ACADEMIC REGULATIONS
COURSE STRUCTURE
AND
DETAILED SYLLABUS

Civil Engineering

For

B. Tech. Four Year Degree Course
(Applicable for the batches admitted from 2014-15)
(MR-14 Regulations)

01

MALLA REDDY ENGINEERING COLLEGE
(AUTONOMOUS)

(An Autonomous institution, Autonomy granted by UGC and affiliated to JNTUH, Accredited by NAAC with 'A' Grade, Accredited by NBA (2008-11) & Recipient of World Bank Assistance under TEQIP phase – II S.C.1.1for the period (2011-14))
Maisammaguda, Dhulapally (Post. Via. Kompally), Secunderabad – 500 100.
Website: www.mrec.ac.in   Email: mrec.2002@gmail.com

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Academic Regulations for B. Tech. (Regular)

(MR14 Regulations)

(Effective for the students admitted into I year from the Academic year 2014-2015 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:

1.1 The candidate shall pursue a course of study for not less than four academic years and not more than eight academic years.

1.2 **After eight academic years of course of study, the candidate is permitted to write the Examinations for two more years.**

1.3 The candidate shall register for 224 credits and secure 216 credits with compulsory subjects as listed in Table-1.

Table 1: Compulsory Subjects

Serial Number	Subject Particulars
1	All practical subjects
2	Industry oriented mini project
3	Comprehensive Viva-Voce
4	Seminar
5	Project work

2. The students, who fail to fulfill all the academic requirements for the award of the degree within ten academic years from the year of their admission, shall forfeit their seats in   B. Tech. course.

3. **Courses of study**

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

Branch Code	Branch
1	Civil Engineering(CE)
2	Electrical and Electronics Engineering (EEE)
3	Mechanical Engineering(ME)
4	Electronics and Communication Engineering(ECE)
5	Computer Science and Engineering (CSE)
7	Mining Engineering(MNE)

4. **Credits**

	Semester	
	Periods/ Week	**Credits**
Theory	04	04
	--	--
Practical	03	02
Drawing	Theory - 02	04
	Practical - 03	
Mini Project	--	02
Comprehensive Viva Voce	--	02
Seminar	--	02
Project	15	10

5 **Distribution and Weightage of Marks**

5.1 The performance of a student in each semester shall be evaluated subject-wise for a maximum of 100 marks for a theory and 75 marks for a practical subject. In addition, industry-oriented mini-project, seminar, comprehensive viva and project work shall be evaluated for 50, 50, 100 and 200 marks, respectively.

5.2 For theory subjects the distribution shall be 25 marks for Internal Evaluation and 75 marks for the End- Examination.

5.3 For theory subjects, during a semester there shall be 2 mid-term examinations. Each mid- term examination consists of one objective paper, one essay paper and one assignment. The objective paper and the essay paper shall be for 10 marks each with a total duration of 1 hour 20 minutes (20 minutes for objective and 60 minutes for essay paper). The Objective paper is set with 20 bits of multiple choices and filling the blanks type of questions for a total of 10 marks. The essay paper shall contain 4 full questions out of which, the student has to answer 2 questions, each carrying 5 marks. While the first mid-term examination shall be conducted in First 2 1/2 units of the syllabus, the second mid-term examination shall be conducted in Remaining 2 1/2 units. Five (5) marks are allocated for Assignments (as specified by the subject teacher concerned). Assignment should be submitted before the end of the first mid-examination, and the second Assignment should be submitted before the conduct of the second mid-examination. The total marks secured by the student in each mid-term examination are evaluated for 25 marks, and the average of the two mid-term examinations shall be taken as the final marks secured by each student. If any student is absent for any subject of a mid-term examination, a re-exam will be conducted in the deserving cases based on the recommendations of College Academic Committee. The end examination will be conducted for 75 marks, which contains PART A and PART B. Part A for 25 marks contains 5 to 8 questions, each two marks and remaining are one mark questions covering the entire syllabus. Part B is for maximum of 50 marks with 5 questions covering from all units consisting of two parts each (a) and (b), Out of which the student has to answer either (a) or (b) not both. Each question in Part B carries 10 marks.

5.4 For practical subjects there shall be a continuous evaluation during a semester for 25 sessional marks and 50 end semester examination marks. Out of the 25 marks for internal evaluation, day-to-day work in the laboratory shall be evaluated for 15 marks and internal practical examination shall be evaluated for 10 marks conducted by the laboratory teacher concerned. The end semester examination shall be conducted with an external examiner and internal examiner. The external examiner shall be appointed by the principal / Chief Controller of examinations

5.5 For the subject having design and/or drawing (Machine Drawing) and Estimation, the distribution shall be 25 marks for internal evaluation (15 marks for day-to-day work and 10 marks for internal tests) and 75 marks for end semester examination. There shall be two internal tests in a Semester and the average of the two shall be considered for the award of marks for internal tests.

5.6 There shall be an industry-oriented Mini-Project, in collaboration with an industry of their specialization, to be taken up during the vacation after III year II Semester examination. However, the mini-project and its report shall be evaluated along with the project work in IV year II Semester. The industry oriented mini-project shall be submitted in a report form and presented before the committee. It shall be evaluated for 50 marks. The committee consists of an **External Examiner**, head of the department, and the supervisor of the mini-project and a senior faculty member of the department. There shall be no internal marks for industry-oriented mini-project.

5.7 There shall be a seminar presentation on specific Applied Engineering Topic in IV year II Semester. For the seminar, the student shall collect the information on a specialized topic and prepare a technical report, showing his understanding of the topic, and submit it to the department. It shall be evaluated by the departmental committee consisting of head of the department, seminar supervisor and a senior faculty member. The seminar report shall be evaluated for 50 marks. There shall be no external examination for the seminar.

5.8 There shall be a Comprehensive Viva-Voce in IV year II semester. The Comprehensive Viva-Voce will be conducted by a Committee consisting of Head of the Department and two Senior Faculty members of the Department. The Comprehensive Viva-Voce is intended to assess the students understanding of the subjects he studied during the B. Tech. course of study. The Comprehensive Viva-Voce is evaluated for 100 marks by the Committee. There are no internal marks for the Comprehensive Viva-Voce.

5.9 Out of a total of 200 marks for the project work, 50 marks will be allotted for Internal Evaluation and 150 marks for the End Semester Examination (Viva Voce). The End Semester Examination of the project work shall be conducted by the same committee as appointed for the industry-oriented mini-project. In addition, the project supervisor shall also be included in the committee. The topics for industry oriented mini project, seminar and project work shall be different from one another. The evaluation of project work shall be made at the end of the IV year II Semester. The Internal Evaluation shall be on the basis of two seminars given by each student on the topic of his project.

5.10 Laboratory marks and the sessional marks awarded by the concerned teacher are subjected to scrutiny and scaling by the Principal / Chief Controller of examinations wherever necessary. In such cases, the sessional and laboratory marks awarded by the concerned teacher will be referred to a Committee headed by principal consisting of HOD, senior professor in that particular department. The Committee will arrive at a scaling factor and the marks will be scaled as per the scaling factor. The recommendations of the Committee are final and binding. The internal test papers including Lab end exam test papers shall be preserved in the exam branch for a minimum period of 6 years from the commencement of the batch, as per the University norms and shall be produced to the Committees as and when the same are asked for.

6 Attendance Requirements

6.1 A student shall be eligible to appear for End examinations only if he acquires a minimum of 75% of attendance in aggregate of all the subjects.

6.2 **Shortage of Attendance below 65% in aggregate shall in NO case be condoned.**

6.3 Condonation of shortage of attendance in aggregate up to 10% amounting to 65% and above and below 75% in each semester may be granted by the College Academic Committee.

6.4 A student will not be promoted to next semester unless he satisfies the attendance requirement of the present semester as applicable.

6.4 A student who is short of attendance in a semester has to seek re-admission into that semester as and when offered within 4 weeks from the date of the commencement of class work.

6.5 Students whose shortage of attendance is not condoned in any semester are not eligible to write their end semester examination of that class and their registration Stands cancelled.

6.6 A stipulated fee shall be payable towards condonation of shortage of attendance.

6.7 A student will be promoted to the next semester if he satisfies the attendance requirement of the present semester, as applicable, including the days of attendance in sports, games, NCC and NSS activities.

6.8 If any candidate fulfills the attendance requirement in the present semester, shall not be eligible for readmission into the same class.

7. <u>Minimum Academic Requirements</u>

The following academic requirements have to be satisfied in addition to the attendance requirements mentioned in item no.6.

7.1 A student is 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 35% of marks in the end semester exam, and minimum 40% of marks in the sum total of the mid-term and end semester exams.

7.2 A student shall be promoted from II to III year only if he fulfills the academic requirement of

34 credits (out of 84 credits) secured from all Regular and Supplementary examinations conducted upto second year first semester examination.

<center>(or)</center>

44 credits (out of 112) secured from all Regular and Supplementary examinations conducted upto second year second semester examination.

7.3 A student shall be **promoted from III year to IV year** only if he fulfills the academic requirements of

56 credits (out of 140 credits) secured from all Regular and Supplementary examinations conducted upto Third year First semester examination.

<center>(or)</center>

68 credits (out of 168) secured from all Regular and Supplementary examinations conducted upto Third year Second semester examination.

7.4 A student shall register and put up minimum attendance in all 224 credits and earn 216 credits. Marks obtained in the best 216 credits shall be considered for the calculation of percentage of marks.

7.5 Students who fail to earn 216 credits as indicated in the course structure within ten academic years (8 years of study + 2 years additionally for appearing for exams only) from the year of their admission, shall forfeit their seat in B.Tech. Course and their admission stands cancelled.

8 <u>Course pattern</u>

8.1 The entire course of study is for four academic years. All 4 years on semester pattern.

8.2 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 during the period of supplementary exams.

8.3 When a student is detained for lack of credits/shortage of attendance, he may be re-admitted into the next semester. However, the academic regulations under which he was readmitted shall continue to be applicable to him.

9   Award of Class

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

Class Awarded	% of marks to be secured	
First Class with Distinction	70% and above	From the aggregate marks secured from 216 Credits.
First Class	Below 70 but not less than 60%	
Second Class	Below 60% but not less than 50%	
Pass Class	Below 50% but not less than 40%	

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

10   Minimum Instruction Days

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

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

12   Transfer from other colleges will be permitted, as per the rules stipulated by the affiliating University and the State government.

13   WITHHOLDING OF RESULTS

If the student has not paid the dues, if any, to the college or if any case of indiscipline is pending against him, the result of the student will be withheld and he will not be allowed into the next semester. His degree will be withheld in such cases.

14.   TRANSITORY REGULATIONS

14.1 Discontinued, detained, or failed candidates are eligible for readmission into that Semester as and when next offered.

14.2 After the revision of the regulations, the students of the previous batches will be given two chances for passing in their failed subjects, one supplementary and the other regular. If the students cannot clear the subjects in the given two chances, they shall be given equivalent subjects as per the revised regulations which they have to pass in order to obtain the required number of credits.

14.3 In case of transferred students from other Universities, the credits shall be transferred to MREC (A) as per the academic regulations and course structure of the MREC (A).

15.   GENERAL

15.1 Wherever the words he, him, his, occur in the regulations, they include she, her, hers.

15.2 The academic regulation should be read as a whole for the purpose of any interpretation.

15.3 In case of any doubt or ambiguity in the interpretation of the above rules, the decision of the College Academic Committee is final.

15.4 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 Academic Committee.

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15.5. The students seeking transfer to MREC from various other Universities / Institutions have to pass the failed subjects which are equivalent to the subjects of MREC, and also pass the subjects of MREC which the candidates have not studied at the earlier Institution on their own without the right to sessional marks. Further, though the students have passed some of the subjects at the earlier institutions, if the same subjects are prescribed in different semesters of MREC, the candidates have to study those subjects in MREC in spite of the fact that those subjects are repeated.

MALLA REDDY ENGINEERING COLLEGE (AUTONOMOUS)
Maisammaguda, Dhulapally (Post via. Kompally), Secunderabad - 500100
ACADEMIC REGULATIONS FOR B. TECH
(LATERAL ENTRY SCHEME)
(Effective for the students admitted into II year from the Academic year 2015-2016 onwards)

1 **Eligibility for award of B. Tech. Degree (LES)**

    I. The LES candidates shall pursue a course of study for not less than three academic years and not more than six academic years.

    II. They shall be permitted to write the examinations for two more years after six academic years of course work.

2. The candidate shall register for 168 credits and secure 160 credits from II to IV year B.Tech. Program (LES) for the award of B.Tech. Degree with compulsory subjects as listed in Table-1

Serial Number	Subject Particulars
1	All practical subjects
2	Industry oriented mini project
3	Comprehensive Viva-Voce
4	Seminar
5	Project work

Table 1: Compulsory Subjects

3. The students, who fail to fulfill the requirement for the award of the degree in 8 consecutive academic years (6 years of study + 2 years additionally for appearing exams only) from the year of admission, shall forfeit their seats.

4. The attendance regulations of B. Tech. (Regular) shall be applicable to B.Tech. (LES).

5. **Promotion Rule**

  A student shall be promoted from second year to third year if he fulfills the minimum attendance requirement.

  A student shall be promoted from III year to IV year only if he fulfills the academic requirements of

  34 credits (out of 84 credits) secured from all Regular and Supplementary examinations conducted upto Third year First semester examination

<div align="center">(or)</div>

  44 credits (out of 112) secured from all Regular and Supplementary examinations conducted upto Third year Second semester examination.

6. **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:

Class Awarded	% of marks to be secured	
First Class with Distinction	70% and above	**From the aggregate marks secured from 160 Credits from II year to IV year.**
First Class	Below 70 but not less than 60%	
Second Class	Below 60% but not less than 50%	
Pass Class	Below 50% but not less than 40%	

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

7. 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

DISCIPLINARY ACTION FOR / IMPROPER CONDUCT IN EXAMINATIONS

	Nature of Malpractices/Improper conduct	Punishment
	If the candidate:	
1. (a)	Possesses or keeps accessible in examination hall, any paper, note book, programmable calculators, Cell phones, pager, palm computers or any other form of material concerned with correlated to the subject of the examination (theory or practical) in which he is appearing but has not made use of (material shall include any marks on the body of the candidate which can be used as an aid in the subject of the examination).	Expulsion from the examination hall and cancellation of the performance in that subject only.
b)	Gives assistance or guidance or receives it from any other candidate orally or by any other body language methods or communicates through cell phones with any candidate or persons in or outside the exam hall in respect of any matter.	Expulsion from the examination hall and cancellation of the performance in that subject only of all the candidates involved. In case of an outsider, he will be handed over to the police and a case is registered against him.
2	Has copied in the examination hall from any paper, book, programmable calculators, palm computers or any other form of material relevant to the subject of the examination (theory or practical) in which the candidate is appearing.	Expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted to appear for the remaining examinations of the subjects of that Semester/year. The Hall Ticket of the candidate is to be cancelled and sent to the University.

