation and drawing of sections for geological maps showing tilted beds,faults, uniformities etc.

LAB EXAMINATION PATTERN

1. Description and identification of FOUR minerals
2. Description and identification of FOUR (including igneous, sedimentary and metamorphicrocks)
3. ONE Inter pretation of a Geological map along with a geological section.
4. TWO Simple strike and Dip problems.

L146 - FLUID MECHANICS AND HYDRAULICS MACHINE LAB

(Common to CE, ME)

IVSEMESTER

Course Educational Objectives:

1. To learn the fundamental principles of fluid mechanics
2. To learn the importance of conservation of mass, conservation of energy, and the conservation of momentum principles in fluid mechanics while performing experiments.
3. To learn the concepts of Bernoulli's theorem, and impulse-momentum applied to jets.
4. To learn the functioning and performance of hydraulic turbines and pumps

Course Outcomes:

1. Develop knowledge on the fundamental principles of fluid flow
2. Apply the laws of conservation of mass, energy and momentum to solve practical problems in fluid mechanics.
3. Practically visualize the functioning and performance of hydraulic turbines and pumps

List of experiments

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

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

S394 - STRUCTURAL ANALYSIS – II

VSEMESTER

Course Educational Objectives

1. To learn the procedures for analysing three-hinged and two-hinged arches
2. To learn the impact of moving loads on structures.
3. To draw influence lines for analysis purpose.
4. To know the principles of analysing the continuous beams and portal frames
5. To know the basics of stiffness and flexibility methods for structural loads analysis

Course Outcomes

1. Analyse the three-hinged and two-hinged arches
2. Estimate the impact of moving loads on structures.
3. Draw influence lines for analysis purpose
4. Analyse the continuous beams and portal frames
5. Understand the basics of stiffness and flexibility methods for structural loads 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.
TWO HINGED ARCHES: Determination of horizontal thrust bending moment, normal Thrust and radial shear – Rib shortening and temperature stresses, tied arches –Fixed arches – (No analytical question).

UNIT-II

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 point loads with fixed distance between them and several point loads-Equivalents uniformly distributed load

UNIT-III

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.load longer than the span, U.D.load shorter than the span-

UNIT-IV

KANI'S METHOD

Analysis of continuous beams – including settlement of supports and single bayportal frames with side sway by Kani's method.

UNIT - V

Flexibility methods, Introduction, application to continuous beams including supportSettlements.Stiffness method: Introduction, application to continuous beams including supportSettlements.

TEXT BOOKS

1. Bhavikathi a Text book on "Analysis of Structures" – Vol. I & 2, Vikas publications, 3rd Edition2005.
2. Vazrani & Ratwani "Theory of Structures Analysis of structures" – KhannaPublications.
3. Pundit and Gupta Structural Analysis (Matrix Approach)– Tata Mc.GrawHill publishers.
4. Ramamuratam "Theory of structures"
5. C.S. Reddy Structural Analysis
6. Punmia. B. C., Jain, A. K., and Jain, A. K., Strength of Materials and Theory of Structures, Vol. II, Eleventh Edition, Laxmi Publications, New Delhi, 2002.

REFERENCES

1. Wang. C. K., Intermediate Structural Analysis, McGraw Hill Publishing Co., Tokyo, Fourth Edition, 1989.
2. Jindal, R. L., Indeterminate Structural Analysis, S.Chand & Co. New Delhi, Third Edition, 1997.
3. Kinney. S.J., Indeterminate Structural Analysis, Oxford IBH Publishing Co., 1999

S183 - DESIGN OF REINFORCED CONCRETE STRUCTURES - I

VSEMESTER

Course objectives:

1. To learn design principles of Working stress and Limit state Designs as per IS: 456-2000
2. To know the design parameters of singly reinforced, doubly reinforced, flanged beam elements for flexure as well as their load carrying capacities.
3. To learn procedures for desig
4. Design the one way and two way slabs in as per IS: 456-2000.
5. Design the structures elements based on limit state of collapsening beam element subjected to shear, torsion and bond.
6. To know the design parameters of short and long columns subjected to axial load, and moments using SP: 16 charts
7. To learn the design parameters and associated principles in the design of slabs and footings.

Course outcomes:

1. Design a singly reinforced RC beam, beams subjected to shear.
2. Design a singly reinforced RC beams subjected to torsion and bond.
3. Design RC columns and isolated footing subjected to axial load, uniaxial and biaxial moments as per IS: 456-2000.

UNIT – I

Concept of Working Stress Method – analysis and design of flexural member using working stress method – design of singly and doubly reinforced section – shear and torsion. Deflection calculation – short term and long term deflection – crack width calculation - Design codes and handbooks, loading standards – Dead, live, wind and earthquake loads, elastic theory, design constants, modular ratio, neutral axis depth and moment of resistance,

UNIT – II

Principles of Limit State method of design –characteristic load and strength – Partial safety factor – stress block parameters Limit State of collapse – flexure – balance and under reinforced – design of singly and doubly reinforced rectangular section– analysis and design of under-reinforced flanged section – l/d ratio with medication factor for deflection calculation – cover for durability and fire resistance.

UNIT – III

Limit State of collapse – shear and torsion - design of a rectangular section for shear, shear-torsion and bending-torsion. Design for development length – end anchorages. Reinforcement details in beam for flexure, shear and torsion – serviceability requirements.

UNIT – IV

Design of slabs - one way and two way – simply supported, continuous and restrained, using coefficients given in IS code Reinforcement details in one way and two way slabs – serviceability requirements.

UNIT – V

Limit State of Collapse – compression; design of columns for axial load – square, rectangular and circular cross section with lateral and spiral ties. Design of short and long columns for uniaxial and biaxial eccentricities using interaction charts – Reinforcement details for columns – serviceability requirements.

TEXT BOOKS

1. Krishna Raju N. and Pranesh R.N., "**Reinforced concerete design IS 456-2000, Principles and practice**", New Age International (P) Ltd, publishers, New Delhi, 2003.
2. Ashok K. Jain, "**Reinforced Concrete Limit State Design**", 4th Edition Nem Chand & Bros, Roorkee,1993.
3. Punmia B.C et al, "**Comprehensive RCC Design**" Laxmi publications (P) Ltd, New Delhi,1998.
4. Gambhir M.I., "**Reinforced Concrete Design**", Macmilan India Limited, 1993.

IS CODES :

IS 456-2000,

SP – 16

NOTE : These codes are permitted in the End Examinations

S255 - GEO TECHNICAL ENGINEERING - I | **VSEMESTER**

Course Educational Objective

1. Creating awareness about soils and their engineering importance.
2. Getting aquatinted with various procedures and tests for classifying soils.
3. Develop relationships among various parameters.
4. Knowledge about behaviour of soils under various drainage conditions.
5. Learning the procedures for performing computations for determination of strength parameters of soil using various theories.

Course Outcomes:

1. Understand soil as a building material and load bearing member.
2. Perform different procedures for classifying soils.
3. Asses the influence of soil water relationship.
4. Analyze engineering behaviour of soils under different load/ drainage conditions
5. Analyze the influence of field conditions on strength and consolidation properties of soils.

UNIT –I

Types and physical properties of soil

Types of soil – Physical properties of soil and their determination – Important definitions related to three phase diagram and relationships – Field identification of soils – Classification of soils based on grain size distribution – Hydrometer analysis.

Consistency and plasticity characteristics of Soil

Determination of consistency limits and their significance to the field behaviour of soil – Classification of soils based on grain size and plasticity characteristics of soils.

UNIT –II

Permeability characteristics of soils

Darcy's Law and its validity – Factors affecting permeability – Laboratory determination of permeability for cohesive and cohesionless soils – Permeability of layered deposits

Concept of effective stress in soils

Terzaghi's effective stress concept for saturated soil deposits – seepage flow and seepage pressure – Quick sand condition and critical hydraulic gradient

UNIT- III

Shear strength of soils

Analysis of shear failure – shear and normal stress at a point – Mohr's stress circle – Relationship that can be obtained from Mohr's circle – Mohr's strength theory – Mohr's coulomb failure criterion Laboratory methods of determination of shear strength parameters of cohesive and non-cohesive soils – Direct shear test – Triaxial shear test – Unconfined compression test and Laboratory vane shear test – Advantages of triaxial test over other tests – Classification of shear test based on drainage conditions.

UNIT-IV

Stress Distribution in soils

Boussinesq's and Westergaard's theories for point loads and their comparison – Approximate methods of determination of stresses and its validity – Computation of stresses beneath circular and square loaded areas – Concept of pressure bulb – Newmark's chart and its applications.

Soil Compaction

Concept of compaction – Methods of laboratory compaction of soils – Factors affecting compaction – Zero air voids curve and its significance – Field compaction control.

UNIT –V

Compressibility characteristics of soils

Terzaghi's theory of one-dimensional consolidation – Concept of consolidation – Determination of coefficient of consolidation from consolidometer test data by Square root of time method and log time method – Calculation of consolidation settlement.

TEXT BOOKS

1. Arora. K.R, "**Soil Mechanics and Foundation Engineering**", Standard Publishers & Distributors, Nai Sarak, Delhi, 1987
2. Murthy.V.N.S, "**A Text book of Soil Mechanics and Foundation Engineering**", KripaTechnical Consultants, Bangalore, 1992
3. Venkataramaiah, "**Geotechnical Engineering**", Wiley Eastern Ltd., Madras, 1993.
4. Punmia. B.C, "**Soil Mechanics and Foundation Engineering**", A.Saurabh and Co.,(P) Ltd., Madras, 1988.

REFERENCES

1. Taylor. D.W, "**Fundamentals of Soil Mechanics**", Asia Publishing house, 1948.
2. Terzaghi and Peck, "**Soil Mechanics in Engineering**", Asia Publishing house,
3. Joseph E. Bowles, "**Physical and Geotechnical Properties of Soils**", McGraw Hill Publishing Co., Newyork, 1994.
4. Lambe.T.W., "**Soil Testing for Engineers**", John wiley & Sons, Newyork, 1990.
5. Gopalranjan and Rao.A.S.R., "**Basic and Applied Soil Mechanics**", Wiley Eastern Ltd, New Delhi, 1997.

S265 - HYDROLOGY

VSEMESTER

Course objectives:

1. Learn the fundamentals of hydrology and its importance in development of water resources
2. Study the different types of irrigation methods,
3. Study of water quality criteria and significance of soil-water-plant relationship
4. Understand the unit hydrograph.
5. Learn about the Geological formation of the aquifers radial flow to wells in confined and unconfined aquifers

Course outcomes:

1. Aware of fundamentals of Irrigation practices
2. Identify appropriate method of irrigation based on field conditions
3. Estimate the moisture availability for irrigation and check the suitability of available water for irrigation purposes
4. Estimate direct run off from total rain fall, and develop the corresponding hydrographs
5. Estimate the ground water potential based on theoretical principles

UNIT -I

Introduction : Engineering hydrology and its applications, Hydrologic cycle. Precipitation: Types and forms of precipitation, rainfall measurement, types of rain gauges, rain gauge network, average rainfall over a basin, consistency of rainfall data, frequency of rainfall, intensity-duration-frequency curves, probable maximum precipitation

UNIT-II

Abstractions : Evaporation, factors affecting evaporation, measurement of evaporation, evaporation reduction, evapotranspiration, factors affecting evapotranspiration, measurement of evapotranspiration - Infiltration, factors affecting infiltration, measurement of infiltration, infiltration indices.

Runoff : Factors affecting runoff ,components of runoff, computation of runoff-rational and SCS methods, separation of base flow.

UNIT-III

Irrigation: Necessity and Importance of Irrigation, advantages and ill effects of Irrigation, types of Irrigation, methods of application of Irrigation water, water logging and drainage, standards of quality for Irrigation water, principal crops and crop seasons, crop rotation. Soil-water-plant relationship, vertical distribution of soil moisture, soil moisture tension, consumptive use, estimation of consumptive use, duty and delta, factors affecting duty, depth and frequency of Irrigation, irrigation efficiencies.

UNIT-IV

Unit Hydrograph, assumptions, derivation of Unit Hydrograph, unit hydrographs of different durations, principle of superposition and S-hydrograph methods, limitations and applications of UH, Synthetic Unit Hydrograph.

Floods and Flood Routing: Stream gauging, direct and indirect methods, floods-causes and effects, flood frequency analysis-Gumbel's method, log Pearson type III method, flood control methods flood routing-hydrologic routing, channel and reservoir routing-Muskingum and Pulse method of routing.

UNIT-V

Ground water : Occurrence, types of aquifers, aquifer parameters, porosity, specific yield, permeability, transmissivity and storage coefficient, types of wells, Darcy's law, Dupuit's equation- steady radial flow to wells in confined and unconfined aquifers, yield of a open well-recuperation test.

TEXT BOOKS

1. Santhosh Kumar Garg, "Irrigation Engineering and Hydraulic Structures," Khann Publishers, New Delhi, 2003
2. Punmia.B.C, "Irrigation and Water Power Engineering," Standard Publishers, New Delhi, 1997.
3. Subramanya.K., "Engineering Hydrology", Tata McGraw Hill, New Delhi , 1999
4. Jayarami Reddy.P., "Hydrology", Tata McGraw Hill, New Delhi , 1999

REFERENCES

1. Ven Te. Chow, Maidment D.R. and Mays L.W. "Applied Hydrology," McGraw Hill International Book Company. New York, 1995.
2. Ven Te Chow, "Hand book of Applied Hydrology", McGraw Hill Book Co., Inc., New York, 1964.
3. Vijay P.Singh, "Elementary Hydrology", Prentice Hall of India, New Delhi, 1994.
4. Ragunath.H., "Hydrology", Wiley Eastern Limited, New Delhi, 1998.