3	Impersonates any other candidate in connection with the examination.	The candidate who has impersonated shall beexpelledfrom examination hall. The candidate is also debarred and forfeits the seat. The performance of the original candidate who has been impersonated, shall be cancelled in all the subjects of the examination (including practical's and project work) already appeared and shall not be allowed to appear for examinations of the remaining subjects of that semester/year. The candidates also debarred for two consecutive semesters from class work and all University examinations. The continuation of the course by the candidate is subject to the academic regulations in connection with forfeiture of seat. If the imposter is an outsider, he will be handed over to the police and a case is registered against him.
4	Smuggles in the Answer book or additional sheet or takes out or arranges to send out the question paper during the examination or answer book or additional sheet, during or after the examination.	Expulsion from the examination hall and cancellation of performance in that subject and all the other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year. The candidate is also debarred for two consecutive semesters from class work and all University examinations. The continuation of the course by the candidate is subject to the academic regulations in connection with forfeiture of seat.
5	Uses objectionable, abusive or offensive language in the answer paper or in letters to the examiners or writes to the examiner requesting him to award pass marks.	Cancellation of the performance in that subject.

6	Refuses to obey the orders of the Chief Superintendent/Assistant Superintendent / any officer on duty or misbehaves or creates disturbance of any kind in and around the examination hall or organizes a walk out or instigates others to walk out, or threatens the officer-in charge or any person on duty in or outside the examination hall of any injury to the person or to any of his relations whether bywords, either spoken or written or by signs or by visible representation, assaults the officer-in charge, or any person on duty in or outside the examination hall or any of his relations, or indulges in any other act of misconduct or mischief which result in damage to or destruction of property in the examination hall or any part of the College campus or engages in any other act which in the opinion of the officer on duty amounts to use of unfair means or misconduct or has the tendency to disrupt the orderly conduct of the examination.	In case of students of the college, they shall be expelled from examination halls and cancellation of their performance in that subject and all other subjects the candidate(s) has (have) already appeared and shall not be permitted to appear for the remaining examinations of the subjects of that semester/year. The candidates also are debarred and forfeit their seats. In case of outsiders, they will be handed over to the police and a police cases registered against them.
7	Leaves the exam hall taking away answer scripter intentionally tears of the script or any part thereof inside or outside the examination hall.	Expulsion from the examination hall and cancellation of performance in that subject and all the other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year. The candidate is also debarred for two consecutive semesters from class work and all University examinations. The continuation of the course by the candidate is subject to the academic regulations in connection with forfeiture of seat.
8	Possess any lethal weapon or firearm in the examination hall.	Expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year. The candidate is also debarred and forfeits the seat.

9	If student of the college, who is not a candidate for the particular examination or any person not connected with the college indulges in any malpractice or improper conduct mentioned in clause 6 to 8.	Student of the colleges expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year. The candidate is also debarred and forfeits the seat. Person(s) who do not belong to the College will be handed over to police and, a police case will be registered against them.
10	Comes in a drunken condition to the examination hall.	Expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year.
11	Copying detected on the basis of internal evidence, such as, during valuation or during special scrutiny.	Cancellation of the performance in that subject and all other subjects the candidate has appeared including practical examinations and project work of that semester/year examinations
12	If any malpractice is detected which is not covered in the above clauses 1 to 11 shall be reported to the University for further action toward suitable punishment.	

MALLA REDDY ENGINEERING COLLEGE

(Autonomous)
Maisammaguda, Dhulapally, (Post Via Kompally), Secunderabad – 500 100.
Proposed Schema for I B.Tech
Non Circuit Branches (CE,ME and Mining)
MR 14 B.TECH.CIVIL ENGINEERING

COURSE STRUCTURE

I YEAR I SEMESTER

Code	Subject	L	T	P	C
40E01	English	3	-	-	3
40P01	Engineering Physics - I	4	-	-	4
40C01	Engineering Chemistry - I	3	-	-	3
40M01	Mathematics - I	4	-	-	4
40501	Computer Programming	4	-	-	4
40301	Engineering Drawing - I	4	1	3	4
40502	Computer Programming Lab	-	-	3	2
40C03	Engineering Chemistry Lab	-	-	3	2
40E03	English Language Communication Skills Lab	-	-	3	2
	Total	**20**	**1**	**12**	**28**

I YEAR II SEMESTER

Code	Subject	L	T	P	C
40E02	English & Professional Ethics	4	1	-	4
40P02	Engineering Physics - II	3	-	-	3
40C02	Engineering Chemistry - II	3	-	-	3
40M02	Mathematics - II	4	-		4
40302	Engineering Mechanics	4	-	-	4
40303	Engineering Drawing - II	2	-	3	4
40P03	Engineering Physics Lab	-	-	3	2
40304	Auto CAD Lab & EM Lab	-	-	3	2
40305	Engineering & IT Workshop	-	-	3	2
	Total	**20**	**1**	**12**	**28**

II YEAR I SEMESTER

Code	Subject	L	T/P/D	C
40M03	Mathematics –III	4	-	4
40101	Strength of Materials –I	4	-	4
40102	Surveying	4	-	4
40103	Fluid Mechanics	4	-	4
40104	Building Materials, Construction & Planning	4	-	4
40105	Environmental Studies	4	-	4
40106	Surveying Lab- I	-	3	2
40107	Strength of Materials Lab	-	3	2
	Total	**24**	**6**	**28**

II YEAR II SEMESTER

Code	Subject	L	T/P/D	C
40M05	Probability & Statistics	4	-	4
40108	Hydraulics & Hydraulic Machinery	4	-	4
40109	Strength of Materials - II	4	-	4
40230	Electrical & Electronics Engineering	4	-	4
40110	Structural Analysis –I	4	-	4
40B01	Managerial Economics and Financial Analysis	4	-	4
40111	Computer Aided Drafting of Buildings	-	3	2
40112	Surveying Lab- II	-	3	2
	Total	**24**	**6**	**28**

III YAER I SEMESTER

Code	Subject	L	T/P/D	C
40113	Concrete Technology	4	-	4
40114	Reinforced Concrete Structures Design and Drawing	4	-	4
40115	Geotechnical Engineering	4	-	4
40116	Water Resources Engineering-I	4	-	4
40117	Structural Analysis -II	4	-	4
	Open Elective			
401A1	Disaster management			
40B04	Human values and professional ethics	4	-	4
40B05	Intellectual property rights			
40118	Fluid Mechanics & Hydraulic Machinery Lab	-	3	2
40E07	Advanced Communication Skills Lab	-	3	2
	Total	**24**	**6**	**28**

III YEAR II SEMESTER

Code	Subject	L	T/P/D	C
40119	Steel Structures Design and drawing	3	2	4
40120	Environmental Engineering	4	-	4
40121	Transportation Engineering-I	4	-	4
40122	Foundation Engineering	4	-	4
40123	Engineering Geology	4	-	4
	Elective I			
401B1	Elements of Earthquake Engineering			
401B2	Ground Improvement Techniques			
401B3	Ground Water Hydrology	4	-	4
401B4	Environmental impact assessment			
40B06	Principles of Entrepreneurship			
40124	Geotechnical Engineering Lab	-	3	2
40125	Engineering Geology lab	-	3	2
	Total	**24**	**8**	**28**

IV YEAR I SEMESTER

Code	Subject	L	T/P/D	C
40126	Remote Sensing & GIS	4	-	4
40127	Transportation Engineering-II	4	-	4
40128	Estimating & Costing	4	-	4
40129	Water Resources Engineering-II	4	-	4
	Elective-II			
401C1	Finite Element Methods			
401C2	Advanced Foundation Engineering	**4**	**-**	**4**
401C3	Watershed Management			
401C4	Air Pollution and Control			
	Elective-III			
401D1	Advanced Structural Design			
401D2	Earth and Rock fill Dams	**4**	**-**	**4**
401D3	Water Resources Systems Analysis			
401D4	Industrial Waste Water Treatment			
40130	Concrete and Highway Materials lab	-	3	2
40131	Environmental Engineering Lab	-	3	2
	Total	**24**	**6**	**28**

IV YEAR II SEMESTER

Code	Subject	L	T/P/D	C
40132	Prestressed Concrete structures	4	-	4
40133	Construction Management	4	-	4
	Elective-IV			
401E1	Rehabilitation and Retrofitting of structures	4	-	4
401E2	Geo-Environmental Engineering			
401E3	Design and Drawing of Irrigation Structures			
401E4	Solid Waste Management			
401E5	Pavement Design			
40134	Industry oriented mini project	-	-	2
40135	Seminar	-	6	2
40136	Project	-	15	10
40137	Comprehensive viva	-	-	2
	Total	**12**	**21**	**28**

Note: All End Examinations (Theory and Practical) are of three hours duration.

T-Tutorial   L – Theory   P – Practical   D-Drawing   C-credit

MALLA REDDY ENGINEERING COLLEGE
(Autonomous)

I YEAR I SEMESTER   **L T/P/D C**
                                                              3 -/-/- 3

ENGLISH
(Common for CE, ME, MINING, ECE, EEE and CSE)

INTRODUCTION:

There is an increasing concern over the English language competency of Engineering students based on their academic and professional performance. The transformation and the mistreatment of language in the social networking over the last decade have greatly affected the language skills of the students. In keeping with the language skill deficiencies, the present syllabus is designed to hone not only the traditional LSRW skills but also their analytical skills that enable to think too in English. This effective approach to develop English Language competency among the Engineering students aims to kindle the thinking skills to communicate effectively. The classroom activities based on the textbook may be used to build confidence among the students as they become active participants and teachers taking the role of a facilitator.

In the English classes, the focus is on the grammar, vocabulary, reading and, writing. For this the teachers should use the text prescribed for detailed study. For example, the students should be encouraged to read the texts/selected paragraphs silently. The teachers can ask comprehension questions to stimulate discussion and based on the discussions students can be made to write short paragraphs/essays etc. The focus is on language error detection as well as correction along with honing vocabulary, reading skills, and writing skills.

The text is for extensive reading/reading for pleasure. Hence, it is suggested that they read it on their own the topics selected for discussion in the class. The time should be utilized for working out the exercises given after each section, as also for supplementing the exercises with authentic materials of a similar kind for example, from newspaper articles, advertisements, promotional material etc.. However, the stress in this syllabus is on skill development, fostering ideas and practice of language skills.

OBJECTIVES:

a. To facilitate for the improvement of the language proficiency of the students in English with emphasis on Reading and writing skills.

b. To equip the students to study academic subjects more effectively using the theoretical and practical components of the English syllabus.

c. Analysing intensive reading strategies and discussing how to distinguish between facts and opinions and draw inferences.

d. Enable the students to improve effective writing skills.

f. To develop English Language communication skills in formal and informal situations.

SYLLABUS:

TEXTBOOK PRESCRIBED:

In order to improve the proficiency of the student in the acquisition of Grammar error free language , the following text and course content, divided into Five Units, is prescribed.

1. Text book **English Today** by K.Durga Bhavani & Co. Published by Foundation Books

For Grammar practice

2. **A Work Book on English Grammar and Composition** published by Tata Mac Graw –Hill , New Delhi 2012.

3. Headway's **Academic Skills-reading, writing and study skills-**Level-2 student's book. Oxford publications

UNIT –I:

Chapters entitled 'Competition Matters' and 'Light Pollution' from **English Today**, Published by Foundation Books

Vocabulary:- parts of speech

Grammar:- Articles, Prepositions

Reading :- Introduction to Reading Skills, reading comprehension.

Writing:- Introduction to writing skills, characteristics of effective writing

UNIT –II

Chapters entitled 'Key to Courage' and 'The Eternal Pilgram' from **English Today**, Published by Foundation Books

Vocabulary:– formation of words, prefixes, suffixes and root words,

Grammar: -Tense, aspect and concord

Reading-Skimming and Scanning

Writing: paragraph writing- use of cohesive devises

UNIT –III

Chapters entitled 'The Wonders of the New Millennium' and The Lost Child' from **English Today**, Published by Foundation Books

Reading: reading for details.

Grammar: integrated exercises in error detection and correction in tenses and concord.

Vocabulary: homonyms and homophones

Writing: paragraph writing and arranging jumbled sentences into paragraphs

UNIT –IV

Chapters entitled 'A Special Kind of Blessing' and 'How to avoid an Argument' from **English Today**, Published by Foundation Books

Grammar: voice – exercises

Vocabulary: phrasal verbs.

Reading: Note making

Writing: notice and circular writing

UNIT –V

Chapters entitled 'Food: Family and Culture' and 'English in India Today: Some Views' from **English Today**, Published by Foundation Books

Grammar: speech- exercises,

Vocabulary: idiomatic expressions

Reading: reading for specific purposes

Writing: Letter writing- both formal and informal.

* Exercises from the texts not prescribed shall also be used for classroom tasks.

LEARNING OUTCOMES:

1. Usage of English Language, written and spoken.

2. Enrichment of language accuracy and fluency.

3. Gaining confidence in using flawless English language and skills for writing in real life situations..

REFERENCE BOOKS:

1. Murphy English Grammar (Intermediate)
2. Basic English by Michael Swan
3. Practical English Grammar by Thomson & Martinet
4. Understanding and Using English Grammar by Betty Schrampfer Azar
5. A Communicative Grammar of English by Geoffrey N. Leech
6. Practical English Usage by Michael Swan
7. Oxford Word Skills Basic by Ruth Gairns
8. Improve Your Written English by Marion Field
9. A Student's Introduction to English Grammar (South Asian Edition) 1st Edition by Author: Rodney Huddleston, Geoffrey K. Pullum
10. Essential English Grammar: A Self-Study Reference and Practice Book for Intermediate   Students of English with Answers 2nd Edition by Murphy
11. Better English Revised Edition 1st Edition by Norman Lewis
12. Learn English: A Fun Book of Functional Language, Grammar, and Vocabulary 1st Edition (Paperback) by Santanu Sinha Chaudhuri, Tata McGraw Hill Education
13. OXFORD GUIDE TO ENGLISH GRAMMAR 1st Edition by John Eastwod
14. How to Write Correct English (Applied English Grammar) by Rajendra Prasad Sinha
15. Collins Easy Learning Grammar & Punctuation by HarperCollins
16. Vocabulary word power made easy by Norman Lewis

MALLA REDDY ENGINEERING COLLEGE
(Autonomous)

I YEAR I SEMESTER   L T/P/D   C
                                                                            4 -/-/-   4

ENGINEERING PHYSICS – I
(Common to all branches)

Course Objectives:

1. To teach the students classification of materials based on the arrangement of atoms, basic concepts of crystallography.
2. To make the students learn the concepts of defects in crystals.
3. To make the students understand the concept of SHM, and different kinds of oscillations.
4. To teach the students the concept of dual nature of matter and experimental support to this concept
5. To expose the students to classical free electron theory and quantum free electron theory and their drawbacks.
6. To teach the students the Band theory and classification of materials based on band theory.
7. To make the students understand the concepts of Fermi level and charge carrier concentrations in semi conductors.
8. To make the students get acquainted with the p n junction diode and its characteristics.
9. To teach the basics of Electromagnetic theory.

UNIT – I
CRYSTALLOGRAPHY AND CRYSTAL STRUCTURES:
Classification of materials – Crystalline, Amorphous, Poly crystalline; Lattice point, Space Lattice, Basis, Crystal structure, Unit Cell, Crystallographic axes, Lattice Parameters; Crystal Systems – Bravais Lattices; Atomic Radius, Co-ordination Number and Packing Factor of SC, BCC, FCC and Diamond structures; Crystal Planes and Directions - Miller Indices, Expression for interplanar distance in cubic system

DEFECTS IN CRYSTALS:
Defects and their classification; Point Defects – Vacancies, Interstitial, Impurities, Electronic defects; Qualitative discussion of Schottky and Frenkel defects; Qualitative treatment of line defects (Edge and Screw dislocations); Burger's Vector

UNIT – II
OSCILLATIONS :
Introduction; Differential equation for S.H.M. and its solution; velocity and acceleration; expression for period and frequency; graphs of displacement, velocity and acceleration; energy of the simple oscillator; Damped oscillations – under damping, critical damping and over damping; Qualitative treatment of Forced vibrations; sharpness of resonance, Qualitative treatment of electrical oscillator circuit containing inductor, capacitor and resistor

UNIT – III
PRINCIPLES OF QUANTUM MECHANICS:
Waves and Particles - de Broglie's concept of Matter Waves; Davisson and Germer's experiment; G.P.Thomson's experiment. Heisenberg's Uncertainty Principle; Schrödinger's Time Independent Wave Equation - Physical Significance of the Wave Function; Energy of a particle in a one dimensional infinite potential well.

BAND THEORY OF SOLIDS:
Qualitative discussion of Classical free electron theory; Expression for electrical conductivity of metals; Qualitative discussion of Quantum free electron theory; Electron in a periodic Potential (Bloch Theorem), Kronig-Penny Model (Qualitative Treatment), Origin of energy Band formation in solids, Classification of materials into Conductors, Semi Conductors & Insulators, Concept of effective mass of an electron
UNIT – IV
SEMICONDUCTOR PHYSICS:
Introduction, Classification of Semiconductors; Formation of p type and n type materials; Charge carrier concentration in Intrinsic semiconductors; Qualitative treatment of charge carrier concentration in Extrinsic semiconductors; Qualitative treatment of Fermi Level in Intrinsic and Extrinsic Semiconductors; Direct & Indirect Band Gap Semiconductors; Hall Effect; formation of p n junction diode; forward bias and reverse bias, I-V characteristics of pn junction diode; Zener Break down, Avalanche Break down

UNIT – V

ELECTRO MAGNETIC THEORY:
Scalar and Vector fields, Gradient of Scalar field and its physical significance; Divergence and Curl of Vector field; Ampere's Law, Faraday's Law of electromagnetic induction; Induced E.M.F. in a conductor; Lenz's Law, Displacement current, Maxwell equations in differential and integral form, wave equation .

Course Outcomes:

1. Students shall learn the classification of materials into three categories. With an emphasis on Crystals, they shall learn the concepts of unit cell and Bravais lattices and evaluation of packing factors for different cubic structures and diamond structure.
2. Students shall learn in detail about various point defects like Vacancies, interstitials etc and extend their understanding up to one dimensional defect like Edge and screw dislocations.
3. Student shall understand and appreciate the physics behind the mathematical equations that govern free oscillations, damped oscillations and forced oscillations. Also they shall understand the concept of resonance
4. Students shall get introduced to the fascinating world of quantum mechanics with the basic and key concepts like de Broglie's concept of matter waves and the experimental support given by Davisson and Germer and G.P.Thomson and learn to solve the Particle in one dimensional infinite potential well problem.
5. Students shall learn the Kronig – Penney model which gives rise to Band theory of solids. Also they understand the concept of effective mass of electron.
6. Students shall learn the mathematical treatment of charge carrier concentration in intrinsic and extrinsic semi conductors. Also they shall learn a very interesting phenomenon called Hall Effect and its applications besides learning pn junction diode, its characteristics and the associated breakdown mechanisms.
7. They shall be able to understand the Faraday's laws of electromagnetism and get introduced to Maxwell's equations.

TEXT BOOKS:

1. Modern Engineering Physics by K. Vijaya Kumar, S. Chandralingam: S. Chand & Co.Ltd
2. Engineering Physics – P.K.Palanisamy - SciTech Publications Pvt. Ltd., 5th Print 2008.
3. Applied Physics – S.O. Pillai & Sivakami-New Age International (P) Ltd., 2nd Edition 2008.
4. Unified Physics Vol – I by S L Gupta and Sanjeev Gupta JNPN Publications.
5. Engineering Physics by B K Panedy, S Chaturvedi, Cengage learning

REFERENCES:

1. Solid State Physics – M. Armugam (Anuradha Publications).
2. A Text Book of Engg Physics – M. N. Avadhanulu & P. G. Khsirsagar– S. Chand & Co. (for acoustics).
3. Introduction to Solid State Physics – C. Kittel (Wiley Eastern).
4. Basic Electronics and Linear Circuits by D C Kulshreshtha, S C Gupta, N N Bhargava, TTTI, Chandigarh
5. Solid State Physics – A.J. Dekker (Macmillan).
6. Applied Physics – T. Bhima Shankaram & G. Prasad (B.S. Publications, Third Edition 2008).
7. A text book of Engineering Physics – S.P. Basvaraju – Subhas store
8. Electricity and magnetism by Edward Purcell – Berkeley series vol 2
9. Physics Vol 2 – Resnick, Halliday & Krane – Fifth edition, Wiley Student edition.
10. Physics – B.Sc. First Year by Dr B Sanjeeva Rao, et al, Telugu Akademi

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I YEAR I SEMESTER   L T/P/D   C

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ENGINEERING CHEMISTRY – I
(Common for all branches)

Course objectives:

1. To make the students to understand the basic concepts of chemistry to develop futuristic materials for high-tech application in the area of engineering.
2. Explore the economically viable technologies developed for utilizing water resources and recycle them. To provide basic skills in chemical analysis of water and materials.
3. Study of chemistry of portable energy storage devices like various conventional as well as modern batteries and their usage in different aspects of life.
4. Gain the knowledge of corrosion science and anti corrosive techniques to protect faster corrosion and monitoring of corrosion.
5. To predict and control properties through an understanding of atomic, molecular, crystalline and microscopic structures of engineering materials.

UNIT –I

WATER TECHNOLOGY - I

Hardness of Water: Causes of hardness, expression of hardness – units – types of hardness, estimation of temporary & permanent hardness of water by EDTA method - numerical problems. Boiler troubles – Scale & sludges, Priming and foaming, caustic enbrittlement and boiler corrosion; Treatment of boiler feed water – Internal treatment (Phosphate, Colloidal, carbonate and calgon conditioning) .

UNIT- II

WATER TECHNOLOGY -II

External treatment – Lime Soda process, Zeolite process and ion exchange process. Numerical Problems. Potable Water-Its Specifications – Steps involved in treatment of potable water – Disinfection of water by chlorination and ozonisation. Reverse osmosis, Electro dialysis and their significance.

UNIT-III

ELECTROCHEMISTRY

Electro Chemical Cells: EMF: Galvanic Cells, types of Electrodes – (Calomel, Quinhydrone and glass electrodes); Nernst equation and its applications ; concentration cells; classification with examples, electro chemical series, Potentiometric titrations, determination of p^H using glass electrode-Numerical problems. Batteries: Primary cells (dry cells) and secondary cells (lead-Acid cell, Ni-Cd cell). Applications of batteries. Fuel cells – Hydrogen – Oxygen fuel cell; Advantages and Applications.

UNIT-IV

CORROSION AND ITS CONTROL:

Causes and effects of corrosion; Theories of corrosion – Chemical & Electrochemical corrosion; Types of corrosion (Galvanic, Water line, Pitting and Inter granular); Factors affecting rate of corrosion – Nature of metal and Nature of Environment – Corrosion control methods – Cathodic protection (sacrificial anodic and impressed current). Surface

coatings: Metallic coatings & methods of application of metallic coatings - hot dipping (galvanization & tinning), Cementation, cladding, electroplating (copper plating) Electro less plating (Ni plating**).**

UNIT- V

MATERIAL CHEMISTRY:

Lubricants: Classification with examples- Characteristics of a good lubricant & properties of lubricants: viscosity, Cloud point, flash and fire points. Refractories: Classification, characteristics of a good refractory and applications. Nanomaterials: Introduction, preparation by sol-gel & chemical vapor deposition methods. Applications of nano materials.

Course Outcomes:

1. Analyze the water samples and will have the knowledge to prepare potable water using different techniques.
2. Have concept on different batteries & fuel cells and their Applications.
3. Interpret the reasons of corrosion and will be monitor them by using the proper technique
4. Be able to apply core concepts in Materials Science to solve engineering problems.

TEXT BOOKS:

1. P. C. Jain and Monica Jain, A text Book of Engineering Chemistry, Dhanapat Rai Publications, New Delhi, 12th Edition 2006.
2. R.V. Gadag and Nithyananda Shetty, A text Book of Engineering Chemistry. I.K International publishing house. Edition 2012.

REFERENCE BOOKS:

1. F.W. Billmeyer, Text Book of Polymer Science, John Wiley & Sons, 4nd Edition, 1996.
2. M.G. Fontana, N. D. Greene, Corrosion Engineering, McGraw Hill Publications, New York, 3rd Edition, 1996.
3. Principles of Physical Chemistry B.R.Puri, L.R.Sharma & M.S.Pathania, S.Nagin Chand &Co., (1993)., (23rdedition) New Delhi.

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I YEAR I SEMESTER   L T/P/D   C
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MATHEMATICS – I
(Theory of Matrices & ODE)
(Common for CE, ME, MINING, ECE, EEE and CSE)

Course Objectives:

1. Finding inverse of a matrix by elementary transformations
2. Solving system of simultaneous equations
3. Calculate the powers of the matrix & Calculate the inverse of the matrix by CHT
4. Know about the properties of the Eigen values and Vectors, Quadratic forms
5. Know the Applications of second order differential equations
6. Converts a real life problem into a differential equation

UNIT – I
MATRICES AND LINEAR SYSTEMS OF EQUATIONS
Rank of the matrix - Elementary transformations –Echelon form - Normal form – PAQ Form - Inverse from Elementary matrices – Solution of Linear Systems – Consistency of Linear system of equations – Linear and Orthogonal Transformations –Linearly independent and dependent of vectors-LU Decomposition- LU Decomposition from Gauss Elimination –Solution of Tri-diagonal Systems

UNIT – II
EIGEN VALUES, EIGEN VECTORS, COMPLEX MATRICES
Eigen values, Eigen vectors – properties – Cayley-Hamilton Theorem (without Proof) - Inverse and powers of a matrix by Cayley-Hamilton theorem. Diagonolization of matrix-Calculation of powers of matrix – Modal and spectral matrices. Real matrices – Symmetric, skew – symmetric.
Complex Matrices: Hermitian, Skew-Hermitian and Unitary – Eigen values and Eigen vectors of complex matrices and their properties.

UNIT – III
QUADRATIC FORMS, ORDINARY DIFFERENTIAL EQUATIONS OF FIRST ORDER
G^{-1} – MP inverse- Singular value decomposition
Quadratic forms , Reduction of quadratic form to canonical form – Rank- Nature - index – signature of Quadratic forms.
Applications of First Order Differential Equations: Orthogonal trajectories, Newton's Law of cooling, Law of natural growth and decay.

UNIT – IV
DIFFERENTIAL EQUATIONS OF SECOND & HIGHER ORDER
Definitions- Complete Solutions –Rules for finding Complementary function-Particular integral (R.H.S of the type e^{ax} , $Sin\ ax$, $Cos\ ax$, $Polynomial\ in\ x$, $e^{ax}V(x)$, $x^m v(x)$) and Method of variation of Parameters.

UNIT – V
LAPLACE TRANSFORMS
Definition of Laplace transform, Condition for existence –L.T. of standard functions –Properties of L.T. Transforms of Periodic function , derivatives and integrals – Multiplication by t^n - division by t -Evalution of Integrals - Inverse Transforms- Other methods of finding Inverse Transforms . Convolution theorem –Application of Laplace transforms to ordinary differential equations - Dirac's delta function – Unit step function .

Course Outcomes:

1. Applies the Theory of Matrices in solving n number of equations
2. Understands how to convert problems in engineering to differential equations
3. Understands the applications of differential equations in second and higher order
4. Understands the Newton's Law of cooling, Law of Natural growth or Decay

TEXT BOOKS:

1. Mathematical Methods of Science and Engineering by Kanti B.Datta ,Cengage Learning
2. Higher Engineering Mathematics by B.S. Grewal, Khanna Publishers.
3. Introduction to Matrix Analysis by Richard Bellman, Dover Publications
4. Differential Equations by Shepley L Ross, Wiley Publications

REFERENCES:

1. Advanced engineering Mathematics by Kreyszig, John Wiley & Sons Publishers.
2. Advanced Engineering Mathematics by R.K. Jain & S.R.K. Iyengar, 3rd edition, Narosa Publishing House, Delhi.
3. Engineering Mathematics – I by T.K. V. Iyengar, B. Krishna Gandhi & Others, S. Chand.
4. Engineering Mathematics – I by D. S. Chandrasekhar, Prison Books Pvt. Ltd.
5. Engineering Mathematics – I by G. Shanker Rao & Others I.K. International Publications.
6. Advanced Engineering Mathematics with MATLAB, Dean G. Duffy, 3rd Edi, CRC Press Taylor & Francis Group.
7. Mathematics for Engineers and Scientists, Alan Jeffrey, 6ht Edi, 2013, Chapman & Hall/ CRC
8. Advanced Engineering Mathematics, Michael Greenberg, Second Edition. Pearson Education.

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I YEAR I SEMESTER   L T/P/D C
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Computer Programming
(Common for CE, ME, MINING, ECE, EEE and CSE)

Course objectives:

1. Learn how to write modular, efficient and readable C programs
2. Declare and manipulate single and multi-dimensional arrays of the C data types.
3. Describe the techniques for creating program modules in C using functions and recursive functions.
4. Create and manage derived data types and perform operations on files.
5. Utilize pointers and dynamic memory allocation functions to efficiently solve problems.
6. To provide an overview on current technologies in Software Industry like Open Source-LINUX and PHP.

UNIT I: Computer fundamentals-Hardware, Software, Programming languages, Translators, Overview of Operating System, Program Development steps-Algorithm, Flow chart; Number Systems,
Introduction to C Language – History, Simple C Program, Identifiers, Basic data types, User defined data types, Variables, Constants, Type qualifiers, Managing Input / Output, Operators, Precedence and Associativity, Expression Evaluation, Type conversions, Simple C Programming examples.

UNIT II: Conditional Statements – if and switch statements, Loop Control Statements – while, for, do-while statements, C Programming examples, Other statements related to control statements – break, continue, goto, C Programming examples.
Arrays– Basic concepts, One-dimensional arrays, Two–dimensional arrays, Multi-dimensional arrays, C programming examples.

Strings – Basic concepts, String Input / Output functions, Arrays of strings, String handling functions, C programming examples.

UNIT III: Introduction to Structured Programming- Functions- Basics, User defined functions, Inter function communication, Standard functions, Storage Classes-auto, register, static, extern, Scope rules, Array and string manipulations using functions, Recursive functions, C programming examples.
Derived types – Structures – Basic concepts, Nested structures, Arrays of structures, Structure manipulations using functions, Unions, bit fields, C programming examples.

UNIT IV: Pointers – Basic concepts, Pointer arithmetic, Pointers and functions, Pointers and strings, Pointers and arrays, Pointers and structures, Self-referential structures, C programming examples.
Preprocessor Directives-include, define, etc., Dynamic Memory Allocation.

File I/O – Basic concepts, Text files and Binary files, File input / output operations, File status functions (error handling), Command-Line Arguments, C programming examples.