S423 - WATER SUPPLY ENGINEERING

VSEMESTER

Course Objectives

1. Understand sources and quantity requirements of water.
2. Know the importance of water quality characteristics.
3. Know the aspects associated with pipe materials.
4. Learn principles of design of water supply treatment systems
5. Study the networks of water supply distribution systems

Course outcomes:

1. Estimate the preliminary requirements of water supply
2. Understand the impact of water quality parameters on receptors
3. Design different water supply treatment systems by understanding the governing principles
4. Grasp treatment methods of desalination of water
5. Analyze and design the water supply distribution systems

UNIT-I

Importance and need for protected water supply - Water demands - Factors affecting per capita demand - Types of demand - fluctuations in demand - Population forecasting - Different methods – Sources of water - Classification and adequacy - Impounding reservoirs - Mass curve analysis –Well hydraulics – Darcy's law - Yield from shallow and deep wells of confined and unconfined aquifer - Infiltration wells and galleries.

UNIT-II

Intake works – Types of intakes - Methods of conveyance of water - Different types of pipe materials - Types of pipe joints - Pipe laying and testing - Corrosion of pipes - Pumps for lifting water - Quality of water - Importance of testing of water - Physical, chemical and biological analysis of water - Standards of water quality desired for domestic water supplies – BIS and WHO Standards - Water borne diseases.

UNIT-III

Treatment of water - Objectives of water treatment - Methods of treatment - Screening - Theory of sedimentation – Types of settling - Stoke's Law - Sedimentation tanks - Design of continuous flow sedimentation tanks - Sedimentation aided with coagulation - Theory of coagulation - Types of coagulants - mixing devices - Flocculator - Settling tank - optimum coagulant dosage - Jar test.

UNIT-IV

Filtration - Theory of filtration - Filter media - Sand filters - Types of sand filters - Slow sand filters - Rapid sand filters - Pressure filters - Design - Operation – Maintenance - Disinfection - Methods of disinfection - Chlorination - Dosage - Various forms - Types of chlorination - Softening of water - Removal of temporary and permanent hardness - Different methods – Other treatment methods – desalination- Reverse osmosis process – Electro dialysis – Fluoridation – Defluoridation - Aeration.

UNIT-V

Distribution of water - Layouts of distribution networks - Method of distribution – Distributionreservoirs - Storage capacity of reservoir - Leakage detection and prevention. Analysis of pipe networks - Hardy Cross method - Equivalent Pipe method - Appurtenances in distribution system – House connections.

TEXT BOOKS

Garg S.K, "**Water Supply Engineering**", Khanna Publishers, Eleventh Edition, New Delhi. 1999.

REFERENCES

1. Steel E.W., "**Water Supply and Sewerage**", Mc Graw Hill Publishers, NewDelhi. 1979
2. Punmia B C, Jain and Jain, Water Supply Engineering, Laxmi Publications.
3. Fair & Geyer, "**Water and Wastewater Engineering Vol. I & II**",Wiley Eastern Publishers, New Delhi. 1966
4. Peavy Rowe, Tchobanoglous, "**Environmental Engineering**", McGraw Hill Publishers, New Delhi. 1985
5. Hazen William's Nomogram for C.I pipes.
6. Modi. P.N., "**Water Supply Engineering**", Standard Book House, Delhi. 1998.
7. Birdie G.S and Birdie J.S, "**Water Supply and Sanitary Engineering**" Dhatpat Rai Publishing Company New Delhi, 1998.

S412 - TRANSPORTATION ENGINEERING – I

VSEMESTER

Course Educational Objectives:

1. Know the transportation development in India
2. Learn the significance of individual elements of highway geometry
3. Identify and analyze the components of traffic management
4. Learn the technical parameters related to the quality of highway materials
5. Identify various stages in construction of pavements.

Course outcomes:

1. Understand the road network development and Highway planning in India.
2. Design various geometric elements of the roads based on the geographical conditions.
3. Understand the different traffic characteristics and analyze the data.
4. Analyze various highway materials for their suitability for highway construction.
5. Apply different design methods for pavement construction.

UNIT- I

Highway planning and Alignment

History of road development in India – Jayakar committee recommendations - Institutions for Highway planning design and implementation at different levels - Engineering Surveys for Alignment – conventional and modern methods (Remote sensing, GIS and GPS techniques) IRC classification of urban and rural roads – Highway cross sectional elements – Right of way, Carriage way, Camber, Kerbs, Shoulders and Footpaths

UNIT - II

Geometric Elements

Geometric Standards – Super elevation, Widening of pavements and Transition curves – Ruling, Limiting, Exceptional and Minimum Gradients – Sight Distance – Factors affecting Sight Distance – PIEV Theory – Stopping Sight Distance (SSD) – Overtaking Sight Distance (OSD) – Sight Distance at Intersection Geometric Design of Hill Roads

UNIT- III

TRAFFIC ENGINEERING AND MANAGEMENT:

Basic Parameters of Traffic-Volume, Speed and Density- Traffic Volume Studies- Data Collection and Presentation-Speed studies- Data Collection and Presentation- Parking Studies and Parking characteristics- Road Accidents-Causes and Preventive measures- Accident Data Recording – Condition Diagram and Collision Diagrams - Road Traffic Signs – Types and Specifications – Road markings-Need for Road Markings-Types of Road Markings

UNIT- IV

Highway Materials and Construction

Subgrade soil - Aggregates - Bituminous materials – Desirable properties – California Bearing Ratio Test and Field Density Test for soil – Crushing, Abrasion and Impact Test for aggregates – Penetration, Ductility, Viscosity, Binder content and Softening point Test for bitumen Construction of Earth, Gravel, WBM, Bituminous and Cement Concrete roads as per IRC and MORTH specifications – BOT and BOLT concepts for highway construction.

UNIT - V

Highway Design and Maintenance

Design principles of Flexible and Rigid Pavements – Design of Flexible pavement (CBR method, IRC Recommendations – Problems) Design of Rigid Pavement (IRC Recommendations – Problems), Defects in flexible pavements – surface defects, cracks, deformation, disintegration – symptoms, causes and treatments. Failures in rigid pavements – scaling, shrinkage, warping, structural cracks, spalling of joints and mud pumping – special repairs.

TEXT BOOKS

1. Khanna,S.K and Justo, "**Highway Engineering**", New Chand and Bros, Roorkee, 8th edition, 2001.
2. Khanna,S.K and Arora,M.G & Jain,S.S, "**Airport Planning and Design**", New Chand and Bros, Roorkee, 2001.

REFERENCES

1. Kadiyali,L.R., "**Principles and Practice of Highway Engineering**", Khanna Publishers Ltd. New Delhi, 2000
2. Sehgal,S.B and Bhanot,B.L, "**Highway and Airport Engineering**", S.Chand and Company Ltd. New Delhi, 1978
3. Venkatappa Rao,G, "**Principles of transportation and Highway Engineering**", Tata McGraw Hill Publishing Co. Ltd. New Delhi, 2000.

IS CODES

1. IRC Standards
2. Bureau of Indian Standards (BIS) Publications on Highway Materials
3. MORTH Guidelines for Highway Engineering.

S113 - ADVANCED SURVEY FIELD WORK

VSEMESTER

Course Educational Objectives

1. Learn the principles and practices of taking angular measurements using theodolite
2. Learn the principles of tacheometry for determining horizontal distances and vertical heights of objects
3. Understand the different functions of total station and use it to determine a few parameters in the field
4. Learn the practices of setting out of a few practical aspects in the field

Course Outcomes

1) Obtain angular measurements in the field using theodolite
2) Determine the elevations of different points in the field using theodolite and total stations
3) Able to execute setting out of a few activities in the field

THEODOLITE

1. Traversing and adjustment of traverse
2. Determination of Horizontal and Vertical distances by stadia methods
3. Determination of Elevations and Heights
   - Height and distances – Single plane method
   - Height and distances – Double plane method

TACHEOMETRY

1. Tacheometry – Constants of Tacheometer
2. Stadia Tachometry
3. Tangential Tacheometry

TOTAL STATION

1. Study of Instrument – Determination of Distances, Directions and Elevations
2. Determination of Boundaries of a Field and computation of area.
3. Determination of Heights of objects.

SETTING OUT

1. Setting of simple circular curve using tape and chain.
2. Setting of simple circular curve using tape or/and theodolite
3. Setting of a simple circular curve using Total Station.
4. Setting out for Building.
5. Preparation of a contour plan/map.

Survey Camp is to be conducted to train in one of the following areas:

i. Preparation of a contour Plan/ Map.
ii. Earth work Computations for a high way / canal projects
iii. Marking of a Sewer line/ Water supply line.

L119 - COMMUNICATION AND PRESENTATION SKILLS LAB

(Common to all branches)

VSEMESTER

Prerequisite: English -I, English - II

Course Educational Objectives

In this course, the students will learn to

1. Gather information and to organize ideas relevantly and coherently
2. Participate in group discussions and debates, Face interviews
3. Write project/research reports/technical reports/ formal letters
4. Make oral presentations
5. Transfer information from non-verbal to verbal texts and vice versa

Course Outcomes

After the completion of this course, prospective engineers will have the ability to

1. Make power point presentations and oral presentations
2. Articulate English with good pronunciation
3. Face competitive exams like GRE, TOEFL, IELTS etc.
4. Face interviews and skillfully manage through group discussions
5. Negotiate skillfully for better placement

The following course content is prescribed for the Communication and presentations Lab:

- Vocabulary building – synonyms and antonyms, one-word substitutes, analogy, idioms and phrases, verbal & alphabet series.
- Oral Presentations – JAM
- Functional English - starting a conversation – responding appropriately and relevantly – using the right body language – role play in different situations.
- Group Discussion – dynamics of group discussion, intervention, summarizing, modulation of voice, body language, relevance, fluency and coherence.
- Making power point presentations.
- Interview Skills – concept and process, pre-interview planning, opening strategies, answering strategies, practicing mock-interviews.
- Resume' writing – structure and presentation, planning, defining the career objective, projecting ones strengths and skill-sets, summary, formats and styles, letter-writing.
- Reading comprehension – reading for facts, guessing meanings from context, scanning, skimming, inferring meaning, and critical reading.

Minimum Requirement:

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 & video system and camcorder etc.

System Requirement (Hardware component):

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

i. P – IV Processor

1. Speed – 2.8 GHZ
2. RAM – 512 MB Minimum
3. Hard Disk – 80 GB
4. Headphones of High quality

Suggested Software:

- Globarena's software,2002
- Young India's Clarity software,2005

Books Recommended:

1. Stephen Bailey , "Academic Writing- A Practical guide for students", Rontledge Falmer, London & New York, 2004.
2. Dr A Ramakrishna Rao, Dr G Natanam & Prof SA Sankaranarayanan, "English Language Communication : A Reader cum Lab Manual, Anuradha Publications, Chennai, ,1st edition,2006
3. DELTA's key to the Next Generation TOEFL Test: Advanced Skill Practice, New Age International (P) Ltd., Publishers, New Delhi,2007
4. Books on TOEFL/GRE/GMAT/CAT by Barron's/cup, ,15th edition,2010
5. IELTS series with CDs by Cambridge University Press.3rd Edition,2007

VISEMESTER

S185 - DESIGN OF STEEL STRUCTURES

Course Educational Objectives:

1. To learn the procedures of limit state design.
2. To develop knowledge in designing of tension members and compression members.
3. To study the built up section in case of heavy loads.
4. To get aware of design of steel beams under various loading conditions economically.
5. To know the design of various types of trusses

Course outcomes:

1. Understand the properties of steel and design basics.
2. Design the compression and tension members of steel.
3. Determine the moment calculations in built up columns.
4. Understand the different types of connections in steel constructions
5. Design the various types of trusses.

UNIT- I

General: Fundamental Concepts of design ovf structures, Different types of rolled steel sections available to be used in steel structures. I.S. specifications, Stress Strain relationship for steel.

Bolted connections: Failure of a joint, Strength and efficiency of a joint, Lap Joint, Butt joint and Design of Bearing type bolted joints subjected to axial load, Eccentric bolted connections.

Welded Connections: Types of welds, stresses in welds, Design of welded joints subjected to axial load, Eccentric welded connections.

UNIT- II

Design of Tension Members: Introduction, types of tension members, net sectional areas, design of tension members, lug angles and splices.

Design of Compression Members: Introduction, effective length and slenderness ratio, various types of sections used for columns, design of eccentrically loaded compression members.

UNIT- III

Built up columns: necessity, design of built up columns, laced and battened columns including the design of lacing and battens.

Column Bases: Introduction, types of column bases, design of slab base and gusseted base, design of gusseted base subjected to eccentrically loading.

UNIT- IV

Design of Beams: Introduction, types of sections, general design criteria for beams, design of laterally supported and unsupported beams, Design of built up sections, Curtailment of flange plates, web buckling, web crippling

UNIT- V

Roof Trusses: Types of trusses, Economical spacing of roof trusses, loads on roof trusses, Estimation of wind load on roof trusses as per IS:875. Design of members of roof truss and joints, Design of purlins.