UNIT V: Open Source: Introduction to Open Standard, Open Standards Model, Standards and Applications, Open Source Software and Technology.
Linux: History, Properties, Flavors, Introduction to file system, Basic commands and shell programming, Execution of c programs.
PHP: - History, Features of PHP, Key Driver of LAMP Stack, PHP Deployment Platform – Sample web site using PHP.

<u>**Course Outcomes:**</u>
Upon completion of the course, the students are expected to:
1. Write, compile and debug programs in C language.
2. Use different data types in a computer program.
3. Design programs involving decision structures, loops, arrays and functions.
4. Explain the difference between call-by-value and call-by-reference
5. Understand the dynamic allocation of memory by using pointers.

6. Use different file operations to create/update basic data files.
7. Use the basic commands of Linux
8. Able to create basic web pages using PHP Deployment

TEXT BOOKS:

1. Programming in C by Pradip Dey, Manas Ghosh – Second Edition, Oxford University Press.
2. C programming: A Problem-Solving Approach by Behrouz A. Forouzan, E.V.Prasad, Richard F.Gilberg – First Edition, Cengage Learning Press
3. C How to Program by Paul Deitel and Harvey Deitel – Seventh Edition, PH.
4. C Programming and Data Structures by E Balagurusamy, Second Edition, Tata McGraw Hill.
5. Introduction to Linux-A Beginner's Guide by Machtelt Garrels
6. Beginning PHP 5.3, by Matt Doyle, SPD/Wrox Press-2011

REFERENCES:

1. The C Programming Language by Brian W. Kernighan, Dennis M. Ritchie – Second Edition, PH.
2. C Programming: Absolute beginner's guide by Greg Perry and Dean Miller, Third Edition, QUE Publishers.
3. Let Us C by Yashwant Kanetkar – Fifth Edition, BPB Publications.

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I YEAR I SEMESTER   L   T/P/D   C
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ENGINEERING DRAWING – I

Pre-requisite: Knowledge in Mathematics

Course Objectives:

The objective of this subject is to provide the basic concepts in projections, technical drawing, dimensioning and specifications.

UNIT – I

INTRODUCTION TO ENGINEERING DRAWING: Principles of Engineering Drawing/Graphics – Various Drawing Instruments – Conventions in Drawing –

Lettering Practice – BIS Conventions.

Curves: Constructions of Curves used in Engineering Practice:
       a) Conic Sections **-** Construction of ellipse, parabola by different methods and hyperbola by general method.
       b) Cycloid, Epicycloid and Hypocycloid
       c) Involute - circle, polygon.
Tangent and normal for all the curves(a, b & c)

UNIT – II

ORTHOGRAPHIC PROJECTIONS IN FIRST ANGLE

Projection: Principles of Orthographic Projections – Conventions – First Angle projections.
Projections of Points.-Including Points in all four quadrants.
Projections of Lines - Parallel, perpendicular, inclined to one plane and inclined to both planes. True length and true angle and traces of a line.

UNIT – III

PROJECTIONS OF PLANES: Plane parallel, perpendicular and inclined to one reference plane. Plane inclined to both the reference planes.

UNIT – IV

PROJECTIONS OF SOLIDS: Projections of regular solids, cube, prisms, pyramids, tetrahedron, cylinder and cone, axis inclined to one and both the planes.

UNIT – V

ISOMETRIC PROJECTIONS : Principles of Isometric Projection – Isometric Scale – Isometric Views– Conventions –Plane Figures, Simple and Compound Solids – Isometric Projection of objects having non-isometric lines. Isometric Projection of parts with Spherical surface.

TRANSFORMATION OF PROJECTIONS: Conversion of Isometric Views to Orthographic Views. Conversion of orthographic views to isometric views – simple objects.

Course Outcomes:

At the end of learning this course the student shall be able to interpret the drawing commonly used in Engineering practice and manufacturing drawing.

TEXT BOOKS:

1. Engineering Drawing, N.D. Bhat / Charotar Publications
2. Engineering Drawing - Basant Agrawal, TMH

REFERENCES:

1. Engineering Drawing - P.J. Shah/S.Chand Publications
2. Engineering Drawing, Narayana and Kannaiah / Scitech publishers.
3. Engineering Drawing- Johle/Tata Macgraw Hill.
4. Computer Aided Engineering Drawing- Trymbaka Murthy- I.K. international.
5. Engineering Drawing – Grower Publications
6. Engineering Drawing , Venugopal / New age Publications

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I YEAR I SEMESTER   L   T/P/D   C
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COMPUTER PROGRAMMING LAB

Course objectives:

1. Gain practical knowledge of C programming to write modular, efficient and readable C programs by identifying the structural elements and layout of C source code.
2. Declare and manipulate single and multi-dimensional arrays of the C data types and derived data types like structures, unions.
3. Use functions from the portable C library and to describe the techniques for creating program modules using functions and recursive functions.
4. Manipulate character strings in C programs. Utilize pointers to efficiently solve problems.
5. Allocate memory to variables dynamically and Perform operations on text and binary files.
6. Learns basic commands of Linux
7. Learns basics of PHP

Week l:
Practice various DOS internal and external commands.

Week 2:

   a) Practice various Menu items and debugging techniques in IDE.
   b) Practicing sample C programs using Conversion specification.
   c) Implement various programs logics using algorithms and flowcharts.

Week 3:
   a) Write a C program to find smallest and largest of given three numbers.
   b) Write a C program to find the roots of a quadratic equation.
   c) Write a C program to implement basic arithmetic operations.

Week 4:
   a) Write a C program to find the sum of individual digits of a positive integer.
   b) A Fibonacci sequence is defined as follows: the first and second terms in the sequence are 0 and 1. Subsequent terms are found by adding the preceding two terms in the sequence. Write a C program to generate the first n terms of the sequence.
   c) Write a C program to find whether the given number is palindrome, perfect, Armstrong or strong.
   d)   Write a C program to generate all the prime numbers between n1 and n2, where n1 and n2 are values supplied by the user.

Week 5:
Write C programs that use both recursive and non-recursive functions
        a) To find the factorial of a given integer.
        b) To find the GCD (greatest common divisor) of two given integers.

Week 6:
□ Write a C program to find both the largest and smallest number in a list of integers.
□ Write a C program that uses functions to perform the following:
          Addition of Two Matrices
          Multiplication of Two Matrices

Week 7:
a) Write a C program that uses functions to perform the following operations:
        i) To insert a sub-string in to given main string from a given position.
        ii) To delete n Characters from a given position in a given string.
b) Write a C program to determine if the given string is a palindrome or not
c) Write a C program to find substring in a given string.
d) Write a C program to count the lines, words and characters in a given text.

Week 8:
a) Write a C program to construct a pyramid of numbers.
b) Write a C program to generate Pascal's triangle.

Week 9:

Write a C program to read in two numbers, x and n, and then compute the sum of this geometric progression:
$1+x+x^2+x^3+\ldots\ldots\ldots + x^n$

For example: if n is 3 and x is 5, then the program computes 1+5+25+125. Print x, n, the sum

Perform error checking. For example, the formula does not make sense for negative exponents – if n is less than 0. Have your program print an error message if n<0, then go back and read in the next pair of numbers of without computing the sum. Are any values of x also illegal? If so, test for them too.

Week 10:

a) 2's complement of a number is obtained by scanning it from right to left and complementing all the bits after the first appearance of a 1. Thus 2's complement of 11100 is 00100. Write a C program to find the 2's complement of a binary number.

b) Write a C program to convert a Roman numeral to its decimal equivalent.

Week 11:

   a) Write a C program that uses functions to perform the following operations:
       i) Reading a complex number
       ii) Writing a complex number
       iii) Addition of two complex numbers

       iv) Multiplication of two complex numbers
       (Note: represent complex number using a structure.)
   b) Write a C program to find grades of a student's using structures and unions.

Week 12:

   a) Write a C program which copies one file to another.

   b) Write a C program to reverse the first n characters in a file.
       (Note: The file name and n are specified on the command line.)

Week 13:

   a) Practicing basic LINUX commands
   b) Write simple shell programs

Week 14:

   a) Develop a sample web Pages using PHP

Course Outcomes:

  Upon completion of the course, the students are expected to:

   1. Understand the basic terminology used in computer programming and to write, compile and debug programs in C language.
   2. Design programs involving decision structures, loops ,arrays and functions.
   3. Understand the dynamics of memory by the use of pointers.
   4. Use different file operations to create/update basic data files.
   5. Familiarizes with basics of LINUX and PHP

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I YEAR I SEMESTER   L T/P/D   C

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ENGINEERING CHEMISTRY LAB

List of Experiments (Any 10 of the following)

Titrimetry:

1. Estimation of ferrous iron by dichrometry.

2. Estimation of hardness of water by EDTA method.

Mineral analysis:

3. Estimation of manganese dioxide in pyrolusite.

Instrumental Methods:

Colorimetry:

4. Determination of ferrous iron in cement by colorimetric method

Conductometry:

5. Conductometric titration of strong acid vs strong base.

6. Conductometric titration of mixture of acids vs strong base.

Potentiometry:

7. Titration of strong acd vs strong base by potentiometry.

8. Titration of weak acid vs strong base by potentiometry.

Physical properties:

9. Determination of viscosity of sample oil by redwood / oswald's viscometer.

10. Determination of Surface tension of lubricants.

Preparations:

11. Preparation of Aspirin

Kinetics:

12. To determine the Rate constant of hydrolysis of methyl acetate by an acid.

TEXT BOOKS:

1. Practical Engineering Chemistry by K. Mukkanti, etal, B.S. Publications, Hyderabad.

2. Inorganic quantitative analysis, Vogel.

REFERENCE BOOKS:

1. Text Book of engineering chemistry by R. N. Goyal and Harrmendra Goel, Ane Books Private Ltd.,

2. A text book on experiments and calculation Engg. S.S. Dara.

3. Instrumental methods of chemical analysis, Chatwal, Anand, Himalaya Publications

MALLA REDDY ENGINEERING COLLEGE
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I YEAR I SEMESTER   **L T/P/D C**
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English Language Communication Skills Lab
(Common for CE, ME, MINING, ECE, EEE and CSE)

The Language Lab focuses on the production and practice of sounds of language and familiarises the students with the use of English in everyday situations and contexts.

Course Objectives:

To sensitize the students to the intelligibility in their pronunciation of English, speech sounds, word accent, intonation and rhythm

To improve the fluency in spoken English and neutralize mother tongue influence

To facilitate honing of listening and speaking skills of students

 To train students to understand nuances of both verbal and non verbal communication during all activities

To develop confidence to face the audience and participate in activities

To help the students shed inhibitions and communicate with clarity

Listening Skills:

Objectives

1. To enable students to develop their listening skill so that they may appreciate its role in the LSRW skills approach to language and improve their pronunciation

2. To equip students with necessary training in listening so that they can comprehend the speech of people of different backgrounds and regions

Students should be given practice in listening to the sounds of the language to be able to recognise them, awareness regarding stress and recognise and use the right intonation in sentences.

• Listening for general content

• Listening to fill up information

• Intensive listening

• Listening for specific information

Speaking Skills:

Objectives

1. To make students aware of the role of speaking in English and its contribution to their success.

2. To enable students to express themselves fluently and appropriately in social and professional contexts.

• Oral practice

• Describing objects/situations/people

• Just A Minute(JAM) Sessions.

Syllabus: English Language Communication Skills Lab shall have two parts:

a. Computer Assisted Language Learning (CALL) Lab

b. Interactive Communication Skills (ICS) Lab

The following course content is prescribed for the English Language Communication Skills Lab

UNIT– I

CALL Lab: Introduction to Phonetics – Speech Sounds – Vowels and Consonants

ICS Lab: Ice-Breaking activity and JAM session

Listening: listening for sounds in context, for ideas.

Speaking: ideation and translation of ideas into sentences.

UNIT – II

CALL Lab: Structure of Syllables - Past Tense Marker and Plural Marker – Weak Forms and Strong Forms -

Consonant Clusters.

ICS Lab: Situational Dialogues – Role-Play- Expressions in Various Situations – Self-introduction and Introducing others – Greetings – Apologies – Requests – Social and Professional Etiquette - Telephone Etiquette.

Listening: listening for specific purposes, for details.

Speaking: speaking in the above situations with clarity, connectivity, maintaining voice characters.

UNIt- III

CALL Lab: Word accent and Listening Comprehension-reading(aloud) meaningfully.

ICS Lab: Descriptions- Narrations- Giving Directions and guidelines.

Listening: listening for intelligible English

Speaking: formal and informal conversations, register.

UNIT – IV

CALL Lab: Intonation and Common errors in Pronunciation- reading aloud(evaluating through recording).

ICS Lab: Extempore- Public Speaking , Oral Presentation Skills

Listening: note taking and listening for speaker's tone/attitude

Speaking: organizing , connecting ideas and sentences, short forms in spoken English, errors in spoken English

UNIT– V

CALL Lab: Neutralization of Mother Tongue Influence and Conversation Practice

ICS Lab: Information Transfer, Debate

Minimum Requirement of infra structural facilities for ELCS Lab:

1. Computer Assisted Language Learning (CALL) Lab:

The Computer aided Language Lab for 40 students with 40 systems, one master console, LAN facility and English language software for self- study by learners.

System Requirement (Hardware component):

Computer network with Lan with minimum 60 multimedia systems with the following specifications: i) P – IV Processor

a) Speed – 2.8 GHZ

b) RAM – 512 MB Minimum

c) Hard Disk – 80 GB

ii) Headphones of High quality

2. Interactive Communication Skills (ICS) Lab :

The Interactive Communication Skills Lab: A Spacious room with movable chairs and audio-visual aids with a Public Address System, a T. V., a digital stereo –audio & video system and camcorder etc.

Books Suggested for English Language Lab Library (to be located within the lab in addition to the

CDs of the text book which are loaded on the systems):

Prescribed Lab Manual: English Language Communication Skills laboratory Manual Published by Pearson, New Delhi 2012

LEARNING OUTCOMES:

1. Better Understanding of nuances of language through audio- visual experience and group activities

2. Neutralization of accent for intelligibility

3. Speaking with clarity and confidence thereby enhancing employability skills of the students

4. Good understanding of listening skills and speaking skills and their application in real life situations.

5. Good understanding of non-verbal communication and developing confidence to face audience, shed inhibitions.

REFERENCE BOOKS.

1. Polyskills by Cambridge Foundation Course
2. Technical Communication by William Sanborn Pfeiffer and TVS Padmaja
3. English Language Communication, a Reader Cum Lab Manual Course Content and Practice by Dr. A Ramakrishna Rao, Dr. G. Natanam, Prof. S.A. Sankaranarayanan
4. A Course On English by K.R. Lakshminarayanan
5. Successful Presentations by John Hughes and Andrew Mallett
6. Oxford Word Skills, learn and Practise English Vocabulary by Ruth Gairns and Redman
7. Public Speaking Techniques, Speak Like a Winner by Akash Karia
8. The Art of Public Speaking by Stephen Lucas
9. Essential Communication Skills by Shalini Aggarwal, Linda Chapman
10. English Language Communication Skills, Lab Manual cum Workbook by Cengage Learning

DISTRIBUTION AND WEIGHTAGE OF MARKS

English Language Laboratory Practical Examination:

1. The practical examinations for the English Language Laboratory shall be conducted as per the college norms prescribed for the core engineering practical sessions.

2. For the Language lab sessions, there shall be a continuous evaluation during the year for 25 sessional marks and 50 year-end Examination marks. Of the 25 marks, 15 marks shall be awarded for day-to-day work and 10 marks to be awarded by conducting Internal Lab Test(s). The year- end Examination shall be conducted by the teacher concerned as an internal examiner and another member from examiners' list recommended by the BOS as an external examiner.

MALLA REDDY ENGINEERING COLLEGE
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I YEAR II SEMESTER

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English & Professional Ethics
(Common for CE, ME, MINING, ECE, EEE and CSE)

INTRODUCTION:

There is an increasing concern over the English language competency of Engineering students based on their academic and professional performance. The transformation and the mistreatment of language in the social networking over the last decade have greatly affected the language skills of the students. In keeping with the language skill deficiencies, the present syllabus is designed to hone not only the traditional LSRW skills but also their analytical skills that enable to think too in English. This effective approach to develop English Language competency among the Engineering students aims to kindle the thinking skills to communicate effectively. The classroom activities based on the textbook may be used to build confidence among the students as they become active participants and teachers taking the role of a facilitator.

In the English classes, the focus is on the grammar, vocabulary, reading and, writing. For this the teachers should use the text prescribed for detailed study. For example, the students should be encouraged to read the texts/selected paragraphs silently. The teachers can ask comprehension questions to stimulate discussion and based on the discussions students can be made to write short paragraphs/essays etc. The focus is on language error detection as well as correction along with honing vocabulary, reading skills, and writing skills.

The text is for extensive reading/reading for pleasure. Hence, it is suggested that they read it on their own the topics selected for discussion in the class. The time should be utilized for working out the exercises given after each section, as also for supplementing the exercises with authentic materials of a similar kind for example, from newspaper articles, advertisements, promotional material etc.. However, the stress in this syllabus is on skill development, fostering ideas and practice of language skills.

This course also has a few elements on professional ethics and human values. It helps the students know their responsibility towards the society and instills in students, a sense of respect towards harnessing values of life and spirit of fulfilling social responsibilities

 OBJECTIVES:

a. To facilitate for the improvement of the language proficiency of the students in English with emphasis on Reading and writing skills.

b. To equip the students to study academic subjects more effectively using the theoretical and practical components of the English syllabus.

c. Analysing intensive reading strategies and discussing how to distinguish between facts and opinions and draw inferences.

d. Enable the students to improve effective writing skills.

f. To develop English Language communication skills in formal and informal situations.

> g. To create an awareness on Engineering Ethics and Human Values.
> h. To understand social responsibility of an engineer.
> i. To appreciate ethical dilemma while discharging duties in professional life.
> j. To mould the students to the needs of the world.

SYLLABUS:

Reading Skills:

Objectives

1. To develop an awareness in the students about the significance of silent reading and comprehension.

2. To develop the ability of students to guess the meanings of words from context and grasp the overall

message of the text, draw inferences etc.

• Skimming the text

• Understanding the gist of an argument

• Identifying the topic sentence

• Inferring lexical and contextual meaning

• Understanding discourse features

• Scanning

• Recognizing coherence/sequencing of sentences

NOTE : The students will be trained in reading skills using the prescribed text for detailed study. They will be examined in reading and answering questions using 'unseen' passages which may be taken from authentic texts, such as magazines/newspaper articles.

Writing Skills :

Objectives

1. To develop an awareness in the students about writing as an exact and formal skill

2. To equip them with the components of different forms of writing, beginning with the lower order ones.

• Writing sentences

• Use of appropriate vocabulary

• Paragraph writing

• Coherence and cohesiveness

• Narration / description

• Note Making

• Formal and informal letter writing

- Circular writing
- Memo writing
- Report writing

LEARNING OUTCOMES:

1. Usage of English Language, written and spoken.

2. Enrichment of comprehension and fluency

3. Improving effective writing skills in personal and professional life.

4. The learners recognise ethical responsibilities of engineers and suggest ways to deal with ethical issues in engineering.
5. The learners can reach an ethically justified or morally reasoned practical solution to an ethical problem with an appropriate plan of action.

TEXT BOOK PRESCRIBED:

Ignited Minds by A. P. J. Abdul Kalam, Penguin Books.

Ethics in Engineering by Mike Martin and Roland Schinzinger , McGraw-Hill.
The course content and study material is divided into seven Units.

UNIT-I

Chapters entitled "The Dream and the Message" and "Give Us a Role Model" from **Ignited Minds** by A.P.J. Abdul Kalam, Penguin Books.

Vocabulary: synonyms and antonyms.

Grammar: question tags, exercises related to questions.

Reading: Intensive Reading and Extensive Reading.

Writing: essay writing.

UNIT-II

Chapters entitled "Visionary Teachers and Scientists" and "Learning from Saints and Seers" from **Ignited Minds** by A.P.J. Abdul Kalam, penguin Books.

Vocabulary: words often confused, idioms and phrases

Grammar: degrees of comparison- exercises.

Reading**:** Reading for themes and gists

Writing: summarizing

UNIT-III

Chapters entitled "Patriotism beyond Politics and Religion" and "The Knowledge Society" from **Ignited Minds** by A.P.J. Abdul Kalam, , Penguin Books.

Grammar: types of sentences, transformation of sentences- simple , complex and compound sentences.

Vocabulary: one word substitutions.

Reading: reading for interpretation

Writing. Writing instructions

UNIT-IV

Chapters entitled "Getting the Forces Together" and "Building a New State" from **Ignited Minds** by A.P.J. Abdul Kalam, , Penguin Books.

Grammar: Conditionals- exercises.

Vocabulary: e-register, foreign expressions.

Reading: critical reading.

Writing: memo writing, review writing

UNIT-V

Chapter entitled "To My Countrymen" from **Ignited Minds** by A.P.J. Abdul Kalam, , Penguin Books.

Grammar: Common errors and integrated exercises.

Vocabulary: gender sensitive language, integrated exercises in vocabulary.

Reading: survey, question, read, recall and review.

Writing - Note-making, Report writing, types of reports

UNIT- VI

Introduction to Engineering Ethics- Definition; Purpose of studying Ethics in Engineering. Engineers as Social Experimenters and Safety Officers, Learning from the past, Knowledge gained, Responsible Experimenters, Accountability, Assessment of Safety and Risk, Risk benefit analyses and reducing risk.

- Field work could be assigned to the students- interaction with the "real" Safety Officers

UNIT –VII

Responsibilities to Employers, Respect for Authority, confidentiality; conflicts of interest-Impairment of Judgment & Service, Gifts & Bribes, Moral Status; Occupational crime, Antidiscrimination Laws, Sexual harassment, Global Issues; Engineers- Leaders, Environmental/ Bio ethics, Computer Ethics, Hacking, Cyber Crime, Engineers as Managers, Moral Leadership

- Field work could be assigned – take up a role of a leader and work on any issue.

*unit VI&VII are to be tested only for internal evaluation. They are not meant for end semester examination.

*midterm I will cover unit1-3, midterm II will cover unit4-7.

* project based on field work in teams will carry 5marks.

REFERENCE BOOKS:

Sharon J. Gerson Steve M. Gerson, "Technical Writing", New Delhi, Pearson education

2. Professional Report Writing by Simon Mort

3. Cambridge English for Engineering : Student's Book, Mark Ibbotson , PB + 2 ACD, ISBN:

4. English for Engineers, Regional Institute of English; Bangalore, PB + CD - ROM, ISBN:

5. Resonance: English for Engineers and Technologists, Dr. K. Elango; Dr. Veena Selvam; Dr. P. R. Sujatha Priyadarshini,

6. A Course in Communication Skills, P Kiranmai Dutt ; Geetha Rajeevan ; C.L.N. Prakash , PB

7. Developing Language and Communication Skills through Effective Small Group Work : SPIRALS: From 3-8, Marion Nash ; Jackie Lowe ; Tracey Palmer , PB

8. Technical Report Writing Today by Daniel G Reordan

9.Comprehension Connections: Bridges to Strategic Reading by Tanny McGregor

10. Keys to Comprehension: How to Help Your Kids Read It and Get It! By Susan Zimmermann

11.Deeper Reading by Kelly Gallagher

12.Notice and Note: Strategies for Close Reading by Kylene Beers

13.Cambridge English Skills Real Reading 3 with Answers by Liz Driscoll

14.Inferences & Drawing Conclusions: 35 Reading Passages for Comprehension by Linda Ward Beech

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I YEAR II SEMESTER   L   T/P/D   C
                                                         3   -/-/-   3

ENGINEERING PHYSICS – II
(Common for all branches)

Course objectives:

1. To teach the students the phenomenon of Interference, Diffraction and Polarization.
2. To make the students aware of X – ray diffraction and different techniques of it.
3. To make the students understand the characteristics of LASER, different working LASERs.
4. To teach various applications of LASERs.
5. To teach the students, basic definitions related to Dielectric materials, different kinds of polarization, and different Dielectric materials.
6. To introduce them the phenomenon of superconductivity and its applications.
7. To teach the students the significance of nano size and its fascinating applications.
8. To teach the students working principle of optical fiber, classification of optical fibers and applications of optical fibers.
9. To teach the production and detection of ultrasonics and their applications.

UNIT – I

OPTICS:
Introduction to Interference, Young's double slit experiment (Qualitative) – Optical path difference and Fringe width – Interference in thin films (Reflected light) Cosine law – Newton's rings experiment – Determination of wavelength of light .
Basic Principles of X – ray diffraction - Bragg's Law, Bragg's X-Ray Spectrometer. Laue Method, Powder Method.
Introduction to Polarization, Polarization of Light, Plane of Polarization, Double Refraction, Nicols's prism.

UNIT – II

LASER:
Characteristics of LASER; Absorption, Spontaneous and Stimulated transitions; Einstein's Coefficients and Relations between them; Population Inversion; Pumping – Optical and Electrical; Meta-stable State; Three and Four level pumping schemes; Ruby LASER; Helium-Neon LASER; Semiconductor Diode LASER; Applications of LASER – Data storage, Medical, Scientific and industrial

UNIT – III

DIELECTRIC PROPERTIES:
Electric Dipole, Dipole Moment, Dielectric Constant, Polarizability, Electric Susceptibility, Displacement Vector; Electronic, Ionic and Orientation Polarizations; Expressions for electronic and ionic Polarizabilities; Qualitative treatment of Internal Field in dielectrics; Clausius - Mossotti Equation; Piezo-electricity and Ferro- electricity

SUPERCONDUCTIVITY:
Concept of Perfect Diamagnetism; Meissner effect – Magnetic levitation; Type I and II Superconductors; Applications of Superconductor

UNIT – IV

NANO TECHNOLOGY:
Introduction, Surface to volume ratio, Quantum confinement, Change of Electrical, magnetic and optical properties with size, Synthesis of nano materials – Sol-gel method, PVD; Characterization by TEM, applications.
FIBER OPTICS:
Principle of Optical Fiber; Acceptance angle and Acceptance cone, Numerical Aperture; Step and Graded index Optical Fibers and their Refractive Index profiles; Attenuation in Optical Fibers, Application of Optical Fibers – Medical, Level sensor and Communication system.

UNIT –V

ULTRASONICS:
Introduction, Production of Ultrasonic waves – Magnetostriction method, Piezo electric method; Detection of ultrasonics – Piezo electric detector, Kundt's tube, Sensitive flame method, Thermal detector; Properties of Ultrasonic waves; Applications – Communication, Industrial, Biological and medical;

ACOUSTICS:
Basic requirements of acoustically good Hall; Reverberation; Sabine's formula for Reverberation Time (Qualitative Treatment); Factors Affecting the Architectural Acoustics and their Remedies

Course Outcomes:

1. Students get introduced to the phenomenon of interference and understand the very famous Young's double slit experiment and Newton's rings experiment.
2. They shall understand the concept of X – ray diffraction and the two techniques Laue method and Powder method.
3. Students shall understand the theory of Double refraction as far as Polarization phenomenon is concerned.
4. Students shall be able to distinguish ordinary light and LASER. They shall learn the physics behind the production of LASER.
5. They shall understand and appreciate the applications of LASER.
6. The students shall be able to distinguish Electronic, Ionic and orientation polarizations, understand the significance of the Clausius – Mossotti relation.
7. The students shall learn regarding Piezo electric materials also.
8. They shall learn Meissner effect and be able to understand the classification of superconductors into two categories.
9. They shall be able to understand and appreciate the applications of Superconductivity.
10. Students shall understand the influence of size of the material on its properties.
11. Students shall understand the concept of total internal reflection based on which optical fibers work and understand the concepts of acceptance angle and numerical aperture.
12. They shall understand and appreciate various diversified applications of optical fibers like medical application, application in instrumentation and application in communication.
13. They shall be able to understand various methods of production and detection of ultrasonics besides learning their applications.
14. They shall get acquainted with the basic concepts of acoustics.

TEXT BOOKS:

1. Modern Engineering Physics by K. Vijaya Kumar, S. Chandralingam: S. Chand & Co.Ltd
2. Engineering Physics – P.K.Palanisamy - SciTech Publications Pvt. Ltd., 5th Print 2008.
3. Applied Physics – S.O. Pillai & Sivakami-New Age International (P) Ltd., 2nd Edition 2008.
4. Unified Physics Vol – I by S L Gupta and Sanjeev Gupta JNPN Publications.
5. Unified Physics Vol – II by S L Gupta and Sanjeev Gupta JNPN Publications.
6. Engineering Physics by B K Panedy, S Chaturvedi, Cengage learning
7. A Text book of Optics by N Subrahmanyam, Brijlal and M N Avadhanulu, S Chand & Co,

REFERENCES:

1. Solid State Physics – M. Armugam (Anuradha Publications).
2. A Text Book of Engg Physics – M. N. Avadhanulu & P. G. Khsirsagar– S. Chand & Co. (for acoustics).
3. Introduction to Solid State Physics – C. Kittel (Wiley Eastern).
4. Engineering Physics by R K Gaur and S L Gupta, Dhanpat Rai and Sons.
5. Solid State Physics – A.J. Dekker (Macmillan).
6. Applied Physics – T. Bhima Shankaram & G. Prasad (B.S. Publications, Third Edition 2008).
7. A text book of Engineering Physics – S.P. Basvaraju – Subhas store
8. Electricity and magnetism by Edward Purcell – Berkeley series vol 2
9. Physics Vol 2 – Resnick, Halliday & Krane – Fifth edition, Wiley Student edition.

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I YEAR II SEMESTER   **L   T/P/D   C**
                                                                                               3   -/-/-   3

ENGINEERING CHEMISTRY – II
(Common for all branches)

Course objectives:

1. Understand various techniques involved in polymerization and application of polymer technology in the area of various engineering fields and manufacturing process of important metallurgical materials.
2. Describe the fundamental aspects of colloids, surface chemistry and properties of multi-phase systems
3. Understanding how light interacts with matter and how it can be used to quantitatively understand chemical samples & engineering materials.
4. To learn about types of fuels and their characteristics, and combustion systems with emphasis on engineering applications.

UNIT- I

POLYMERS-I

Classification of Polymers, Types of Polymerization (Chain (Free radical Mechanism) & Step growth). Plastics**:** Thermoplastic & Thermo setting resins, Compounding & fabrication of plastics (Compression and injection moulding). Preparation, properties, engineering applications of PVC, Teflon and Bakelite.Fibers**-** Charcterstics of fibers – preparation, properties and uses of Nylon – 6,6 and Dacron – Fiber Reinforced Plastics (FRP) – applications.