TEXT BOOKS

1. S.K.Duggal, Design of Steel Structures –Tata McGraw Hill, New Delhi
2. S.S.Bhavikatti, Design of Steel Structures – I.K.International Publishing House Pvt. Ltd

REFERENCES

1. N.Subramanian, Design of Steel Structures, Oxford University Press
2. K.S.Sai Ram, Design of Steel Structures, Pearson Education
3. Limit State Design of steel structures IS:800-2007-V.L.Shah and Veena Gore, Structures Publications, Jai – Tarang, 30 Parvati, Pune
4. Ramachandra, Design of Steel Structures, Standard Book

IS CODES

- IS -800 – 2007
- IS -875 (Part-III)
- Steel Tables.

These codes and steel tables are permitted in the examinations.

S420 - WASTEWATER ENGINEERING

VISEMESTER

Course educational objectives

1. Understand sources and quantity wastewater generation
2. Know the importance of wastewater quality characteristics
3. Design different treatment systems of wastewater engineering.
4. Study the biological filtrations of sewage.
5. Understand the different sewer materials and sanitation aspects of domestic and rural areas

Course outcomes:

1. Estimate the quantity of wastewater generation
2. Understand the impact of wastewater quality parameters on receptors
3. Design different wastewater treatment systems by understanding the governing principles.
4. Analyzes the dilution of sewage by various biological filtrations.
5. Understand different aspects of plumbing and sanitation systems

UNIT – I

Systems of sanitation - Estimating quantity of sewage - Dry weather flow - Estimating storm runoff by rational formula - Systems of sewerage - Separate, combined and partially separate system - Different shapes of sewer - Hydraulic design of sewers - Use of Nomograms & charts.

UNIT –II

Characteristics of sewage - Decomposition - Aerobic and anaerobic decomposition – carbon, nitrogen, sulphur cycles - Physical and chemical quality of sewage - BOD and their testing - BOD curve – BOD equation - Problems - Population equivalent- Self purification of natural streams -Zones of pollution in a river - Oxygen deficit – Deoxygenation and reoxygenation curves – Oxygen -Deficit curve - Streeter - Phelps equation - problems -

UNIT – III

Treatment of sewage - Primary treatment - Screening - Grit chamber - Design of grit chamber - Skimming tanks - Primary sedimentation tanks and its design - Secondary treatment of sewage – Activated sludge process – Methods of aeration for activated sludge process - Bulking of sludge and its control – Design considerations in ASP, BOD loading, F/M ratio, sludge age, sludge volume index – Modifications in ASP – Other treatments viz Oxidation ponds , aerated lagoon, stabilization ponds, oxidation ditches.

UNIT – IV

Biological filtration of sewage - Contact beds, intermittent sand filters - Trickling filters – Types of trickling filter– Low rate and high rate trickling filters - Design of trickling filters – Advanced biological treatment –Sludge digestion - Sludge characteristics - Digestion process - Digestion tanks - Design - Disposal of digested sludge- Septic tanks - Construction details – Design considerations - Code provisions - Dispersion trenches - Soaking pit –

UNIT – V

Forces acting on sewers - Sewer materials – Laying and testing of sewers - Sewer appurtenances - Maintenance of sewer - cleaning and ventilation of sewers –Pumping of sewage – Types of pumps -Sewage Disposal in lakes, sea -Disposal on land – Effluentirrigation and sewage farming - Sewage sickness.Disposal of sewage in isolated buildings - Sanitary practices in rural areas.Drainage and sanitation in buildings - Plumbing system - Types of traps - Systems of plumbing -Single stack system - One pipe system -Two pipe system - Sanitary fittings.

TEXT BOOK

Garg.S.K, "**Sewage disposal and Air Pollution Engineering**", Khanna Publishers New Delhi. 2001

REFERENCES

1. Birdie G.S, Birdie J.S, "**Water Supply and Sanitary Engineering**", Dhanpat Rai PublishingCompany, New Delhi, 1998
2. Peavy, Rowe, Tchobanoglous , "**Environmental Engineering**", McGraw Hill Publishers, NewDelhi. 1985
3. Hussain S.K, "**Water Supply and Sanitary Engineering** ", Oxford & IBH Publishers PublishingCo.Pvt Ltd., New Delhi. 1985
4. Punmia B.C, Jain and Jain, "**Waste water Engineering**", Laxmi Publications, New Delhi, 1998
5. Mark J. Hammer, Mark J.Hammer, Jr, "**Water and Wastewater Technology**", Prentice Hall ofIndia Pvt., Ltd., New Delhi, 2002.
6. Duggal K.N., "**Elements of Environmental Engineering**", S.Chand & Company Limited, NewDelhi, 2000.
7. Manual on sewerage and sewage treatment, CPHEEO, Ministry of urban affairs and employment,Govt. of India, New Delhi, 2001

S421 - WATER RESOURCES ENGINEERING

VISEMESTER

Course objectives:

1. Learn the concept of reservoir planning and importance of reservoir sedimentation
2. Study the gravity and earth dams and perform their stability analysis
3. Learn the various types of head works constructed at the head of the canal and types and different components and their purposes.
4. Identify canal regulation structures and cross drainage structures featuring in the alignment of the channels.
5. Know about classification of canals and design of irrigation canals by Kennedys and Laceys theories

Course outcomes:

1. Understand importance of reservoir sedimentation in planning for water resources
2. Perform stability analysis for gravity and earth dams
3. Analyze the parameters needed in the design of weirs/barrages in permeable soils.
4. Design the irrigation canals, canal regulation structures and cross drainage Structures
5. Design canals using existing theories

UNIT-I

Reservoir planning: types of reservoirs, selection of site for reservoir, zones of storage of a reservoir, reservoir yield, estimation of capacity of reservoir using mass curve-Reservoir sedimentation

Dams: Types of dams, merits and demerits, factors affecting selection of type of dam, factors governing selecting site for dam

UNIT-II

Gravity dams: Forces acting on a 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.

Earth 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-III

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.

UNIT-IV

Canals: Classification of canals, design of canals by Kennedy's and Lacey's theories, balancing depth of cutting, canal lining, design of lined canal, economics of canal lining.

Canal structures : types of falls and their location, design principles of Sarda type fall, trapezoidal notch fall and straight glacis fall.

UNIT-V

Canal regulation works: Head regulator and cross regulator, design principles of Cross regulator and head regulators, canal outlets, types of canal modules, proportionality, sensitivity and flexibility.

Cross Drainage works: types, selection of site, design principles of aqueduct, siphon aqueduct and super passage.

TEXT BOOKS

1. Santhosh Kumar Garg, "Irrigation Engineering and Hydraulic Structures," Khann Publishers, New Delhi, 2003
2. Punmia.B.C, "Irrigation and Water Power Engineering," Standard Publishers, New Delhi, 1997.

REFERENCES

1. Michael A.M., "Irrigation – Theory and Practice", Vikas Publishing House, New Delhi, 1990.
2. Sharma R.K., "Irrigation Engineering and Hydraulic Structures", Oxford and IBH Publishing company, New Delhi, 1994.
3. Dilip Kumar Majumdar, "Irrigation Water Management Principles and Practice", Prentice – Hall of India, Private Limited, New Delhi, 2000.
4. Modi.P.N., "Irrigation Water Resources and Water Power Engineering", Standard Book House, Delhi, 1995.

S256 - GEO TECHNICAL ENGINEERING – II **VISEMESTER**

Course Educational Objectives:

1. Understand the principles of soil mechanics
2. To study the applicable of soil mechanics in design of foundations
3. Learn the importance of safe bearing capacity of soil for construction purposes
4. Study about retaining structures design

Course Outcomes

1. Understand soil exploration.
2. Design different types of foundations.
3. Understand role of earth pressure theory in the construction of foundations.
4. Determine safe bearing capacity for design of buildings.
5. Design the retaining walls and special foundations

UNIT- I

Site investigation and Selection of foundations

Objective of site investigation – Methods of investigation – Planning of Site investigation – Depth of soil exploration – Significant depth – Spacing of bore holes – Standard penetration test and its significance in soil exploration – Correction to Standard penetration values – Functions and requisites of foundation – Different types of shallow foundations and situations under which they are adopted. Soil sampling techniques – Sampling Disturbance – Methods of obtaining undisturbed samples – Requirements of an undisturbed sample.

UNIT – II

Shallow Foundations and Bearing Capacity of Soils

Bearing Capacity of soils – Factors affecting Bearing capacity of soil – Terzaghi's and Meyerhof's bearing capacity theories- General principle of Design of Shallow Foundations – Floating Founadtion — Plate bearing test and its limitations – Vibro Floatation method of improving bearing capacity of sandy soils. Settlement of foundation – Causes of total and differential settlement of foundations in sand and clays – Methods of controlling settlement – Code provisions – Conventional procedure for proportioning of footing for equal settlement.

UNIT –III

Deep Foundations

Pile foundation – Consideration leading to the selection of pile foundation – Functions of piles – Types of piles – Friction pile, End bearing pile – Pile grouping – Soil structure interaction - Estimation of individual pile capacity by Static and Dynamic approaches.

Group Capacity of Piles

Pile group efficiency – Downward drag phenomenon on piles and its significance in the design of pile foundations – Pile load test (Constant rate penetration test only) and its interpretation – Impact of pile driving (within the site and neighbouring area)

UNIT – IV

Earth Pressure Theories

Rankine's and Coulomb's earth pressure theories and their comparison – Earth pressure at rest – Active and Passive earth pressures for cohesive and non cohesive soils and their determination by analytical methods only (No graphical procedures)

Retaining Walls

Different types of Retaining Walls – Design principles of Cantilever and Counterfort Retaining walls (Structural Design not included).

UNIT – V

Special Foundations

Caisson Foundation – Necessity of selection – Types of Caisson foundation – Design principles of Caisson foundation (Structural Design not included). Foundation in filled up grounds – Foundation on expansive soil – Use of under-reamed pile foundations – Principles of Machine foundations – Design principles and code provisions.

Stability of slopes

Stability analysis of finite earth slopes – Factors of safety – Taylor's stability number and its significance – Stability analysis by method of Slices and F = 0 analysis – Different conditions of slope stability analysis.

TEXT BOOKS

1. Arora K.R, "**Soil Mechanics and Foundation Engineering**", Standard Publishers & Distributors, Nai Sarak, Delhi. 1987
2. Brahma.S.P, "**Foundation Engineering**", Tata McGraw Hill Publishing Co., Ltd., NewDelhi. 1985
3. Shamsher Prakash, Swamisaran and Gopal Ranjan , "**Analysis and Design of Foundations and Retaining Structures**", Sarita Prakashan, Meerut, New Delhi. 1987.

REFERENCES

1. Wayne C. Teng, "**Foundation Design**", Printice Hall of India Ltd., New Delhi. 1965.
2. Peck.R.B, Hanson,W.E and Thomburn.T.W, "**Foundation Engineering**", John Wiley and Sons, New York. 1974.
3. Nayak.N.V, "**Foundation Design Manual**", Dhanpat Rai and Sons. 1982.
4. Leonards.C.A, "**Foundation Engineering**", McGraw Hill Book Co., Inc., New York. 1962.

S413 - TRANSPORTATION ENGINEERING-II | **VISEMESTER**

COURSE OBJECTIVES

1. To get familiar with the rail network development and railway planning in India.
2. To get acquainted with different technical aspects of railway junctions
3. To get acquainted with different technical aspects of signalling system and interlocking
4. To identify the technical issues related to planning and design of airports
5. To understand the technical components of waterway system

COURSE OUTCOMES:

1. Get familiar with the rail network development and railway planning in India.
2. Get acquainted with different technical aspects of railway junctions
3. Get acquainted with different technical aspects of signalling system and interlocking
4. Identify the technical issues related to planning and design of airports
5. Understand the technical components of waterway system

UNIT – I: RAILWAY PLANNING AND PERMANENT WAY

Role of Indian Railways in National Development - Alignments – Role of Remote Sensing, GIS and GPS - Permanent way – Specification of Components Gauges - Typical cross sections – Embankments and cuttings – Construction, renewal and maintenance of permanent way – Rail joints and welding of rails.

UNIT – II: TRACK JUNCTIONS

Points and crossings – Devices and layouts - Most commonly employed layouts – Special fittings and safety devices – Station and yard – Different types and their typical layouts – General equipments – Track junction – Movable diamond crossing

UNIT – III: SIGNALS AND INTERLOCKING

Signals – Different types and their working – Location of signals – Principles and mechanism of interlocking – Safety devices – Different system of control on movement of trains Introduction to modern trends in Indian railways in the design of high speed tracks – MRTS and suburban railways – Electric traction – BOT and BOLT (basic concepts)

UNIT – IV: AIRPORT ENGINEERING

Importance of Airports in National Transportation Sector – Airport Planning - Standards for planning of airports as per ICAO and Federal Airway– Site selection survey – Airport Zoning – Runway – Orientation – Geometric design – Different types, pattern and layout Taxiways and Aprons – Holding Aprons – Planning and layout of Terminal Buildings, Hangars and Parking area

UNIT – V: HARBOR AND DOCKS

Harbour Components

Harbours and Ports – Requirement and classification - Wind and waves – Hydrographic surveying – Breakwaters and pier heads – Docking platforms – Piers, wharves, jetties and quays – Fender mooring accessories – Entrance channels – Inland water transport and container transportation

Docks and Navigational Aids

Docks – Wet and dry – Marine railways – Offshore docks – Floating docks, temporary docks – Locks Dredgers and dredging – Transit sheds and warehouses – Terminal building – Navigational aids and signals

TEXT BOOKS

1. Saxena.S.C and Arora.S, "**A Text Book of Railway Engineering**", Dhanpat Rai Publications Pvt., Ltd,New Delhi, 2005
2. Bindra.S.P, "**A course work in Docks and Harbour Engineering**", Dhanpat Rai Publications Pvt., Ltd, New Delhi, 2003
3. Khanna,S.K and Arora, M.G & Jain,S.S, "**Airport Planning and Design**", New Chand and Bros, Roorkee, 2001.

REFERENCES

1. Rangwala.S.C, "**Principles of Railway Engineering**", Charotar Publishing House, Court Road, Anand, 2000
2. Bindra.S.P, "**A course in Bridge, Tunnel and Railway Engineering**", Dhanpat Rai Publications Pvt., Ltd, New Delhi, 1996
3. Ahuja and Birdi, "**Roads, Railways, Bridges and Tunnels Engineering**", Standard Book House, New Delhi, 2000
4. Srinivasan.R, "**Dock, Harbour and Tunnel Engineering**", Charotar Publishing House, Court Road, Anand, 1989
5. Transportation Engineering-2, NPTEL Video Lectures

S251 - FINITE ELEMENT METHODS IN CIVIL ENGINEERING

VISEMESTER

COURSE OBJECTIVES

1. To develop mathematical modelling and boundary conditions for the given structure.
2. To learn principles of one-dimensional approach of Finite element modeling
3. To learn the principles of analyzing the trusses using Finite element approach
4. To learn the principles of two-dimensional approach of Finite element modeling
5. To learn the basics of solving multi-nodal problems

COURSE OUTCOMES

1. Idealize given structure with mathematical modelling and boundary conditions.
2. Apply the one-dimensional approach of Finite element modeling
3. Analyze the trusses using Finite element approach
4. Apply the two-dimensional approach of Finite element modeling
5. Solve multi-nodal problems

UNIT – I: FUNDAMENTAL CONCEPTS

Introduction - Stresses and equilibrium - Boundary conditions - Strain displacement relations - Stress strain relations - Potential energy and equilibrium – Weighted Integral and Weak Formulations – Variational Approach – Rayleigh Ritz Method

UNIT – II: ONE - DIMENSIONAL PROBLEMS

Introduction - Modeling - Co-ordinates and shape functions - Potential energy approach - Galerkin Approach - Assembly of global stiffness matrix and load vector - Properties of K - FE Equations - Treatment of Boundary conditions - Quadratic shape functions.

UNIT – III: TRUSSES

Introduction – Plane trusses – Local and Global coordinate systems – Element Stiffness Matrix – Stress Calculations – Introduction to three dimensional trusses

UNIT – IV: TWO DIMENSIONAL PROBLEMS

Introduction – Finite element modelling – Constant Strain Triangle – Iso-parametric representation – Potential energy approach - Element Stiffness – Force vector – Stress calculations – Introduction to beam element.

UNIT – V: TWO DIMENSIONAL ISOPARAMETRIC ELEMENTS AND NUMERICAL INTEGRATION

Introduction – Four node quadrilateral – Shape functions – Element stiffness matrix – element force vectors – Higher order elements and Applications – Nine node quadrilateral – Eight node quadrilateral – Numerical Integration –One point formula – Two point formula - Two dimensional integrals

TEXT BOOKS

1. S.S. Bhavakatti, "Finite element analysis", New Age International publishers
2. Reddy.J.N, "An Introduction to the Finite Element Method", M/s. Tata McGraw Hill Publishing Co., Ltd., New Delhi, 2003.
3. Rajasekaran, S, "Finite Element Analysis in Engineering Design", A.H. Wheeler Publishing, 1993.

REFERENCES

1. Desai.C.S and Abel.J.F, "Introduction to Finite Element Method", East Western Press Pvt. Ltd., New Delhi, 1987.
2. Zienkiewics.O.C, "The finite element method" fourth edition, Tata McGraw Hill Publishing Co. Ltd. New Delhi, 2000.
3. Tirupati.R. Chandrepatla and Ashok D. Belegundu, "Finite Elements Methods in Engineering", Pearson Education Publications.
4. David V Hutton, "Finite element analysis", Tata McGraw Hill, New Delhi

S431 - **CONSTRUCTION TECHNIQUES, EQUIPMENT AND PRACTICES**

VISEMESTER

COURSE OBJECTIVES

1. To understand the building planning and various types of masonry works
2. To understand the supporting structures and various RCC constructions
3. To learn the damp prevention and fire protection techniques
4. To identify the various techniques adopted for acoustics of buildings
5. To identify the various equipments used in constructions

COURSE OUTCOMES

1. Understand the building planning and various types of masonry works
2. Understand the supporting structures and various RCC constructions
3. Learn the damp prevention and fire protection techniques
4. Identify the various techniques adopted for acoustics of buildings
5. Identify the various equipments used in constructions

UNIT - I : FUNCTIONAL PLANNING OF BUILDING

Introduction-man made environment-general principles of site selections-site plan-planning regulations and bye laws-principles of planning. Masonry construction: General Discussion-masonry classifications-stone masonry-brick masonry-hollow concrete masonry-reinforced masonry-composite masonry.

UNIT-II :SUPPORTING STRUCTURES AND CONCRETE CONSTRUCTIONS

General-form work-scaffolding-shoring-underpinning–reinforced concrete constructions-precast concrete constructions pre stressed concrete constructions- joints in concrete works

UNIT-III: DAMP PREVENTION AND FIRE PROTECTION

A)Damp preventions -Source of Dampness- effect of dampness- techniques and methods of damp preventions-material used for damping (DPC)-treatment in building-treatment of dampness-

B)Fire protection: important considerations in fire protections- properties of fire resisting materials –fire resistant constructions- general measurement of fire safety in buildings

UNIT-IV: ACOUSTICS OF BUILDING

Characteristics of audible sound, Behaviour of sound and its effects acoustical defects and acoustic buildings air conditions of buildings-classifications –system of air conditions-essentials of an air conditioned system & anti –terminate in building essential –types of proofing methods.

UNIT-V :CONSTRUCTION EQUIPMENT

Selection of Equipment-excavation equipment-compaction equipment-hauling equipment-hoisting equipment-conveying equipment-pumping equipment-pile driving equipment

TEXT BOOKS

1. Peurifoy, R.L., Ledbetter, W.B. and Schexnayder, C., “Construction Planning, Equipment and Methods”, 5th Edition, McGraw Hill, Singapore, 1995.
2. Arora S.P. and Bindra S.P., Building Construction, Planning Techniques and Method of Construction, Dhanpat Rai and Sons, 1997

REFERENCES

1. Jha J and Sinha S.K., Construction and Foundation Engineering, Khanna Publishers, 1993.
2. Sharma S.C. "Construction Equipment and Management", Khanna Publishers New Delhi, 1988.
3. Deodhar, S.V. "Construction Equipment and Job Planning", Khanna Publishers, New Delhi, 1988.
4. Mahesh Varma, "Construction Equipment and its Planning and Application", Metropolitan Book Company, New Delhi-, 1983.

VISEMESTER

S435 - MATRIX METHODS OF STRUCTURAL ANALYSIS

COURSE OBJECTIVES

1. To understand the basic principles of matrix methods of analysis
2. To generate element stiffness matrix and flexibility matrix
3. To generate stiffness matrix for beams and calculate displacements
4. To generate stiffness matrix for plane trusses and single bay plane frames and calculate displacements
5. To generate flexibility matrix for analysis of beams and plane frames and solve problems

COURSE OUTCOMES:

1. Understand basics of matrix methods of analysis
2. Generate element stiffness matrix and flexibility matrix
3. Generate stiffness matrix for beams and calculate displacements
4. Generate stiffness matrix for plane trusses and single bay plane frames and calculate displacements
5. Generate flexibility matrix for analysis of beams and plane frames and solve problems

UNIT-I :FLEXIBILITY AND STIFFNESS MATRICES

Flexibility and stiffness-Axial displacement-Transverse displacement-Bending or flexural displacement-Torsional displacement
Flexibility Matrix: Properties
Stiffness Matrix: Properties, relationship between flexibility and stiffness matrix
Development of flexibility and stiffness matrices

UNIT-II: FORCE METHOD AND DISPLACEMENT METHODS

Force method and displacement method – Similarities between them-Applications to two and three span continuous beams with and without sinking of supports

UNIT-III: RIGID JOINTED PLANE FRAMES

Introduction-Force method-Shear equations for rigid jointed plane frames
Stiffness of a rigid joint-rotational stiffness and translational stiffness
Stiffness matrix for rectangular frames-Displacement mkethod

UNIT-IV: PIN JOINTED FRAMES

Introduction-Displacement of pin jointed plane frame-Force method-Stiffness of a pin-joint, Member forces-Displacement method

UNIT-V: TRANSFORMATION MATRICES _ ELEMENT APPROACH

Introduction-Force method-Static analysis by method of joints
Displacement method-Effect of axial deformation of members

TEXT BOOKS :

1. Pundit and Gupta, “Matrix Methods of Structural Analysis”, Tata McGraw Hill Publishing Co, New Delhi
2. Weaver and Gere, “Matrix Methods of Structural Analysis”, CBS Publishers.

REFERENCES:

1. Robert E Sennet, "Matrix analysis of structures", Prentice Hall Englewood cliffs-New Jersey.
2. P. Dayaratnam, "Advanced structural analysis", Tata McGraw Hill publishing company limited, New Delhi.
3. Advanced Structural Analysis, NPTEL Web Notes

S437 - REPAIR AND REHABILITATION OF STRUCTURES

VISEMESTER

COURSE OBJECTIVES

1. To understand the various types of cracks and maintenance in R.C structures and masonry structures.
2. To identify requirements of serviceability and durability in concrete
3. To understand the various types of repairing materials to regain its strength
4. To identify the damages of the structures by Non destructive testing
5. To understand the various techniques of rehabilitation of structures

COURSE OUTCOMES:

1. Understand the various types of cracks and maintenance in R.C structures and masonry structures.
2. Identify requirements of serviceability and durability in concrete
3. Understand the various types of repairing materials to regain its strength
4. Identify the damages of the structures by Non destructive testing
5. Understand the various techniques of rehabilitation of structures

UNIT-I: CRACKS AND MAINTENANCE

Introduction: Maintenance, rehabilitation, repair, retrofit and strengthening, need for rehabilitation of structures.
Cracks in R.C. buildings: Various cracks in R.C. buildings, causes and effects
Maintenance: Maintenance importance of maintenance, routine and preventive maintenance.
Damages to masonry structures: Various damages to masonry structures and causes

UNIT- II: SERVICEABILITY AND DURABILITY OF CONCRETE

Quality assurance for concrete construction concrete properties- strength, permeability, thermal properties and cracking. - Effects due to climate, temperature, chemicals, corrosion – design and construction errors - Effects of cover thickness and cracking

UNIT-III: REPAIR AND GROUTING MATERIALS

Repair materials: Various repair materials, Criteria for material selection, Methodology of selection, Healthand safety precautions for handling and applications of repair materials
Special mortars and concretes: Polymer Concrete and Mortar, Quick setting compounds
Grouting materials: Gas forming grouts, Salfoalumate grouts, Polymer grouts, Acrylate and Urethane grouts.
Bonding agents: Latex emulsions, Epoxy bonding agents.
Protective coatings: Protective coatings for Concrete and Steel

UNIT-IV: DAMAGE DIAGNOSIS AND SUBSTRATE PREPARATION

Damage diagnosis and assessment

Visual inspection, Non Destructive Testing using Rebound hammer, Ultra sonic pulse velocity, Semi destructive testing, Probe test, Pull out test Chloride penetration test, Carbonation, Carbonation depth testing, Corrosion activity measurement

Substrate preparation

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

UNIT-V: CRACK REPAIR METHODS

Crack repair

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

Corrosion of embedded steel in concrete

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

Jacketing

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

Strengthening

Strengthening, Beam shear strengthening, Flexural strengthening

TEXT BOOKS

1. Noel P.Mailvaganam , "Repair and protection of concrete structures" CRC press, London.
2. Peter.H.Emmons, "Concrete repair and maintenance Illustrated" Galgotia publishers.
3. Pankaj Agarwal and Manish Shrikande, "Earthquake resistant design of structures", PHI.
4. R.T.Allen and S.C.Edwards, "Repair of Concrete Structures", Blakie and Sons, UK, 1987

REFERENCES

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

S434 - GROUNDWATER DEVELOPMENT AND MANAGEMENT

VISEMESTER

COURSE OUTCOMES

1. To get acquainted with the principles of ground water flow
2. To learn the principles of design of wells and the associated parts
3. To become familiar with the practices of well construction and management
4. To learn suitable methods of artificial recharge of groundwater and control methods for saline water intrusion
5. To get exposed to different methods of groundwater exploration

COURSE OUTCOMES

1. Acquainted with basics of ground water flow
2. Design wells and the associated parts
3. Familiar with the practices of well construction and management
4. Select suitable methods of artificial recharge of groundwater and control methods for saline water intrusion
5. Exposed to different methods of groundwater exploration

UNIT – I: WELL HYDRAULICS

INTRODUCTION

Groundwater in the hydrological cycle, ground water occurrence, aquifer parameters and their determination, general ground water flow equation.