UNIT-II

POLYMERS-II

Rubbers – Natural rubber and its processing (vulcanization). Elastomers – Buna-s, Butyl rubber. Conducting polymers: Polyacetylene, Polyaniline, Mechanism of Conduction, doping; applications of Conducting polymers. Bio-degradable Polymers- preparation and Applications of Poly vinyl acetate and Poly lactic acid .Liquid Crystal Polymers and its Application.

UNIT- III

PHOTOCHEMISTRY AND SPECTROSCOPY

Photochemistry: Laws of photochemistry - Grotthuss–Draper law, Stark–Einstein law and Lambert-Beer Law. Quantum efficiency – determination Spectroscopy: Electromagnetic spectrum - Absorption of radiation – Electronic, Vibrational and rotational transitions. UV-visible spectroscopy – principles, instrumentation and Applications (Block diagram only).

UNIT-IV

PHASE RULE & SURFACE CHEMSITRY

Phase Rule: Definition of terms: Phase, component, degree of freedom, phase rule equation. Phase diagrams –one component system- water system. Two component system Lead- Silver System. Adsorption: Types of Adsorption, Isotherms – Freundlich and Langmuir adsorption isotherm, applications of adsorption. Colloids: Classification of Colloids; Electrical & optical properties, micelles, applications of colloids in industry.

UNIT-V

FUELS & COMBUSTION

Fuels – Classification – soild fuels: coal – analysis of coal - proximate and ultimate analysis and their significance. Liquid fuels – petroleum and its refining – cracking – types – fixed bed catalytic cracking. Knocking – octane and cetane rating, synthetic petrol, Fischer-Tropsch's process: Gaseous fuels - constituents, characterstics and applications of natural gas, LPG and CNG. Analysis of flue gas by Orsat's apparatus.

Combustion – Definition, Calorific value of fuel – HCV , LCV; Determination of calorific value by Junker's gas calorimeter – Numerical problems on combustion.

Course Outcomes:

1. Demonstrate general knowledge and understanding concerning properties and use of polymeric materials, including knowledge and understanding of related environmental aspects.

2. The student will obtain an understanding of interactions between surfaces and gases, liquids or solutions, and how interfaces are important in many technological and biological processes.

3. Use of spectroscopy to characterize organic compounds. Students will use spectroscopic data to make meaningful observations about the chemical properties of compounds.

4. Understand and analyze the combustion mechanisms of various fuels

TEXT BOOKS:

1. Engineering Chemistry by R.P. Mani,K.N. Mishra, B. Rama Devi /CENGAGE learning.
2. Engineering Chemistry by P.C Jain & Monica Jain, Dhanpatrai Publishing Company (2008).

REFERENCE BOOKS

1. Engineering Chemistry by B. Siva Shankar Mc.Graw Hill Publishing Company Limited, New Delhi (2006)
2. Engineering Chemistry J.C. Kuriacase & J. Rajaram, Tata McGraw Hills Publishing Company Limited, New Delhi (2004).
3. Text Book of Engineering Chemistry by S.S. Dara & Mukkati S. Chand & Co Publishers, New Delhi(2006)
4. Chemistry of Engineering Materials by CV Agarwal,C.P Murthy, A.Naidu, BS Publications.

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I YEAR II SEMESTER	L	T/P/D	C
	4	-/-/-	2

MATHEMATICS – II
(Differential, Vector Calculus & Numerical Techniques)
(Common for all branches)

Course Objectives:

1. In engineering applications, data collected from the field are usually discrete and the physical meanings of the data are not always well known. To estimate the outcomes and, eventually, to have a better understanding of the physical phenomenon, a more analytically controllable function that fits the field data is desirable.
2. The process of estimating the outcomes in between sampled data points is called interpolation; whereas the process of estimating the outcomes beyond the range covered by the existing data is called extrapolation.
3. Understand the Rolles' theorem using intermediate value theorem ,Mean using Lagrange Mean Value theorem ,Cauchy Mean value theorem
4. Understand the beta function and relation between beta and gamma functions, Applications of beta, gamma functions in finding areas etc., Applications of integration in Cartesian, Parametric & Polar co-ordinates ,Evaluation of double integrals, Evaluation of triple integrals.
5. Vector calculus studies various differential operators defined on scalar or vector fields, which are typically expressed in terms of the Del operator (∇), also known as "nabla". The five most important differential operations in vector calculus are: (a) Grad (b) Div (c) Curl (d) Vector Laplacian (e) Laplacian. , Green's theorem is mostly used to solve two-dimensional flow integrals, stating that the sum of fluid outflows at any point inside a volume is equal to the total outflow summed about an enclosing area. In plane geometry, and in particular, area surveying.
6. Green's theorem can be used to determine the area and centroid of plane figures solely by integrating over the perimeter. In vector calculus, the divergence theorem, also known as Gauss's theorem, is a result that relates the flow (that is, flux) of a vector field through a surface to the behavior of the vector field inside the surface.

UNIT – I
DIFFERENTIAL CALCULUS

Rolle's Theorem – Lagrange's Mean Value Theorem – Cauchy's mean value Theorem – Generalized Mean Value theorem.
Differentiability of multivariable functions : Jacobian - Functional dependence - Maxima and Minima of functions of two variables with constraints and without constraints (Lagrange's method of multipliers).

UNIT – II
INTERPOLATION

Introduction- Errors in Polynomial Interpolation – Finite differences- Forward Differences-Backward differences – Central differences – Symbolic relations and separation of symbols- Difference Equations - Differences of a polynomial-Newton's formulae for interpolation – Central difference interpolation Formulae – Gauss Central Difference Formulae – Interpolation with unevenly spaced points-Lagrange's Interpolation formula.

UNIT – III
SOLUTION OF NON- LINEAR SYSTEMS, SPECIAL FUNCTIONS

Introduction : Solution of Algebraic and Transcendental Equations, The Bisection Method – The Method of False Position – The Iteration Method – Newton-Raphson Method.
Beta and Gamma Functions: Relation between them, their properties – evaluation of improper integrals using Gamma / Beta functions

UNIT – IV
MULTIPLE INTEGRALS

Multiple integrals - double and triple integrals – change of variables – change of order of integration – Finding Surface areas, volumes

UNIT – V
VECTOR CALCULUS

Gradient - Divergence- Curl and their related properties of sums- products- Laplacian and second order operators. Vector Integration - Line integral – work done – Potential function – area- surface and volume integrals Vector integral theorems: Green's theorem-Stoke's and Gauss's Divergence Theorem (With out proof). Verification of Green's - Stoke's and Gauss's Theorems.

Course Outcomes:

1. Understands the geometrical interpretation of Rolle's, Lagrange's, Cauchy Mean value theorems,
2. Understands the Taylors theorem, Understands applications of Taylor theorem in complex analysis, understands the geometrical interpretation of all the forms of remainders, Understands the maximum and minimum concept with and without constraints.
3. Learns about the solution of transcendental equations, Understands geometrical meaning of the solution of the curves.
4. Student learn about the interpolation process, He can find the interpolating polynomial function for the given data. Student understands how to find the unknown values of y wrt x values
5. Learn about vecor and scalar fields, Grad, div and Curl and their applications and properties,
6. Study about Solenoidal and irrotational vectiors with scalar potential function.Vector integration like - Line integral, Surface and Volume integrals and their Evaluations. Study about Integral Theorems Like –Green's , Gauss's and Stokes's theorem's and their verifications

TEXT BOOKS:

1. Mathematical Methods of Science and Engineering by Kanti B.Datta ,Cengage Learning
2. Higher Engineering Mathematics by B.S. Grewal, Khanna Publishers.
3. Numerical Methods using MATLAB by John H Matthews, Kurt D Fink, Pearson Education
4. Numerical Methods, Jain, SRK Iyyengar Narosa Publications

REFERENCES:

1. Advanced engineering Mathematics by Kreyszig, John Wiley & Sons Publishers.
2. Advanced Engineering Mathematics by R.K. Jain & S.R.K. Iyengar, 3rd edition, Narosa Publishing House, Delhi.
3. Engineering Mathematics – I by T.K. V. Iyengar, B. Krishna Gandhi & Others, S. Chand.
4. Engineering Mathematics – I by D. S. Chandrasekhar, Prison Books Pvt. Ltd.
5. Engineering Mathematics – I by G. Shanker Rao & Others I.K. International Publications.
6. Advanced Engineering Mathematics with MATLAB, Dean G. Duffy, 3rd Edi, CRC Press Taylor & Francis Group.
7. Mathematics for Engineers and Scientists, Alan Jeffrey, 6ht Edi, 2013, Chapman & Hall/ CRC
8. Advanced Engineering Mathematics, Michael Greenberg, Second Edition. Pearson Education.

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I YEAR II SEMESTER   L T/P/D C
                                                                                 4 1/-/-   4

Engineering Mechanics
(Common for CE, ME, MINING)

Pre-requisite: Applied Physics
Objective: : The objective of this subject is to provide the basic concepts
Codes/Tables: Nil

UNIT – I
Introduction to Engineering Mechanics – Basic Concepts, Laws of Motion, Force-types, characteristics- Principle of transmissibility.
Systems of Forces: Classification**,** Coplanar Concurrent Forces – Components of force in Space – Resultant- Triangle law of Forces-Polygon law of Forces- Parallelogram Law of Forces-Resolution and composition of Forces– Coplanar Non-Concurrent System of Forces, Resultant of Parallel system of Forces -Moment of Force and its Application – Varignon's theorem, Couples.

UNIT – II
Equilibrium of Systems of Forces: Free Body Diagrams, Types of Supports and their reactions, Internal and External Forces - Types of Equilibrium, Equations of Equilibrium, Conditions of Equilibrium, Equilibrium of bodies under Coplanar concurrent system of forces – Lami's Theorem, Converse of the law of Triangle of forces, converse of the law of polygon of forces. Equilibrium of Spatial Systems for concurrent forces.

UNIT – III
Centroid: Centroids of Lines and Areas (from basic principles) –simple figures– Centroid of Composite Figures-Centroid of L, T, I, Z and channel Sections.
Centre of Gravity: Centre of gravity of simple solids (from basic principles), centre of gravity of composite solids, Pappu's-Guldinu's theorems.
Area moment of Inertia : Definition –Moment of inertia of plane areas, Polar Moment of Inertia, Transfer Theorem, Moments of Inertia of Composite Figures, Moment of Inertia of Sections, Products of Inertia, Transfer Formula for Product of Inertia.
Mass Moment of Inertia: Moment of Inertia of Simple solids, Transfer Formula for Mass Moments of Inertia, mass moment of inertia of composite bodies.

UNIT – IV
Kinematics: Rectilinear motion – Motion of Rigid Body under uniform and variable accelerations – motion under gravity-curvilinear motion -Projectiles-rotary motion, kinematics of general plane motion.
Kinetics: Analysis as a Particle and Analysis as a Rigid Body in Translation – D'Alemberts Principle – Connected bodies- Kinetics of rotating bodies- Equations of Plane Motion– Rolling Bodies.

UNIT – V
Work, Power and Energy: Work-energy equation for translation-connected bodies on horizontal and inclined planes-pulleys-Work done by a spring-Work-energy equation to rotary motion and general plane motion.
Impulse-Momentum principle: Linear impulse and momentum-connected bodies-force of jet on a vane-pile & hammer.

Outcome: At the end of this course, the student shall be able to understand the basic concepts of force, moment, couple, resultant forces, loads, supports, Lamis' theorem, Newton's theorem, De Alemrt's theorem for work-energy principles.

TEXT BOOKS :
1. Engineering. Mechanics / Timoshenko & Young.
2. Engineering. Mechanics / S.S. Bhavikatti & J.G. Rajasekharappa
3. Engineering. Mechanics / D.S.Kumar
REFERENCES :
1. Engineering Mechanics / Fedinand . L. Singer / Harper – Collins.
2. Engineering Mechanics / K. Vijaya Kumar Reddy / J. Suresh Kumar
3. Engineering. Mechanics / R.V. Kulkarni & R.D. Askhevkar
4. Engineering. Mechanics /R.S. Khurmi / S.Chand.
5. Engineering. Mechanics / K L Kumar / Tata McGraw Hill

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I YEAR II SEMESTER   L T/P/D   C
                                                                                                   2   -/-/3   4

Engineering Drawing - II
(Common for CE, ME, MINING)

Pre-requisite: Mathematical Geometry
Objective: The objective of this subject is to provide the basic concepts about Engineering Drawing. Detailed concepts are given in projections, technical drawing, dimensioning and specifications

Codes/Tables: Nil

UNIT-I
Scales: Construction of different types of Scales, Plain, Diagonal, Vernier scale.

UNIT-II
Sections And Sectional Views: Right Regular Solids – Prism, Cylinder, Pyramid, Cone .
Intersection Of Solids:- Intersection of Cylinder Vs Cylinder, Cylinder Vs Prism, Cylinder Vs Cone

UNIT – III
Development Of Surfaces: Development of Surfaces of Right Regular Solids – Prisms, Cylinder, Pyramids, Cone and their parts. frustum of solids.

UNIT – IV
Perspective Projections: Perspective View: Points, Lines, Plane and solids Figures.

UNIT – V
Auto Cad Commands:-Basic Draw Commands, Display Commands, Editing Commands Construction Commands

Outcome: At the end of learning this course the student shall be able to understand the planes, lines, curves, projections, orthographic views, isometric views, sections of solids

TEXT BOOK:

1. Engineering Drawing, N.D. Bhat / Charotar

2. Engineering Drawing - Basant Agrawal, TMH

REFERENCES:

1. Engineering drawing - P.J. Shah.S.Chand.

2. Engineering Drawing, Narayana and Kannaiah / Scitech publishers.

3. Engineering Drawing- Johle/Tata Macgraw Hill.

4. Computer Aided Engineering Drawing- Trymbaka Murthy- I.K. international.

5. Engineering Drawing - Grower.

6. Engineering Drawing , Venugopal / New age.

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I YEAR II SEMESTER   **L T/P/D   C**

                                                             0   -/3/-   2

ENGINEERING PHYSICS LAB

Course Objectives:

1. To motivate the student to gain experimental skills, working with various measuring instruments.
2. To learn the basic circuit designing concepts.

LIST OF EXPERIMENTS

1. Dispersion of Light –Dispersive power of material of a given glass and calcite prism
2. Diffraction grating – Determination of the wavelength of a Sodium vapour lamp.
3. Newton's Rings – Radius of curvature of Plano convex lens
4. Melde's Experiment – Longitudinal and Transverse modes
5. Study of RC time constant and RL circuit.
6. The series RLC circuit – determination of resonant frequency, bandwidth and quality factor.
7. Magnetic field along the axis of current carrying circular coil- Stewart and Gee's experiment.
8. LASER- Diffraction due to single slit and double slit.
9. Evaluation of Numerical aperture of the given fiber.
10. Energy band –gap of a material of a P-N junction diode.
11. Torsional Pendulum- Determination of Rigidity modulus of two different wires.
12. Sonometer- Frequency of A.C supply
13. LASER diode – I-V characteristics.
14. Michelson interferometer (Demonstration only)
15. Hall Sensor (Demonstration only)

Course Outcomes:

1. Various experiments related to Optics, Mechanics, Electrical and Electronics areas help the student understand the subtle concepts in a practical way.
2. Also the labs sessions inculcate the sense of team work.
3. Working with various measuring instruments help the student gain experimental skills.
4. Interpretation and analysis of data are also learnt by the student.