WELL HYDRAULICS

Steady radial flow and unsteady radial flow to a well in confined and unconfined aquifers, Theis solution, Jacob and Chow's methods, Leaky aquifers.

UNIT- II: WELL DESIGN

Water well design- well diameter, well depth, well screen-screen length, slot size, screen diameter and screen selection, design of collector wells, infiltration gallery.

UNIT- III: WELL CONSTRUCTION AND DEVELOPMENT

Water wells, drilling methods-rotary drilling, percussion drilling, well construction-installation of well screens-pull-back method, open- hole, bail-down and wash-down methods, well development-mechanical surging using compressed air, high velocity jetting of water, over pumping and back washing, well completion, well disinfection, well maintenance

UNIT- IV : ARTIFICIAL RECHARGE AND SALINE WATER INTRUSION

ARTIFICIAL RECHARGE

Concept of artificial recharge of groundwater, recharge methods-basin, stream-channel, ditch and furrow, flooding and recharge well methods, recharge mounds and induced recharge

SALINE WATER INTRUSION

Occurrence of saline water intrusion, Ghyben- Herzberg relation, Shape of interface, Control of saline water intrusion

UNIT-V: GEOPHYSICS

Surface methods of exploration of ground water- Electrical resistivity and seismic refraction methods, Sub-surface methods- Geophysical logging and resistivity logging. Aerial photogrammetric application-Concept of Ground Penetration Radar

TEXT BOOKS

1. H.M. Raghunath, "Groundwater", Wiley Eastern Ltd.
2. David Keith Todd, "Ground water Hydrology", John Wiley & Son, New York

REFERENCES

1. Karanth K R. "Groundwater Assessment and Management", Tata McGraw Hill Publishing Co., 1987.
2. Bouwer H, "Groundwater Hydrology", McGraw Hill Book Company, 1978.
3. Willis R and W.W.G. Yeh, "Groundwater Systems Planning and Management", Prentice Hall Inc., 1986.
4. Walton W C, "Groundwater Resources Evaluation", Mc Graw Hill Book Company, 1978.

L149 - GEOTECHNICAL ENGINEERING LAB

VISEMESTER

COURSE OBJECTIVES:

1. To make the student learn, apply his ability of knowledge with hands of practice to determine index and engineering properties of soils.
2. To have an exposure for determining various properties of soils in field and through simulating in lab.

COURSE OUTCOMES:

1. Identify tools, equipment required and familiarity with experimental procedures for determining index and engineering properties of soils
2. Perform field tests for soil investigations.
3. Apply field conditions for computing and analyzing the experimental data.
4. Infer the results and compare.

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

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

L145 - ENVIRONMENTAL ENGINEERING LAB | **VISEMESTER**

Course Educational Objectives

1. Learn the laboratory analytical approaches of determining certain parameters related to water and wastewater quality
2. Understand to analyse the laboratory data with respect to field conditions

Course Outcomes

1. Perform the different laboratory techniques for examining the water and wastewater quality parameters
2. Analyse the laboratory data with respect to field conditions

List of Experiments

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

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

VIISEMESTER

S244 - ESTIMATION AND QUANTITY SURVEYING

Course objectives:

1. Learn the basic principles of estimating the quantities in buildings
2. Learn the steps to calculate the quantities of buildings, roads and canals.
3. Get aware about the procedures and practices for writing specifications and preparation of analysis of rates
4. Study the procedural aspects of valuating the property

Course outcomes:

1. Estimate the various types of structures.
2. Estimate the quantities of different items in buildings
3. Compute the overall cost of different projects in buildings, canals and roads
4. Prepare and write specifications and rate analysis
5. Perform valuation of the property as per the prevailing regulations

UNIT – I

Estimate of Buildings

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

Methods of building estimates

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

Estimate of residential building

Estimate of a building from line plan.

UNIT – II

Estimate of RCC works and Roads

Standard hooks and cranks; Estimate of RCC slab; RCC beam; RCC T–beam slab and RCC column with foundation.**Road Estimating** Estimate of earthwork; Estimate of pitching of slopes; Estimate of earthwork of road fromlongitudinal sections; Estimate of earthwork in hill roads.

UNIT – III

Canal estimate

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

SpecificationsPurpose and method of writing specifications; General specifications. Detailed Specifications for Brick work; R.C.C; Plastering; Mosaic Flooring; R.R.Stone Masonary.

UNIT – IV

Analysis Of Rates

Task or out – turn work; Labour and materials required for different works; Rates of materials and labour; Preparing analysis of rates for the following items of work: i) Concrete ii) RCC Works iii) Brick work in foundation and super structure iv) Plastering v) CC flooring vi) White washing.

PWD Accounts and Procedure of Works

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

UNIT – V

Valuation

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

Miscellaneous Topics

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

TEXT BOOKS

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

S348 - PRESTRESSED CONCRETE STRUCTURES

VIISEMESTER

Course educational objectives:

1.Distinguish between RCC and PSC members
2.Understand principle in various methods of pre stressing systems
3.Evaluate the losses in pre tensioned members
4. Evaluate the losses post tensioned members
5.Analyze and design members subjected to flexure and shear.

Course outcomes:

1.Understand the general mechanical behavior of prestressed concrete.
2.Perform analysis and design of prestressed concrete members and connections
3.Identify and interpret the appropriate relevant industry design codes.
4.Become familiar with professional and contemporary issues in the design and fabrication ofprestressed concrete members.
5.Perform an industry relevant design project in a team setting.

UNIT – I

General principles

INTRODUCTION: Historic development – General principles of prestressing pretensioning and posttensioning – Advantages and limitations of prestressed concrete – Materials – High strength concreteand high tensile steel their characteristics.

I.S.Code provisions, Methods and Systems of Prestressing; Pre-tensioning and post tensioningmethods – Analysis of post tensioning - Different systems of prestressing like Hoyer System, MagnelSystem Freyssinet system and Gifford – Udall System.

UNIT – II

LOSSES OF PRESTRESS: Loss of prestress in pre-tensioned and post-tensioned members due tovarious causes like elastic shortage of concrete, shrinkage of concrete, creep of concrete, Relaxationof steel, slip in anchorage bending of member and frictional losses.

Analysis of sections for flexure; Elastic analysis of concrete beams prestressed with straight, concentric, eccentric, bent and parabolic tendons.

UNIT – III

DESIGN OF SECTIONS FOR FLEXURE AND SHEAR: Allowable stress, Design criteria as perI.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 – IV

ANALYSIS OF END BLOCKS: by Guyon's method and Mugnel method, Anchorage zone strusses –Approximate method of design – Anchorage zone reinforcement – Transfer of prestress pre-tensionedmembers.

Composite section: Introduction – Analysis of stress – Differential shrinkage – General designconsiderations.

UNIT – V

DEFLECTIONS OF PRESTRESSED CONCRETE BEAMS: Importance of control of deflections –factors influencing deflections – short term deflections of uncrackedmember's prediction of long termdeflections.

TEXT BOOKS

1. Krishnaraju N, "**Prestressed Concrete**", Tata McGraw Hill Publishing Co.,Ltd., New Delhi, 1995.
2. Rajagopalan.N, "**Prestressed Concrete**",Narosa Publishing House, New Delhi, 2002.
3. Sinha.M.C & Roy.S.K, "**Fundamentals of Prestressed Concrete**", S.Chand & Company Ltd, New Delhi, 1994.

REFERENCES

1. James R.Libby, "**Modern Prestressed Concrete**", Design principles and Construction methods - Van Standard Rainford Co., New York, 1977
2. Lin.T.Y, & Ned.H.Burns, "**Design of Prestressed Concrete Structures**",John Wiley & Sons, New York, 1981.
3. Arthur H.Nilson, "**Design of Prestressed Concrete**", John Wiley & Sons, New York, 1978.
4. Dayaratnam, P, "Prestressed Concrete Structures", Oxford and IBH, New Delhi, 1982.

IS Codes

1. IS 1343:1980 Code of Practice for Pre Stressed Concrete
2. IS 3370(Part 3):1965 Code of Practice for Concrete Structures for the Storage of Liquids-Part 3 Pre stressed Concrete
3. IS 3370(Part 4):1965 Code of Practice for Concrete Structures for the Storage -Part 4

NOTE : These codes are permitted in the End Examinations

S184 - DESIGN OF REINFORCED CONCRETE STRUCTURES - II

VIISEMESTER

CourseObjectives

1.To learn design principles of shallow foundations
2.To know the design parameters of slabs
3.To learn design aspects of stair cases
4.To know the design parameters of retaining walls and RCC water tanks.

Course outcomes:

1. Design shallow foundations
2. Design slabs
3. Design stair cases
4. Design retaining walls
5. Design RCC water tanks

UNIT- I

Design of shallow foundation – square – rectangular isolated footing of uniform thickness and sloped footing – combined – rectangular and trapezoidal footing

UNIT-II

Yield line theory – Design of circular, flat and grid slabs with different boundary conditions subjected to UDL.

UNIT-III

Design of stairs spanning horizontally – Design of dog legged stair.

UNIT-IV

Types of retaining walls, Forces on retaining walls; Stability requirements; Design and detailing of cantilever type retaining wall.

UNIT-V

Design of RCC water tanks –surface, underground, and elevated- rectangular and circular - Staging.

TEXT BOOKS

1. Punmia B.C, Ashok Kumar Jain, Arun Kumar Jain "**Comprehensive RCC Design**" Laxmi publications (P) Ltd, New Delhi, 1998
2. Ashok K. Jain, "**Reinforced Concrete Limit State Design**", 4th Edition Nem Chand & Bros, Roorkee,1993
3. Krishnaraju. N, "**Advanced Reinforced Concrete design**", CBS Publishers & Distributors, New Delhi, 1988.

REFERENCES

1. Varghese, "**Limit State Design of Reinforced Concrete**", Prentice Hall of India Pvt., Ltd., New Delhi, 2002
2. Varghese, "**Advanced Reinforced Concrete Design**", Prentice Hall of India Pvt., Ltd., New Delhi, 2002
3. Unnikrishna pillai and Devdas Menon, "**Reinforced concrete design**", Tata McGraw Hill Publishing company Ltd, New Delhi, 1998

IS CODES

1. IS 456:2000 Plain and Reinforced Concrete – Code of Practice.
2. SP 16:1980 Design Aids for Reinforced Concrete to IS:456-1978.
3. IS 3370 (1-4):1965 Code of Practice for Concrete Structures for the Storage of Liquids.
4. IS 875 (1-5):1987 Code of Practice for Design Loads (Other than Earthquake) for Buildings

VIISEMESTER

S432 - ENVIRONMENTAL POLLUTION CONTROL

COURSE OBJECTIVES

1. To get acquainted with the impacts of air pollution on society and environment
2. To calculate the ground level concentrations of pollutants at any location using available air quality models and be able to design the air pollution control equipment
3. To learn the appropriate techniques for solid waste management in the society
4. To learn the impacts of noise pollution on society and apply appropriate measures to reduce noise pollution
5. To study the impacts of hazardous waste flow in society and apply the principles of CETP, EIA and Environmental Audit to develop the possible solutions to major environmental problems

COURSE OUTCOMES

1. Acquainted with the impacts of air pollution on society and environment
2. Calculate the ground level concentrations of pollutants at any location using available air quality models and be able to design the air pollution control equipment
3. Apply the appropriate techniques for solid waste management in the society
4. Acquainted with the impacts of noise pollution on society and apply appropriate measures to reduce noise pollution
5. Aware of the impacts of hazardous waste flow in society and apply the principles of CETP, EIA and Environmental Audit to develop the possible solutions to major environmental problems

UNIT-I: AIR POLLUTION - SOURCES, IMPACTS AND METEOROLOGY

Air pollution-History-sources, types, Units of measurement-Simple problems, Air pollution meteorology: Effect of Pressure, Temperature, Wind, Heat Island, Valley effect, Sea-land effect, Wind rose, Maximum Mixing Depth, Lapse rates, Inversion, Plume behaviour

UNIT-III: PLUME DISPERSION MODEL AND CONTROL TECHNIQUES

Determination of stack height-Simple problems for estimation of stack height, plume rise and dispersion-Gaussian plume dispersion model: theory and application- Control techniques for particulate air pollutants-Simple problems, Control techniques for gaseous air pollutants, Ambient Air quality standards

UNIT-III: SOLID WASTE MANAGEMENT

Solid Waste Management – Regulations in India- Sources, Composition and Properties of solid waste – Collection and Handling – Separation and Processing – Recycling and Recovery of solid wastes - Solid Waste Disposal methods –Composting- Incineration-Landfilling – Gas generation and Leachate Control - Simple calculations for estimation of moisture content, density, Energy content, methane generation, air requirement for composting.

UNIT-IV: NOISE POLLUTION

Noise Pollution – Sound and Noise-Sources of Noise-Basic definitions – Power, Intensity, Decibels, Equivalent Noise levels, Sound Intensity Level, Sound Pressure level, Weighting Networks, Octave band- Impacts of Noise – Noise rating systems-Equivalent noise levels – Noise level Standards-Simple calculations for estimating equivalent noise levels, Addition of sound levels, Averaging Sound pressure levels – Control methods.

UNIT V: HAZARDOUS WASTE MANAGEMENT & OTHER ISSUES

Hazardous Waste – Biomedical Waste – E-Waste-Regulations in India – Classification, Control and Disposal methods - Indian Scenario- Concept of Common Effluent Treatment Plants, Environmental Impact Assessment & Environmental Audit – Necessity, Objectives, Advantages and Limitations

TEXT BOOKS

1. S.K. Garg, "Sewage Disposal and Air Pollution Engineering", Khanna Publishers, 29th Edition, New Delhi, 2014.
2. Suresh K. Dhameja, "Environmental Science and Engineering", S.K. Kataria & Sons Publications, New Delhi.

REFERENCE BOOKS

1. H.S. Peavy, D.R. Rowe and G. Tchobanoglous, "Environmental Engineering", McGraw Hill Publications, Singapore, 1985.
2. K.V.S.G. Muralikrishna, "Air Pollution and Control", University Science Press, 2015.
3. Environmental Management & Impact Assessment, NPTEL Video Lectures.
4. Solid & Hazardous Waste Management, NPTEL Video Lectures

S258 - GROUND IMPROVEMENT TECHNIQUES

VIISEMESTER

COURSE OBJECTIVES

1. To study the ground improvement techniques suitable for different soils.
2. To learn the principles of drainage and dewatering of soils under various conditions.
3. To learn the principles for the in-situ treatment of soils
4. To study available suitable grouting techniques for the soils in different conditions.
5. To study the application of geosynthetics in soils.

COURSE OUTCOMES

1. Identify the ground improvement techniques suitable for different soils.
2. Assess the process of drainage and dewatering of soils under various conditions.
3. Assess the suitable procedure for the in-situ treatment of soils
4. Pickup the suitable grouting techniques for the soils in different conditions.
5. Identify the appropriate application of geosynthetics in soils.

UNIT – I: INTRODUCTION

Role of ground improvement in foundation engineering – Ground improvement methods – Geotechnical problems in lateritic, alluvial and black cotton soils – selection of Ground improvement techniques based on soil conditions-use of piezometers-inclinometers in field-Ground anchors

UNIT – II: DRAINAGE AND DEWATERING

Well point system – Vacuum dewatering system – Electro-osmatic method – Seepage analysis for two dimensional flow – fully penetrating slots in homogeneous deposits (simple cases only).

UNIT – III: INSITU TREATMENT OF SOILS

Insitu densification of Granular and consolidation of cohesive soils – Dynamic compaction – Vibrofloatation – Sand pile compaction – Stone Column - Preloading with sand drains and fabric drains.

UNIT – IV: GROUTING TECHNIQUE

Suspension grouts – solutions grouts – Grouting equipment and method – Grouting with soil, Bentonite – cement mixes and asphalt – Grout monitoring schemes.

Stabilisation: Methods of stabilization-mechanical-cement- lime-bituminous-chemical stabilization with calcium chloride, sodium silicate and gypsum.

UNIT – V: GEOSYNTHETICS APPLICATIONS

Types of Geosynthetic materials- Geotextile – Types – Geotextiles in Filtration, Drainage, Separation and Reinforcement – Geomembranes – Containments and barriers – Application to Landfills, Highways etc.

TEXT BOOKS

1. Purusothamaraj.P., “Ground Improvement Techniques”, Laxmi Publication (P) Ltd., New Delhi, 2000.
2. Koerner.R.M., “Construction and Geotechnical Methods in Foundation Engineering”, McGraw Hill Publishing Company, New York, 1984.

REFERENCES

1. Moseley. M.P., "Ground Improvement", Blackie Academic and Professional, Chapman and Hall, Glassgow, 1993.
2. Manfred R.Hausmann, "Engineering Principles of Ground Modification", McGraw Hill Publishing Company, New york, 1990.
3. John, N.W.M., "Geotextiles", John Blackies and Sons Ltd., London, 1987.

S439 - TRAFFIC ENGINEERING AND TRANSPORT PLANNING

VIISEMESTER

COURSE OBJECTIVES

1. To understand the different parameters of traffic flow.
2. To study the technical aspects of traffic control aspects.
3. To study the different techniques of transport planning.
4. To learn the various techniques adopted in highway safety and capacity.
5. To study the impacts of traffic flow in society and apply Environmental Audit to develop the possible solutions to major environmental problems like air pollution, noise pollution.

COURSE OUTCOMES

1. Identify different parameters of traffic flow.
2. Get acquainted with different technical aspects of traffic control aspects.
3. Study about different techniques of transport planning.
4. Understand the various techniques adopted in highway safety and capacity.
5. Aware of the impacts of traffic flow in society and apply Environmental Audit to develop the possible solutions to major environmental problems like air pollution, noise pollution.

UNIT-1: FUNDAMENTAL PARAMETERS OF TRAFFIC FLOW

Traffic stream characteristics: Introduction to traffic engineering: Road user characteristics, human and vehicle characteristics

Fundamental parameters of traffic flow: Speed, density, volume, travel time, headway, spacing, time-space diagram, time mean speed, space mean speed and their relation, relation between speeds, flow, density, fundamental diagrams;

UNIT-2: TRAFFIC CONTROLS

Traffic signs- Importance of traffic signs, types of traffic signs

Road markings and regulation - functions, types of road markings, basic principles of regulation, regulation of speed, vehicles and parking

Traffic signals- advantages and disadvantages of traffic signals, signal face, warrants for signals, Signal Design by Webster Method – Signal Phasing and Timing Diagrams.

UNIT-3:TRANSPORTATION PLANNING PROCESS

Trips: General concept of Trip – Trip Generation – Trip Distribution

Trip generation models-Factors governing Trip Generation and Attraction: Multiple linear Regression Models – Category analysis.

Trip distribution models: Methods of Trip Distribution-Growth Factor Models – Uniform Growth Factor Method; Average Growth Factor Method; Fratar Method; Furness Method; limitation of Growth Factor Models; Concept of Gravity Model.

UNIT -4: HIGHWAY SAFETY AND CAPACITY

Collection of accident data, statistical methods for analysis of accident data, Causes – Engineering Measures to reduce Accidents- Enforcement Measures –Educational Measures-Road Safety Audit- Principles of Road Safety Audit-Importance of Highway capacity and level of service of rural highways and urban roads-Geometric design-Types of intersections and channelization

UNIT -5:ENVIRONMENT AND TUNNELLING

Highway and The Environment- Detrimental effect of traffic on environment – Air Pollution – Pollutants due to Traffic – Measures to reduce Air Pollution due to Traffic- Noise Pollution – Measures to reduce Noise Pollution.

Tunnelling-Necessity of tunnels, advantages and disadvantages of tunnelling, tunnelling shapes and sizes, tunnelling methods tunnel lining, drainage and ventilation.

TEXT BOOKS:

1. L.R. Kadiyali, Traffic engineering and transport planning, Khanna publishers, eighth edition, 2013.
2. Garbar Nicholas. J "Principles of Traffic and Highway Engineering", Cengage Learning, first edition.
3. Highway Capacity Manual (HCM), Transportation Research Board, USA, 2000.

REFERENCES:

1. P. Chakroborty and A. Das, "Principles of Transportation Engineering", Prentice Hall of India Pvt. Ltd., 2003.
2. C.S. Papacostas and P.D. Prevedouros, "Transportation Engineering and Planning", Prentice Hall India, 2001

S172 - CONSTRUCTION MANAGEMENT

VIISEMESTER

COURSE OBJECTIVES:

1. Learn management of various projects and financial facilities
2. Know how to plan and organize for any project
3. Learn proper utilization of materials equipments and labour
4. Know the procedure of scheduling.
5. Know the programming for any project by network analysis

COURSE OUTCOMES:

1. Manage any project technically and Financially
2. Control project budget.
3. Plan the project to complete in schedule.
4. Perform detailed network analysis to complete project within schedule.
5. Deal contracts and bidding processes.

UNIT - I

CONSTRUCTION PROJECT MANAGEMENT

Introduction – Project Life Cycle – Major Types of construction – Selection of professional services – Construction contractors – Financing of constructed facilities – Legal & Regulatory requirements – Role of project managers

UNIT - II

PROJECT PLANNING & ORGANIZATION

Development of project plan, objective and conception– Programming – Scheduling – Project Organization – Project budget fund flow statement – Controlling system

UNIT - III

LABOUR, MATERIAL & EQUIPEMENT UTILIZATION

Introduction – Labour Productivity – Factors affecting job site productivity – Materials Management – Material procurement & Delivery – Inventory control – Plant & Equipment management

UNIT - IV

NETWORK ANALYSIS

Introduction – Basic concepts of network analysis – CPM and PERT – Use of CPM & PERT Techniques – Problems, and prospects and applications of CPM & PERT – Introduction to software applications in project Management

UNIT - V

CONTRACTS

Introduction – Types of Contract – Contract document – Specifications – Important conditions of contract – Tender and tender document – Deposits by the contractor – Arbitration – M. Book, R.A Bills & Advances – Muster Roll – Stores

TEXT BOOKS

1. S. Sanga Reddy & Meyyappan, "Construction Management", Kumaran Publications, 2009.
2. Gahlot, P.S & Dhir, D.M., "Construction Planning and Management", Wiley Eastern Limited,1992.
3. Chitkara, K.K., "Construction Project Management", Tata McGraw Hill Publishing Co, Ltd., New Delhi, 1992.
4. Punmia B.C., "Project Planning and Control with PERT and CPM", Laxmi Publications, NewDelhi, 1987.

REFERENCES

1. Jerome D. Wiest & K. Levy, "Management Guide to PERT/CPM",
2. Clough R.H. & Sears. G.A, "Construction Project Management" 2008.

S196 - DISASTER MANAGEMENT

VIISEMESTER

COURSE OBJECTIVES

1. To learn the problems of natural and manmade disasters
2. To study the impacts of Disasters
3. To learn the importance of technology in handling disaster management situations
4. To learn the responsive actions to be taken according to the situation in case of occurrence of disaster.
5. To know the level of involvement of Corporate sector and community focused approach in disaster management

COURSE OUTCOMES:

1. Get awareness about natural and manmade disasters
2. Aware of the impacts of Disasters
3. Acquainted with the role of technology in handling disaster management situations
4. Respond according to the situation in case of occurrence of disaster.
5. Acquainted with the involvement of Corporate sector and community focused approach

UNIT – I: DEFINITIONS & TYPES OF DISASTER

Introduction - inter disciplinary–nature of the subject - Definitions – types of Disasters-Relationship between Disaster and Human and Development- Disaster Management Cycle: Terminologies, Various disaster in India: drought, cyclone, extreme heat and cold, avalanche, collision of tectonic plates-volcano, mudflow and landslide, Industrial, Nuclear and Chemical disasters, Accident Related Disasters, Biological Disasters, Disasters Caused due to Social, Ethnic and Religious Conflicts, Fire hazards – transport hazard dynamics – solid waste management – post disaster – bio terrorism -threat in mega cities, rail and air craft's accidents, High Power Committee on Disaster Management in India-Disaster Management Act 2005

UNIT – II: IMPACT OF DISASTERS

Introduction: life & livestock-habitation, agriculture & livelihood loss-health hazards-malnutrition problems-contamination of water-impact on children-environmental loss-assessment of Disaster Impacts using Modern Technologies.

UNIT – III: ROLE OF TECHNOLOGY IN DISASTER MANAGEMENTS

Disaster management for infra structures, taxonomy of infrastructure treatment plants and process facilities – electrical substations – roads and bridges – mitigation programme for earth quakes – flowchart, geospatial information in agriculture drought assessment – multimedia technology in disaster risk management and training – transformable indigenous knowledge in disaster reduction.

UNIT – IV: RESPONDING TO DISASTERS

PLANNING & RISK PREVENTION: Planning, early warning system-crisis intervention and management-Response and Rehabilitation after Disasters-temporary shelter – food and nutrition-safe drinking water –rehabilitation after cyclones- respond to drought response to river erosion-response after earth quake-response after Tsunami- Hunger and Disaster.

EDUCATION AND COMMUNITY PREPAREDNESS: Education in disaster risk reduction – Essentials of school disaster education – community capacity and disaster resilience – Community based disaster recovery - Community based disaster management and social capital – Designing resilience – building community capacity for action

UNIT – V: OTHER ISSUES

Impact of disaster on poverty and deprivation - Climate change adaptation and human health – Exposure, health hazards and environmental capacity in disaster management - the red cross and red crescent movement - Corporate sector and disaster risk reduction - A community focused approach

Casestudies

TEXT BOOKS

1. Jagbir Singh (Ed.), "Disaster Management – Future Challenges and Opportunities", IK International Publishing, 2007
2. Ghosh G.K , "Disaster Management", APH Publishing Corporation, 2006.