Laboratory manual:

Engineering Physics Practicals by Dr.B.Srinivasa Rao, KesavaVamsiKrishna.V, K.S.Rudramamba.

(University Science Press)

Note: Any 10 of the following

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I YEAR II SEMESTER   **L T/P/D   C**
                                                                                          0   -/3/-   2

Auto CAD Lab & EM Lab
(Common for CE, ME, MINING)

A. Engineering Mechanics Lab

1. Verification of law of co-planar concurrent forces.

2. Equilibrium of coplanar concurrent force system-forces in the jib crane.

3. Determine the support reaction for a beam

4. Determine the moment of inertia of a flywheel.

5. Statics experiment on equilibrium

6. Dynamics experiment on momentum conservation.

B. Auto CAD Lab

1. Drafting: Development of part drawings for various components in the form of orthographic and isometric using Auto Cad Package. Representation of dimensioning and tolerances scanning and plotting. (From a given list of 6 Tutorials of 2D Drawing).

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I YEAR II SEMESTER	**L**	**T/P/D**	**C**
	0	**-/3/-**	**2**

ENGINEERING & IT WORKSHOP
(Common for all branches)

ENGINEERING WORKSHOP

Pre-requisite: Nil
Objective: The objective of this subject is to provide the basic concepts about tools used in different trades like Fitting, Carpentry, House wiring, Tin smithy etc in Engineering Workshop.
Outcome: At the end of this course the students shall be capable to do house wiring, tinsmith, fitting, foundry, carpentry and do some maintenance of wooden furniture. This subject/ practice keep the students a habit of life-long learning
Codes/Tables: Nil

1. TRADES FOR EXERCISES:
At least two exercises from each trade:
1. Carpentry
2. Fitting
3. Tin-Smithy and Development of jobs carried out and soldering.
4. House-wiring.
5. Foundry.

2. TRADES FOR DEMONSTRATION
a) Machine shop
b) Plumbing

Outcome: At the end of this course the students shall be capable to do house wiring, tinsmith, fitting, foundry, carpentry and do some maintenance of wooden furniture. This subject/ practice keep the students a habit of life-long learning

TEXT BOOKS:
1. Work Shop Manual – P. Kanniah/ K. L. Narayana, Scitech Publishers.
2. Work Shop Manual by Venkat Reddy/B.S. Publications
3. Work Shop Practice Manual by K. Venkat Reddy,/B.S. Publications

IT WORKSHOP

Course Objectives:
1. To study/demonstrate the concepts of computer w.r.t. its hardware, operating system, assembling and disassembling.
2. To conduct the experiments related to IT Workshop, installations

List of Tasks:
1. Computer Hardware: Identification of Peripherals
2. Assembling and disassembling of a PC
3. Simple diagnostic exercises – Related to hardware
4. Installation of Windows Operating System
5. Installation of Linux Operating System
6. Simple diagnostic exercises –Related to Operating System
7. Design the applications using following features of MS Word
   a) Letter
   b) Header and footer
   c) Hyperlink, Bullets and numbering
   d) Inserting various objects
   e) Spelling and grammar checking
   f) Tables
   g) Mail merge
8. Design the applications using following features of MS Excel

a)Formulas
b)Functions
c)Conditional formatting
d)Sorting
e)Filters
9. Design the applications using following features of MS Powerpoint
a) Design Templates
b) Layouts
c) Inserting Objects
d) Custom Animation
e) Macros
10. Designing the same applications(7,8, & 9) using Open Office.

Course Outcomes:

Students will be able to:

1. Identify, assemble, dissemble, install and
2. Write commands for a given configuration of a computer.
3. Familiarizes with MS Word, Excel, Power Point and Open Office.

TEXTBOOKS:

1. IT Essentials PC Hardware and Software Companion Guide Third Edition by Davis Anfinson and Ken Quamme CISC Press, Pearson Education.
2. PC Hardware and A+ Handbook – Kate J. Chase PHI (Microsoft).

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II YEAR I SEMESTER	L	T/P/D	C
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MATHEMATICS – III
(Numerical Differentiation, Integration & Transform Techniques)
(Common for all branches)

Course Objectives:

1. Understands the applications of z-transforms
2. Find the Fourier series representation of the Periodic functions
3. Find the Fourier series representation for the functions in an arbitrary interval
4. Find the applications of numerical differentiation in evaluating engineering problems
5. For the given data the student can fit the respective curves.

Course Outcomes:

1. This best-fitting curve can be obtained by the method of least squares.
2. Applications of Fourier transforms in engineering problems.
3. PDEs can be used to describe a wide variety of phenomena such

   as sound, heat, electrostatics, electrodynamics, fluid flow, elasticity, or quantum mechanics.

UNIT – I
FOURIER SERIES & TRANSFORMS
Fourier Series: Determination of Fourier coefficients – Fourier series – even and odd functions – Fourier series in an arbitrary interval – even and odd periodic continuation – Half-range Fourier sine and cosine expansions.
Fourier Transforms: Fourier integral theorem - Fourier sine and cosine integrals. Fourier transforms – Fourier sine and cosine transforms – properties – inverse transforms – Finite Fourier transforms.

UNIT – II
Z-TRANSFORMS
Z-Transforms Inverse Z-Transform properties, damping rule, shifting rule, Initial and final value theorems, convolution theorem solution of difference equation by Z-Transforms

UNIT – III
CURVE FITTING, NUMERICAL DIFFERENTIATION & INTEGRATION
Curve fitting: Fitting a first degree (linear) and second degree (parabola), exponential, power curves for a data by the Method of least squares.
Numerical Differentiation & Integration: Trapezoidal Rule, Simpson's 1/3rd, 3/8 Rule, Gaussian Integration, Evaluation of principal value integrals, Generalized Quadrature.

UNIT – IV
NUMERICAL SOLUTION OF IVP'S IN ODE
Numerical solution of Ordinary Differential equations: Solution by Taylor's series-Picard's Method of successive Approximations-Euler's Method-Runge-Kutta Methods –Predictor-Corrector Methods- Adams- Bashforth Method.

UNIT – V
PARTIAL DIFFERENTIAL EQUATIONS & APPLICATIONS
Formation of partial differential equations by eliminating arbitrary constants or arbitrary functions, Solutions of first order linear (Lagrange) equation, Solution of nonlinear first order equations (four standard types), Solution using separation of variables, Application to heat equation (one dimension), wave equation (one dimension).

TEXT BOOKS:

1. Mathematical Methods of Science and Engineering by Kanti B.Datta ,Cengage Learning
2. Higher Engineering Mathematics by B.S. Grewal, Khanna Publishers.
3. Numerical Methods using MATLAB by John H Matthews, Kurt D Fink, Pearson Education
4. Numerical Methods, Jain, SRK Iyyengar Narosa Publications

REFERENCES:

1. Advanced engineering Mathematics by Kreyszig, John Wiley & Sons Publishers.
2. Advanced Engineering Mathematics by R.K. Jain & S.R.K. Iyengar, 3rd edition, Narosa Publishing House, Delhi.
3. Engineering Mathematics – I by T.K. V. Iyengar, B. Krishna Gandhi & Others, S. Chand.
4. Engineering Mathematics – I by D. S. Chandrasekhar, Prison Books Pvt. Ltd.
5. Engineering Mathematics – I by G. Shanker Rao & Others I.K. International Publications.
6. Advanced Engineering Mathematics with MATLAB, Dean G. Duffy, 3rd Edi, CRC Press Taylor & Francis Group.
7. Mathematics for Engineers and Scientists, Alan Jeffrey, 6ht Edi, 2013, Chapman & Hall/ CRC
8. Advanced Engineering Mathematics, Michael Greenberg, Second Edition. Pearson Education.

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II YEAR I SEMESTER

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STRENGTH OF MATERIALS – I

Course Objectives

- To provide basic knowledge of mathematics, science and engineering in field of analysis0f structural elements like beams and Colums.
- Enable the students to identify, formulate and solve engineering problems of structural elements subjected to flexure, shear and torsion.
- To give procedural knowledge to analyses of structural system, component of elements such as beams and columns subjected to various load combinations with different boundary conditions.
- To imbibe the culture of professional and ethical responsibilities in the analysis, Flexural stress and shear stress developed in beams.
- To show the impact of engineering solutions on the society and also will be aware of contemporary issues regarding failure of structures due to wrong analysis
- To provide factual knowledge on analysis of structural elements who can participate and succeed in competitive examinations.

UNIT – I

SIMPLE STRESSES AND STRAINS: Elasticity and plasticity – Types of stresses and strains – Hooke's law – stress – strain diagram for mild steel – Working stress – Factor of safety – Lateral strain, Poisson's ratio and volumetric strain – Elastic moduli and the relationship between them – Bars of varying section – composite bars – Temperature stresses.
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 these loads – Point of contra flexure – Relation between S.F., B.M and rate of loading at a section 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 of rectangular 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 like rectangular, circular, triangular, I, T angle sections.

UNIT – IV

DEFLECTION OF BEAMS: Bending into a circular arc – slope, deflection and radius of curvature – Differential equation 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 – Moment area method – application to simple cases including overhanging beams.

CONJUGATE BEAM METHOD: Introduction-concept of conjugate beam method. Difference between a real beam and a conjugate beam. Deflections of determinate beams with constant and different moments of inertia.

UNIT – V

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 biaxial stresses – Two

perpendicular normal stresses accompanied by a state of simple shear – Mohr's circle of stresses – Principal stresses and strains – Analytical and graphical solutions

THEROIES OF FAILURE : Introduction Various Theories of failures like Maximum Principal stress theory – Maximum Principal strain theory – Maximum shear stress theory – Maximum strain energy theory – Maximum shear strain energy theory (Von Mises Theory).

Course Outcomes

- Student acquires the basis of Elasticity and the Strength of Materials
- The student will be able to pre-design different types of elements, for mechanical components, civil engineering structures and buildings.
- The stress and strain fields will be computed based on this theory

TEXT BOOKS:

1. Introduction to text book of Strength of materials by R.K.Bansal – Laxmi publications Pvt. Ltd., New Delhi.
2. Introduction to text book of Strength of Material by U.C. Jindal, Galgotia publications.
3. Strength of materials by R. Subramanian, Oxford university press, New Delhi

REFERENCES:

1. Strength of Materials by S. Ramakrishna and R.Narayan – Dhanpat Rai publications.

2. Strength of materials by R.K.Rajput, S.Chand & Co, New Delhi.

3. Strength of Materials by L.S.Srinath et al., Macmillan India Ltd., Delhi.

4. Strength of Materials by BhaviKatti.

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II YEAR I SEMESTER

L	T/P/D	C
4	-/-/-	4

SURVEYING

Course Objectives

- Ability to apply knowledge of mathematics in surveying to calculate areas and volumes for different projects.
- Ability to identify, formulate and solve problems in the field of advanced surveying.
- Ability to analyze survey data and design civil engineering projects.
- Ability to engage in life- long learning with the advances in survey techniques.

UNIT – I

INTRODUCTION BASIC CONCEPTS: Introduction, Objectives, classifications and Principles of surveying, Scales, Shrinkage of maps, conventional symbols and code of signals, Surveying Accessories, phases of surveying.

MEASUREMENT OF DISTANCES AND DIRECTIONS:
Linear distances: Approximate methods, Direct methods-chains – tapes, ranging- tape corrections, Indirect methods-optical methods –E.D.M methods.
Prismatic Compass: Bearings, Included Angles, Local Attraction, Magnetic Declination and Dip.

UNIT – II:

LEVELING AND CONTOURING:
Leveling: Basic definitions, types of levels and leveling staves,Temporary and permanent adjustments- method of leveling. Booking and determination of levels-HI method – Rise and fall method, effect of curvature if earth and refraction
Contouring: Characteristics and Uses of contours, Direct and indirect methods of contour surveying, interpolation and sketching of Contours.

COMPUTATION OF AREAS AND VOLUMES:
Areas: Area from field notes, computation of areas along irregular boundaries and area consisting of regular boundaries, Planimeter.
Volumes:Embankments and cutting for a level section and two level sections with and without transverse slopes, determination of the capacity of reservoir, volume of barrow pits.

UNIT – III

THEODOLITE SURVEYING: Types of Theodolite, description, uses and adjustments – temporary and permanent, measurement of horizontal and vertical angles. Principles of Electronic Theodolite. Trigonometrical leveling when the base is accessible and in accessible

UNIT – IV

TRAVERSING: Methods of traversing traverse computation and adjustments , gale's traverse table, omitted measurements
TACHEOMETRIC SURVEYING: Principles of tacheometry, Stadia and tangential methods of Tacheometry.

UNIT – V

CURVES: Types of curves, design and setting out – simple and compound curves.

INTRODUCTION TO MODERN SURVEYING METHODS: Total Station, Global positioning system and Geographic information system (GIS).

Course Outcomes

1. Students will learn surveying techniques that will remain current for long periods of time.
2. Students understand the range of calculations that can be made with surveying data and understand the linkages between surveying data and engineering design.
3. Students learn to work with others, respect the contributions of others, resolve difficulties, and understand responsibility.

TEXT BOOKS:

1. "Surveying (Vol – 1, 2 & 3), by B.C.Punmia, Ashok Kumar Jain and Arun Kumar Jain - Laxmi Publications (P) ltd., New Delhi
2. Duggal S K, "Surveying (Vol – 1 & 2), Tata Mc.Graw Hill Publishing Co. Ltd. New Delhi,
3. Surveying and levelling by R. Subramanian, Oxford university press, New Delhi

REFERENCES:

1. Arror K R "Surveying Vol 1, 2 & 3), Standard Book House, Delhi, 2004
2. Chandra A M, "Plane Surveying", New age International Pvt. Ltd., Publishers, New Delhi, 2002.
3. Chandra A M, "Higher Surveying", New age International Pvt. Ltd., Publishers, New Delhi,

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II YEAR I SEMESTER   L   T/P/D C
                                                                              4   -/-/-   4
FLUID MECHANICS

Course Objectives

- Ability to apply the knowledge of mechanics of fluids in the practical civil engineering problems.
- Ability to identify, formulate and solve problems in fluid mechanics.
- Ability to analyze the behavior of fluid in static and dynamic conditions.
- Ability to use the techniques, skills to formulate and solve engineering problems.
- Ability to engage in lifelong learning with the advance in hydraulics.

UNIT I

INTRODUCTION: Dimensions and units – Physical properties of fluids specific gravity, viscosity, surface tension, vapor pressure and their influences on fluid motion, Pressure at a point, Pascal's law, Hydrostatic law - atmospheric, gauge and vacuum pressure- measurement of pressure. Pressure gauges, Manometers: differential and Micro Manometers.

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

UNTI – II

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

UNIT – III

FLUID DYNAMICS: Surface and body forces – Euler's and Bernoulli's equations for flow along a stream line for 3-D flow, (Applications of Bernoulli's Equation) (Navier – stokes equations (Explanationary) Momentum equation and its application – forces on pipe bend.

UNIT – IV

BOUNDARY LAYER THEORY : Approximate Solutions of Navier Stoke's Equations – Boundary layer – concepts, Prandtl contribution, Characteristics of boundary layer along a thin flat plate, Vonkarmen momentum integral equation, laminar and turbulent Boundary layers,BL in transition, separation of BL, control of BL, flow around submerged objects- Drag and Lift- Magnus effect.