REFERENCES

1. Carter, W. N. "Disaster Management: A Disaster Management Handbook", Asian Development Bank, Bangkok, 1991.
2. Chakrabarty, U. K "Industrial Disaster Management and Emergency Response",Asian Books Pvt. Ltd., New Delhi 2007.
3. H K Gupta (Ed.), "Disaster Management", Universities Press, 2003
4. Government of India website on Disaster Management: www.ndmindia.nic.in

S424 - **WATERSHED MANAGEMENT** **VIISEMESTER**

COURSE OBJECTIVES

1. To the study the different components of watershed
2. To learn the different techniques to reduce erosion
3. To study the different approaches for water harvesting
4. To learn the principles involved in the techniques for land management
5. To learn the basic principles in improving the ecosystem

COURSE OUTCOMES:

1. Understand the different components of watershed
2. Apply different techniques to reduce erosion
3. Adopt different approaches for water harvesting
4. Adopt the techniques for land management
5. Apply the basic principles in improving the ecosystem

UNIT-I

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-II

PRINCIPLES OF 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.

MEASURES TO CONTROL EROSION: Contour techniques, ploughing, furrowing, trenching, bunding, terracing, gully control, rockfill dams, brushwood dam, Gabion.

UNIT-III

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

UNIT-VI

LAND MANAGEMENT: Land use and Land capability classification, management of forest, agricultural, grassland and wild land. Reclamation of saline and alkaline soils.

UNIT-V

ECOSYSTEM MANAGEMENT: 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. JVS Murthy, “Watershed Management”, New Age International Publishers, 2011.
2. VVN Murthy, “Land and Water Management”, Kalyani Publications, 2013.

REFERENCES

1. D.K.Majumdar, “Irrigation and Water Management”, Prentice Hall of India.
2. R.A. Wurbs and W.P. James, “Water Resource Engineering”, Prentice Hall Publishers, 2001
3. Watershed Management, NPTEL Video Lectures
4. Watershed Management, NPTEL Web Notes

S369 - REMOTE SENSING AND GIS

VIISEMESTER

COURSE OBJECTIVES

1. To study the technical aspects and fundamentals of Remote sensing and GIS usage.
2. To learn the principles involved in interpreting photogrammetric images.
3. To learn the procedures involved in the analysis involved in analysis of image and spatial data based on remote sensing and GIS data
4. To study the various techniques in image processing
5. To understand the techniques of RS & GIS suitable for solving civil engineering applications

COURSE OUTCOMES

1. Understand technical aspects and fundamentals of Remote sensing and GIS usage.
2. Understanding different photogrammetric images.
3. Analyze and apply the image and spatial data analysis based on remote sensing and GIS data
4. Understanding apply the different image processing
5. Apply the RS & GIS techniques for solving civil engineering applications

UNIT – I: INTRODUCTION TO REMOTE SENSING

Basic concepts of remote sensing, electromagnetic radiation, electromagnetic spectrum, interaction with atmosphere, energy interaction with the earth surfaces characteristics of remote sensing systems. Sensors and platforms: Introduction, types of sensors, airborne remote sensing, spaceborne remote sensing, image data characteristics, digital image data formats-band interleaved by pixel, band interleaved by line, band sequential, IRS, LANDSAT, SPOT.

UNIT – II: IMAGE ANALYSIS

Introduction, elements of visual interpretations, digital image processing- image pre-processing, image enhancement, image classification, supervised classification, unsupervised classification.

UNIT – III: GEOGRAPHIC INFORMATION SYSTEM

Introduction, key components, application areas of GIS, map projections. Data entry and preparation: spatial data input, raster data models, vector data models.

UNIT – IV: SPATIAL DATA ANALYSIS

Introduction, overlay function-vector overlay operations, raster overlay operations, arithmetic operators, comparison and logical operators, conditional expressions, overlay using a decision table, network analysis-optimal path finding, network allocation, network tracing.

UNIT – V: RS AND GIS APPLICATIONS

Land cover and land use, agriculture, forestry, geology, geomorphology, urban applications, Flood zoning and mapping, groundwater prospects and potential recharge zones, watershed management.

TEXT BOOKS

1. M.Anji Reddy, "Remote Sensing and Geographical Information systems", B.S.Publications, 2012.
2. S.Kumar, " Basics of Remote sensing & GIS", Laxmi Publications

REFERENCES

1. LRA Narayan,, "Remote Sensing and its applications", University Press 1999.
2. D.N.Bhatta, "Remote Sensing and GIS applications", Oxford Publication
3. Remote Sensing and Geographical Information System, NPTEL, Video Lectures
4. Modern Surveying Techniques, NPTEL, Web Notes

VIISEMESTER

L122 - COMPUTER AIDED ANALYSIS AND DESIGN LAB

Course objectives:

1. Learn the Basic concepts of STADD.Pro
2. Learn the analysis and design of continuous beam, trusses and frames
3. Learn the design and analysis of retaining wall and
4. Learn the design and analysis multi-storeyed building.
5. Learn to draw bar bending schedule for various RCC elements

Course outcomes:

1. Analyze and design continuous beam, trusses and frames .
2. Analyze and design a simple tower.
3. Analyze and design multi-storied building.
4. Analyze and design retaining walls.
5. Analyze and design of RCC elements.

EXCERCISES

Part-A

SOFTWARE:STAAD PRO or Equivalent

Note: A minimum of 6 no. shall be done and recorded

1. Basics of STAADPRO
2. Analysis and Design of a Continuous Beam
3. 2-D Frame Analysis and Design
4. 3-D Frame Analysis and Design
5. Design and analysis of multi-storied building
6. Analysis of plane truss
7. Retaining Wall Analysis and Design
8. Simple tower Analysis and Design

Part-B

Any four experiments using AutoCad (2 from DRCS, 2 from DSS)

DRCS

1. Reinforcement particulars of T-beams and L-beams.
2. Reinforcement detailing of continuous beams.
3. Reinforcement particulars of columns and footings.
4. Detailing of One way, Two way and continuous slabs.

DSS

5. Detailing of Compound beams including curtailment of flange plates.
6. Detailing of Column including lacing and battens.
7. Detailing of steel roof trusses including particulars at joints.
8. Detailing of Plate girder including curtailment, splicing and stiffeners.

1. Ramachandra, Design of Steel Structures, Standard Book
2. S.K.Duggal, Design of Steel Structures –Tata McGraw Hill, New Delhi
3. Varghese, "**Limit State Design of Reinforced Concrete**", Prentice Hall of India Pvt., Ltd., New Delhi, 2002
4. UnnikrishnanPillai and Devdas Menon, "**Reinforced concrete design**", Tata McGraw Hill Publishing company Ltd, New Delhi, 1998

L151 - HIGHWAY AND CONCRETE TECHNOLOGY LAB

VIISEMESTER

Course objectives

1. Conduct tests and evaluate the quality of aggregates and bitumen.
2. Conduct tests and evaluate the quality of cement and concrete as construction material.
3. Get exposure to various Non Destructive Techniques used in structural testing.

Course outcomes:

1. Perform different tests on aggregates and bitumen for their suitability in highway construction
2. Perform different tests on cement and concrete for their suitability in structural construction
3. Perform the Non Destructive Technique used in structural testing.

TESTS ON ROAD AGGREGATES:

1. Aggregate Crushing value
2. Aggregate Impact Test.
3. Specific Gravity and Water Absorption.
4. Attrition Test
5. Abrasion Test.
6. Shape tests

TESTS ON BITUMINOUS MATERIALS:

1. Penetration Test.
2. Ductility Test.
3. Softening Point Test.
4. Flash and fire point tests.

TESTS ON CEMENT AND CONCRETE

1. Normal Consistency of fineness of cement.
2. Initial setting time and final setting time of cement.
3. Specific gravity and soundness of cement.
4. Compressive strength of cement.
5. Workability test on concrete by compaction factor, slump and Vee-bee consistometer test.
6. Young's modulus and compressive strength of concrete.
7. Bulking of sand.
8. Non-Destructive testing on concrete (for demonstration)

S111 - ADVANCED STRUCTURAL DESIGN

VIIISEMESTER

COURSE OBJECTIVES

1. To study the different forces involved in the design of counter fort retaining wall.
2. To study the principles involved in the design of the bunkers, silos and Chimneys.
3. To study the principles involved in the design aspects of plate girder.
4. To study the design principles of gantry girder.
5. To study the design principles of elevated steel water tanks

COURSE OUTCOMES

1. Analyse the forces and design the counter fort retaining wall.
2. Design the bunkers, silos and Chimneys.
3. Acquainted with the design aspects of plate girder.
4. Design the gantry girder.
5. Design the elevated steel water tanks.

UNIT – I: RETAINING WALLS

Types of retaining walls, Forces on retaining walls; Stability requirements; Design and detailing of counter fort retaining wall.

UNIT – II: BUNKERS, SILOS AND CHIMNEY

Introduction, concepts of loading and design.

UNIT – III: PLATE GIRDER

Introduction, elements of plate girder, design steps of a plate girder, necessity of stiffeners in plate girder, various types of stiffeners, web and flange splices, Curtailment of flange plates.

UNIT – IV: GANTRY GIRDERS

Introduction, various loads, specifications, design of gantry girder.

UNIT – V: ELEVATED STEEL WATER TANKS

Design of elevated steel water tanks.

TEXT BOOKS

1. B.C. Punmia, Ashok K. Jain and A.K. Jain. Reinforced concrete structures Vol-2, Laxmi Publications Pvt. Ltd., New Delhi
2. P.C. Varghese, Advanced Reinforced Concrete Structures, Prentice Hall of India Pvt. Ltd
3. P. Dayaratnam, Design of Steel Structures; S. Chand Publishers
4. B. C. Punmia, 'Design of Steel Structures', Jain & Jain, Laxmi Publications Pvt Ltd., New Delhi.

REFERENCES

1. N. Krishna Raju, Design drawing of concrete and steel structures, University Press 2005.
2. S.U. Pillai and D. Menon, Reinforced concrete design, Tata McGraw Hill Publishing company

IS CODES:

IS 456-2000 plain and reinforced concrete
IS 800-2007
IS 4995-1974 and
Any other relevant IS Codes

S430 - ADVANCED FOUNDATION ENGINEERING **VIIISEMESTER**

COURSE OBJECTIVES

1. To study the basic principles of shallow foundations and settlement analysis
2. To study the basic principles in deriving the 3-D consolidation equation and its application for the analysis of practical situations
3. To study the fundamental aspects of analysis and design of the machine foundations
4. To learn the basic principles of well foundation
5. To understand the problems associated with expansive soils and their remediation

COURSE OUTCOMES

1. Analyse the shallow foundations by using different methods and understand the settlement criteria
2. Derive the 3-D consolidation equation and apply for the analysis of practical situations
3. Analyse and design the machine foundations
4. Understand the various components of well foundation
5. Evaluate the problems associated with expansive soils and their remediation

UNIT-I

BEARING CAPACITY OF SHALLOW FOUNDATIONS

Effect of eccentric loading, inclined load, inclination of base of foundation, sloping ground; Bearing Capacity of stratified soils; Meyerhof analysis, Vesic's analysis and Hansen's analysis.

SETTLEMENT ANALYSIS

Contact pressure, sources of settlement, uniform settlement, differential settlement, construction practices to avoid differential settlement, immediate settlement in sands and clays-Terzaghi and Janbu's methods for clays , Schmertmann and Hartman method for cohesion less soils;

UNIT-II: THREE DIMENSIONAL CONSOLIDATION

Consolidation settlement, 3D Consolidation equation in Cartesian and cylindrical coordinates, Sand drains, Effect of lateral strains on consolidation

UNIT-III: MACHINE FOUNDATIONS

Introduction; Terminology, Design criteria for machine foundation; single degree freedom system, free and forced vibration; Methods of analysis of block foundation; Dynamic subsoil investigation; Damping; Design and construction of foundation for reciprocating and impact type machines; Active and Passive isolation

UNIT-IV: CAISSONS AND WELL FOUNDATIONS

Types of caissons, different shapes of well, components of well, functions of wells, sinking of wells, lateral stability by Terzaghi analysis

UNIT-V: FOUNDATIONS IN EXPANSIVE SOILS

Problems associated with expansive soils, Swelling potential, percent swell, swell pressure factors affecting, methods of measurement of swell pressure ; Prediction of heave, factors affecting heave, methods of prediction of heave; IS Classification of expansive soils, Under-reamed pile foundations, Sand cushion method, CNS layer method, granular pile-anchor technique, lime stabilization of expansive soils, Moisture control in expansive clays-Horizontal and vertical moisture barriers, sub-surface drainage and surface drainage, pre-wetting and ponding.

TEXT BOOK

1. B.M. Das, "Principles of Foundation Engineering", PWS Publishing Company, 4th edition, Singapore, 1999
2. Gopal Ranjan and ASR Rao, "Basic and Applied Soil Mechanics", Wiley Eastern Limited, New Delhi.

REFERENCES

1. Bowles, J.E, "Foundation Analysis & Design" McGraw- Hill Book Company, Singapore.
2. SK Gulati & Manoj Datta, " Geotechnical Engineering", Tata McGraw- Hill Publishing Company Limited.
3. Swami Saran, "Soil Dynamics and Machine Foundations".
4. VNS Murthy, "Soil Mechanics and Foundation Engineering", CBS Publishers.
5. Advanced Foundation Engineering, NPTEL Video Lectures

S438 - RURAL ROAD TECHNOLOGY **VIIISEMESTER**

COURSE OUTCOMES

1. To learn the concepts of planning and alignment of rural roads.
2. To study the materials required for pavement usage, the design aspects of flexible and rigid pavements for rural roads and various drainage systems.
3. To study the procedures involved in the construction of pavements and the appropriate material specifications
4. To learn the various approaches in the use of waste material for pavement construction
5. To study the appropriate quality control aspects involved in the construction and maintenance of pavements

COURSE OUTCOMES

1. Get acquainted with concepts of planning and alignment of rural roads.
2. Get acquainted with materials required for pavement usage, the design aspects of flexible and rigid pavements for rural roads and various drainage systems.
3. Get acquainted with construction of pavements and the appropriate material specifications
4. Get acquainted with use of waste material for pavement construction
5. Get acquainted with the quality control aspects involved in the construction and maintenance of pavements

UNIT-I: PLANNING AND ALIGNMENT

Planning of Rural Roads, Concept of Network planning, rural roads planning, road alignment and surveys, governing factors on route selection, factors considered for alignment.

UNIT-II: MATERIALS AND PAVEMENT DESIGN

Introduction, Soil ,material surveys, embankment and subgrade materials, stabilized Soils, Road aggregates, aggregate for base courses, new materials as stabilizers, materials for desert areas, materials for bituminous constructions and surfacing; materials for rigid pavements, special pavement, climatic suitability of concrete materials. Introduction, design procedure, pavement components, design of flexible and rigid pavements, special pavements design, types of drainage, and general criteria for road drainage, system of drainage, surface and subsurface systems.

UNIT-III: CONSTRUCTION AND SPECIFICATIONS

Introduction, selection of materials and Methodology, Embankment and sub-grade, sub – base (granular), base(granular), shoulder, bituminous concrete, semi- rigid pavements, construction, concrete pavements, construction of special pavements, equipment required for different procedures.

UNIT-IV: WASTE MATERIAL FOR PAVEMENT CONSTRUCTION

Introduction, fly ash for road construction, design & construction, design &construction of fly ash embankment lime fly ash and stabilized soil, lime fly ash pavements, control of compaction, concrete stabilized fly ash with admixtures.

UNIT-V: QUALITY CONTROL IN CONSTRUCTION AND MAINTENANCE

Introduction, Pre-requirements, organizational setup, specification and code of practice, Laboratory equipment, Earth and granular layers, bituminous courses, semi- rigid and rigid pavements, special requirements, recovered of quality control data. Distresses/Defects in rigid and flexible pavements, Maintenance and evaluation, inventory roads and inspections, types of Maintenance Activities, Maintenance

REFERENCES:

1.IRC Manual for rural roads. Special publication – 20 (2002)
2. HMSO, Soil Mechanics for rural Engineers in, London
3. IRC related code books
4. NRRDA – guidelines and code books

VIIISEMESTER

S338 - PAVEMENT ANALYSIS AND DESIGN ENGINEERING

COURSE OBJECTIVES:

1. To study the types and stress distribution on layered system of pavements.
2. To learn the principles of designing flexible pavements.
3. To learn the principles of designing rigid pavements.
4. To study the approaches in the analysis for the maintenance and performance of pavements.
5. To study the different stabilization techniques for pavements.

COURSE OUTCOMES:

1. Understand the types and stress distribution on layered system of pavements.
2. Design flexible pavements.
3. Design rigid pavements.
4. Analyse the approaches for maintenance and performance of pavements.
5. Apply different stabilization techniques for pavements.

UNIT- I: TYPE OF PAVEMENT AND STRESS DISTRIBUTION ON LAYERED SYSTEM

Introduction - Pavement as layered structure - Pavement types - rigid and fl exible -Stress and deflections in pavements under repeated loading.

UNIT – II: DESIGN OF FLEXIBLE PAVEMENTS

Flexible pavement design - Empirical - Semi empirical and theoretical Methods – Design procedure as per latest IRC guidelines – Design and specification of rural roads.

UNIT – III: DESIGN OF RIGID PAVEMENTS

Cement concrete pavements - Modified Westergaurd approach - Design procedure as per latest IRC guidelines - Concrete roads and their scope in India.

UNIT – IV: PERFORMANCE EVALUATION AND MAINTENANCE

Pavement Evaluation [Condition and evaluation surveys (Surface Appearance, Cracks, Patches And Pot Holes, Undulations, Ravelling, Roughness, Skid Resistance), Structural Evaluation By Deflection Measurements, Present Serviceability Index], Pavement maintenance. [IRC Recommendations Only]

UNIT – V: STABILISATION OF PAVEMENTS

Stabilisation with special reference to highway pavements - Choice of stabilisers -Testing and field control –Stabilisation for rural roads in India -use of Geo-synthetics (geo-textiles & geo-grids) in roads.

TEXT BOOKS

1. Kadiyali, L.R., “Principles and Practice of Highway Engineering”, Khanna Publications, New Delhi, 2000.
2. Design and Specification of Rural Roads (Manual), Ministry of rural roads, Government of India, New Delhi, 2001

REFERENCES

1. Guidelines for the Design of Flexible Pavements, IRC: 37 - 2001, The Indian Roads Congress, New Delhi.
2. Guideline for the Design of Rigid Pavements for Highways, IRC:58-1998, The Indian Roads Congress, New Delhi
3. Wright, P.H., "Highway Engineers", John Wiley & Sons, Inc., New York, 1996.
4. Pavement Design, NPTEL Video Lectures
5. Pavement Design, Web Notes

S433 - GREEN BUILDINGS

VIIISEMESTER

COURSE OBJECTIVES:

1. To identify the appropriate materials for constructing a green building
2. To plan for Energy and Resource Conservation in Green Buildings
3. To learn the practices of optimum use of the renewable energy resources
4. To learn the principles of designing the buildings using climatic factors
5. To plan for effective green building rating system

COURSE OUTCOMES:

1. Identify the appropriate materials for constructing a green building
2. Plan for Energy and Resource Conservation in Green Buildings
3. Optimally use renewable energy resources
4. Carefully design the buildings using climatic factors
5. Plan for effective green building rating system

UNIT-I GREEN BUILDINGS-CONCEPT AND MATERIALS:

Definition of Green Buildings, typical features of green buildings, benefits of Green Buildings- Sustainable site selection and planning of buildings to maximize comfort, day lighting, ventilation, planning for storm water drainage-Natural Materials like bamboo, timber, rammed earth, stabilized mud blocks, hollow blocks, lime & lime-pozzolana cements, materials from agro and industrial waste, ferro-cement and ferro-concrete, alternative roofing systems, various paints reducing the heat gain of the building, etc

UNIT – II: ENERGY AND RESOURCE CONSERVATION

Need for energy conservation, various forms of energy used in buildings, embodied energy of materials, energy used in transportation and construction processes- water conservation systems in buildings-water harvesting in buildings – waste to energy management in residential complexes or gated communities-Concept of Life Cycle Assessment.

UNIT- III: USE OF RENEWABLE ENERGYRESOURCES

Wind and Solar Energy Harvesting, potential of solar energy in India and world, construction and operation of various solar appliances, success case studies of fully solar energy based buildings in India.

UNIT- IV CLIMATE DESIGN

Local climatic conditions – temperature, humidity, wind speed and direction-impact of climate change on built environment - comforts: the desirable conditions – Principles of thermal design - means of thermal –light and lighting-building acoustics- energy efficient lighting, Ventilation and air quality requirement, various techniques for passive cooling, garden roofs, case studies for passive cooling and thermal comfort.

UNIT- V: GREEN BUILDING RATING SYSTEMS

Introduction to Leadership in Energy and Environment Design (LEED), Green Rating systems for Integrated Habitat Assessment – Indian Rating Systems-Modular wastewater treatment systems for built environment - Building automation and building management systems.

TEXT BOOKS:

1. K.S. Jagadish, B.V. Venkatarama Reddy and K.S. Nanjunda Rao, “Alternative building materials and technologies”, New Age International, 2014.

2. N. Kumara Swamy and A. Kameswara Rao, "Building Planning and Drawing", Charotar Publications, 2013.

REFERENCE BOOKS

1. Green Building: Principles and Practices in Residential Construction By Abe Kruger and Carl Seville, Demar Cengage Learning, 2012.
2. 'Non-Conventional Energy Resources' by G. D. Rai, Khanna Publishers

S151 - BUILDING TECHNOLOGY

VIIISEMESTER

COURSE OBJECTIVES

1. To learn the building bye laws and NBC regulations
2. To study the basic principles of architectural planning in construction practice
3. To study the suitable materials required for construction of buildings
4. To learn the new concepts of green buildings and smart buildings
5. To learn the concepts of low cost and energy efficient housing aspects

COURSE OUTCOMES

1. Aware of the building bye laws and NBC regulations
2. Grasp the basic principles of architectural planning in construction practice
3. Identify suitable materials required for construction of buildings
4. Familiar to the new concepts of green buildings and smart buildings
5. Familiar to concepts of low cost and energy efficient housing aspects

UNIT-I: BUILDING BYE LAWS AND NBC REGULATIONS

Introduction: Types of buildings, criteria for location and site selection, site plan and its detail, Components of building.

Building Bye Laws and NBC Regulations: Objective of bye-laws, Regulation regarding; means of access, lines of building frontages, covered area, floor area ratio, open spaces around buildings, height & sizes of rooms, plinth regulation and sanitation provisions

UNIT-II: PRINCIPLES OF PLANNING

Different factors affecting planning viz-aspect, prospect, furniture requirement, roominess, grouping, circulation, elegance, privacy, Bubble diagram approach for Residential buildings and non residential buildings.

UNIT-III: SELECTION OF BUILDING MATERIALS

Characteristic properties and selection of different building materials such as bricks, stones, tiles, wood, cement, concrete, steel, asbestos sheets, types of masonry –Role in building technology

Deterioration of buildings-Preventive maintenance in buildings-planning, Handling of cracks, dampness, corrosion

UNIT-IV: NEW APPROACHES

Green buildings-Benefits-Design Criteria-Building materials-Comparison and assessment with conventional buildings-Intelligent buildings-Components-Benefits-Design aspects-Alternate materials for building construction

UNIT-V: LOW COST HOUSING

Low cost housing-Concept-Rural housing-Housing in disaster prone areas-Low cost infra structural options-Social housing-Prefabricated housing-Energy efficient construction

TEXT BOOKS:

1. N. Kumara Swamy and A. Kameswara Rao, “Building Planning and Drawing”, Charotar Publications, 2013.
2. A K Lal, “Hand Book of Low Cost Housing”, New Age Publishing, 1995
3. A C Panchdhari, “Maintenance of Buildings”, New Age Publishing, 2005
4. National Building Code of India, 2005 (SP 7)

REFERENCE BOOKS/SITES:

1. S K Duggal, "Building materials", New Age International Publishers
2. P.C. Varghese, "Building materials", Prentice-Hall of India private Ltd, New Delhi
3. Andrew J Charlett, Maybery-Thomas, Craig, "Fundamental Building Technology", Routledge Publications, 2006.
4. http://www.urbanindia.nic.in/publicinfo/byelaws.htm

S436 - MODERN CONSTRUCTION SYSTEMS AND TECHNIQUES

VIIISEMESTER

COURSE OBJECTIVES

1. To learn the different low cost housing techniques
2. To study the foundation techniques used in low cost housing
3. To learn various practices of prestressing systems
4. To learn the different types of construction equipments
5. To study the bridge launching techniques

COURSE OUTCOMES

1. Get exposed to different low cost housing techniques
2. Get exposed to the foundation techniques used in low cost housing
3. Get exposed to various practices of prestressing systems
4. Learn about different types of construction equipments
5. Learn about bridge launching techniques

UNIT - I :LOW COST HOUSING

Introduction – Building Materials - Foundations - Walls - Roofs - Prefabrication - Case Study

UNIT - II :FOUNDATION SYSTEM

Introduction – Piling – Pier Construction – Caisson – Well Foundations – Footings Underpinning – Dewatering – Trenchless Techniques.

UNIT - III :PRESTRESSING SYSTEMS

Introduction – Principles and applications – Tensioning Devices – Pretensioning Systems – Hoyer's Long line system – Post Tensioning systems – Freyssinet, Gifford-Udall, Anderson and Magnel-blaton – Lee-McCall System – Thermo electric Pretensioning – Chemical Pretensioning – Ground anchors.

UNIT - IV :CONSTRUCTION EQUIPMENT PLANNING

Introduction – Earth moving equipments – Lifting equipments – Hauling Equipments – Paving Equipments – Productivity calculations.

UNIT - V: BRIDGE LAUNCHING TECHNIQUES

Introduction – Temporary and Enabling structures – Setting out of Bridges – Girder Erection – Balanced Cantilever Segmental construction – Cable Stayed Bridges – Fixing of Bearings – Case Study.

TEXT BOOKS

1. Krishnaraju N., "Prestressed Concrete", Tata McGraw Hill Publication, 2000.
2. Chudley R., "Construction Technology", [Vol. 3 and 4], ELBS Publisher, 2006
3. Madhava Rao A.G. and Ramachandra Murthy D.S.," Appropriate Low Cost Housing", Oxford & IBH Publication, 1997.
4. Johnson Victor, "Essentials of Bridge Engineering", Oxford & IBH Publication, 1995

REFERENCES

1. Horrison, "Construction Equipments Planning", Longman Publication.
2. Peurifoy, "Construction Methods and Planning", McGraw Hill Publication, 2000
3. Nainan P. Kurian, "Foundation Systems", Narosa Publication, 2005
4. Rakshit K.S., "Design and Construction of Highway Bridges", New Central Book Agency(P) Ltd, 2009
5. Modern Construction Techniques and Systems, NPTEL Video Lectures