LAMINAR AND TURBULENT FLOW: Reynold's experiment – Characteristics of Laminar & Turbulent flows. Flow between parallel plates, Flow through long tubes, flow through inclined tubes.

UNIT – V

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.

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

Course Outcomes

- Use the control volume approach to determine the velocity, flow rate, mass, force or energy within a system.
- Develop an experiment to measure fluid properties in a actual environmental problem.

- Increase ability to work with computers, especially for the purpose of solving problems and communicating solutions on fluid mechanics topics.

TEXT BOOKS:
1. Fluid Mechanics by Modi and Seth, Standard book house.
2. Introduction to Fluid Machines by S.K.Som & G.Biswas (Tata Mc.Grawhill publishers Pvt. Ltd.)
3. Introduction to Fluid Machines by Edward J. Shaughnessy, Jr, Ira M. Katz and James P. Schaffer , Oxford University Press, New Delhi

REFERENCES:
1. Fluid Mechanics by J.F.Douglas, J.M. Gaserek and J.A.Swaffirld (Longman)
2. Fluid Mechanics by Frank.M. White (Tata Mc.Grawhill Pvt. Ltd.)
3. Fluid Mechanics by A.K. Mohanty, Prentice Hall of India Pvt. Ltd., New Delhi
4. Fluid Mechanics by Subramanya Tata McGraw-Hill Education, 2011
5. Fluid Mechanics by R.K.Rajput, S. Chand, 01-Jan-2008

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II YEAR I SEMESTER   L   T/P/D C
                                                                          4   -/-/-   4

BUILDING MATERIALS, CONSTRUCTION AND PLANNING

Course Objectives

- To provide basic knowledge in engineering materials which includes role of materials in civil engineering based on Physical, chemical and Mechanical properties which will be useful for all engineering works.
- Enable the students to develop knowledge of material science and behavior of various building materials used in construction.
- To identify the construction materials required for the assigned work.
- To provide procedural Knowledge of the simple testing methods of cement, Lime and concrete etc.
- This course has several advantages that will enable a student to get engaged in any civil engineering work area.

UNIT – I

STONES AND BRICKS, TILES: Building stones – classifications and quarrying – properties – structural requirements – dressing.
Bricks – Composition of Brick earth – manufacture and structural requirements.

WOOD, ALUMINUM, GLASS AND PAINTS: Wood - structure – types and properties – seasoning – defects; alternate materials for wood – GI / fibre –reinforced glass bricks, steel & aluminum.

UNIT – II

CEMENT & ADMIXTURES: Ingredients of cement – manufacture – field & lab tests
Admixtures – mineral & chemical admixtures – uses.

UNIT-III

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

BUILDING SERVICES: Plumbing Services: Water Distribution, Sanitary – Lines & Fittings; Ventilations: Functional requirements systems of ventilations. Air-conditioning - Essentials and Types; Acoustics – characteristic – absorption – Acoustic design; Fire protection – FireHarzards – Classification of fire resistant materials and constructions.

UNIT – IV

MASONRY AND FINISHINGS: Brick masonry – types – bonds ; Stone masonry – types; Composite masonry – Brick-stone composite ; Concrete, Reinforced brick. Finishers : Plastering, Pointing, Painting, Claddings – Types – Tiles - ACP
FORM WORK: Requirements – Standards – Scaffolding – Design ; Shoring, Underpinning.

UNIT – V

BUILDING PLANNING: Principles of Building Planning, Classification of buildings and Building by laws.
Course Outcomes

- The student has the fundamental education that will lead to a leadership role in the construction industry
- The student possesses the fundamental knowledge and skills needed to manage the principal resources of the construction industry to include human, material, equipment, and financial resources
- The student will understand the global nature of the construction industry

TEXT BOOKS:

1. Building Materials by S.C.Rangwala, Charotar Publishing House.

2. Building Materials and Construction – Arora & Bindra, Dhanpat Roy Publications
3. Building Construction by B.C.Punmia, Ashok Kumar Jain and Arun Kumar Jain - Laxmi Publications (P) ltd., New Delhi
4. Construction Technology – Vol – I & II by R. Chuddy, Longman UK

REFERENCES:

1. Building Materials by Duggal, New Age Internationsl
2. Building Construction by PC Verghese PHI.
3. National Building code-2002

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(Autonomous)

II YEAR I SEMESTER   **L   T/P/D C**
                                                                         4   -/-/-   4

ENVIRONMENTAL STUDIES

Course Objectives

- An interdisciplinary approach to complex environmental problems using basic tools of the natural and social sciences including geosystems, biology, chemistry, economics, political science and international processes.

- The ability to work effectively as a member of an interdisciplinary team on complex problems involving multiple competing stakeholders and agendas.

- The ability to apply quantitative reasoning skills to environmental problems including basic calculations related to energy, water, and air issues and the use of statistical methods in data analysis and argumentation.

UNIT-I

ECOSYSTEMS: Definition, Scope and Importance of ecosystem, Concept of ecosystem, Classification of ecosystems, Structure and Structural Components of an ecosystem, Functions of ecosystem, Food chains, food webs and ecological pyramids. Flow of energy, Biogeochemical cycles, Homeostasis / Cybernetics, Food chain concentration, Biomagnification, ecosystems value, services and carrying capacity.

UNIT-II

NATURAL RESOURCES: Classification of Resources: Living and Non-Living resources, Renewable and non-renewable resources. Water resources: use and over utilization of surface and ground water, floods and droughts, Dams: benefits and problems. Mineral resources: use and exploitation, environmental effects of extracting and using mineral resources – case studies. Energy resources: growing energy needs, renewable and non renewable energy sources, use of alternate energy sources – case studies. Land resources: land as a resource, land degradation, man induced landslides and land use / land cover mapping.

BIODIVERSITY AND BIOTIC RESOURCES: Introduction, Definition, genetic, species and ecosystem diversity. Value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and intrinsic values. Hot spots of biodiversity. Threats to biodiversity: habitat loss, poaching of wildlife, man- wildlife conflicts, conservation of biodiversity: In-Situ and Ex-situ conservation. Food and fodder resources, Timber and non-timber forest products.

UNIT-III

ENVIRONMENTAL POLLUTION AND CONTROL: Classification of pollution and pollutants, causes, effects and control technologies. Air Pollution: Primary and secondary pollutants, Automobile and Industrial pollution, Ambient air quality standards. Water pollution: Point and non-point sources of pollution, Major pollutant of water and their sources, drinking water quality standards, Waste water treatment methods: effluent treatment plants (ETP), Sewage treatment plants (STP), common and combined effluent treatment plants (CETP).Soil Pollution: Soil as sink for pollutants, Impact of modern agriculture on soil, degradation of soil. Marine Pollution: Misuse of International water for dumping of hazardous waste, coastal pollution due to sewage and marine disposal of industrial effluents. Noise Pollution: Sources, Industrial Noise- Occupational Health hazards, standards, Methods of control of Noise. Thermal Pollution: Thermal Comforts, Heat Island effect, Radiation effects. Nuclear Pollution: Nuclear power plants, nuclear radiation, disasters and impacts, genetical disorders. Solid waste: types, Collection processing and disposal of industrial and municipal solid wastes composition and characteristics of e-Waste and its management.

UNIT-IV

GLOBAL ENVIRONMENTAL PROBLEMS AND GLOBAL EFFORTS : Green house effect, Green House Gases (GHG), Global Warming, Sea level rise, climate change and their impacts on human environment. Ozone depletion and Ozone depleting substances (ODS).Deforestation and desertification. International conventions / Protocols: Earth summit, Kyoto protocol and Montréal Protocol,

ENVIRONMENTAL IMPACT ASSESSMENT (EIA) AND ENVIRONMENTAL MANAGEMENT PLAN: Definition of Impact: classification of impacts, Positive and Negative, methods of baseline data acquisition. Impacts on different environmental components. Prediction of impacts and impact assessment methodologies. Environmental Impact Statement (EIS). Environmental Management Plan (EMP): Technological Solutions, preventive methods, Control technologies, treatment technologies: green-belt- development, rain water harvesting, Remote sensing and GIS methods.

UNIT-V

ENVIRONMENTAL POLICY, LEGISLATION, RULES AND REGULATIONS: National Environmental Policy, Environmental Protection act, Legal aspects Air (Prevention and Control of pollution) Act- 1981, Water(Prevention and Control of pollution) Act-1974, Water pollution Cess Act-1977, Forest Conservation Act, Municipal solid waste management and handling rules, biomedical waste management and handling rules, hazardous waste management and handling rules .

TOWARDS SUSTAINABLE FUTURE
Concept of Sustainable Development, Threats to Sustainability, Population and its explosion, Crazy Consumerism, Over-exploitation of resources, Strategies for Achieving Sustainable development, Environmental Education, Conservation of Resources, Urban Sprawl, Sustainable Cities and Sustainable Communities, Human health, Role of IT in Environment, Environmental Ethics, Environmental Economics, Concept of Green Building, Clean Development Mechanism (CDM).

Course Outcomes

- To enable the students to realise the importance of the sustainable use of natural resources
- To make the students aware of the impacts of human actions on environment and measures to minimize and mitigate them
- To enable the students to become aware of the current issues and problems pertaining to the environment

TEXT BOOKS:

1. Environmental studies , From crisis to cure by R.Rajagopalan, 2005
2. Environmental studies by Erach Bharucha 2005, University Grants Commission, University Press.

REFERENCE BOOKS:

1. Text book of Environmental Science and Technology by M.Anji Reddy 2007
2. Environmental Science: towards a sustainable future by Richard T.Wright. 2008 PHL Learning Private Ltd. New Delhi
3. Environmental Engineering and science by Gilbert M.Masters and Wendell P. Ela .2008 PHI Learning Pvt. Ltd.

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II YEAR I SEMESTER	0	-/3/-	2

SURVEYING LAB – I

Course objectives:

- Ability to apply knowledge of mathematics in surveying field to calculate areas and volumes for different projects.
- Ability to operate different types of instruments in surveying.
- Ability to analyze survey data and design civil engineering projects.
- Ability to work in a team

LIST OF EXERCISES:

1. Survey of an area by chain survey (closed traverse) & Plotting

2. Chaining across obstacles

3. Determination of distance between two inaccessible points with compass.

4. Surveying of a given area by prismatic compass (closed traverse) and plotting after adjustment.

5. Radiation method, intersection methods by plane Table survey

6. Two point and three point problems in plane table survey

7. Traversing by plane table survey

8. Fly leveling (differential leveling)

9. An exercise of L.S and C.S and plotting

10. Two exercises on contouring.

LIST OF MAJOR EQUIPMENT:

1. Chains, tapes, Ranging rods, cross staff, arrows

2. Compasses and Tripods, Optical square.

3. Plane tables, Alidade, Plumbing fork, trough compasses

4. Leveling instruments and leveling staves

5. Box sextants, planimeter.

Course outcomes:

1. Have the ability to apply knowledge of mathematics, science, and engineering to understand the measurement techniques and equipment used in land surveying.
2. Gain the ability to use modern survey equipment to measure angles and distances
3. Improve ability to function as a member of a survey party in completing the assigned field work

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STRENGTH OF MATERIALS LAB

Course Objectives:

- Ability to apply knowledge of Mathematics and Engineering in calculating the mechanical properties like tensile strength, compressive strength, bending strength, shear strength, hardness of Mild steel, HYSD bars, cast iron and wood.
- Ability to use the techniques, skills, and modern engineering tools necessary for engineering
- The broad education to understand the impact of engineering solutions in a global and Societal context with respect to problems in Materials Testing.
- Ability to engage in life- long learning with the advances in Material testing

LIST OF EXERCISES:

1. Tension test

2. Bending test on (Steel / Wood) Cantilever beam.

3. Bending test on simple support beam.

4. Torsion test

5. Brinell hardness & Rock well hardness test

6. Spring test

7. Compression test on wood or concrete

8. Impact test

9. Shear test

10. Verification of Maxwell's Reciprocal theorem on beams.

11. Use of electrical resistance strain gauges

12. Continuous beam – deflection test.

LIST OF EQUIPMENT:

1. UTM for conducting tension test on rods

2. Steel beam for flexure test

3. Wooden beam for flexure test

4. Torsion testing machine

5. Brinnell's / Rock well's hardness testing machine

6. Setup for spring tests

7. Compression testing machine

8. Izod Impact machine

9. Shear testing machine

10. Beam setup for Maxwell's theorem verification.

11. Continuous beam setup

12. Electrical Resistance gauges.

Course outcomes:

- Understand the concepts and principles applied to members under various loadings and the effects of these loadings.
- Analyze and design structural members subjected to tension, compression, torsion, bending and combined stresses using the fundamental concepts of stress, strain and elastic behavior of materials.
- Conduct himself or herself professionally and with regard to his or her responsibilities toward society, especially with respect to designing machine parts and structures to prevent failure

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II YEAR II SEMESTER   L   T/P/D C
                                                          4   -/-/-   4
PROBABILITY & STATISTICS

Course Objectives:

1. Understand a random variable that describes randomness or an uncertainty in certain realistic situation.
2. It can be of either discrete or continuous type.
3. In the discrete case, study of the binomial and the Poisson random variables and the Normal random variable for the continuous case predominantly describe important probability distributions. Important statistical properties for these random variables provide very good insight and are essential for industrial applications.
4. Most of the random situations are described as functions of many single random variables. In this unit, the objective is to learn functions of many random variables through joint distributions.
5. The types of sampling, Sampling distribution of means ,Sampling distribution of variance,Estimations of statistical parameters, Testing of hypothesis of few unknown statistical parameters.
6. The mechanism of queuing system ,The characteristics of queue,The mean arrival and service rates
7. The expected queue length, The waiting line
8. The random processes, The classification of random processes, Markov chain, Classification of states
9. Stochastic matrix (transition probability matrix),Limiting probabilities, Applications of Markov chains

UNIT-I
SINGLE RANDOM VARIABLES AND PROBABILITY DISTRIBUTIONS: Random variables – Discrete and continuous. Probability distributions, mass function/ density function of a probability distribution. Mathematical Expectation, Moment about origin, Central moments, Moment generating function of probability distribution. Binomial, Poisson & normal distributions and their properties. Moment generating functions of the above three distributions, and hence finding the mean and variance.

UNIT-II
MULTIPLE RANDOM VARIABLES, CORRELATION & REGRESSION: Joint probability distributions- Joint probability mass / density function, Marginal probability mass / density functions, Covariance of two random variables, Correlation - Coefficient of correlation, The rank correlation. Regression- Regression Coefficient, The lines of regression and multiple correlation & regression.

UNIT-III
SAMPLING DISTRIBUTIONS AND TESTING OF HYPOTHESIS
Sampling: Definitions of population-sampling-statistic - parameter. Types of sampling, Expected values of
Sample mean and variance, sampling distribution, Standard error, Sampling distribution of means and sampling distribution of variance.
Parameter estimations – likelihood estimate, interval estimations.
Testing of hypothesis: Null hypothesis, Alternate hypothesis, type I, & type II errors – critical region, confidence interval, Level of significance. One sided test, two sided test.
Large sample tests:
(i) Test of Equality of means of two samples equality of sample mean and population mean (cases of known variance & unknown variance, equal and unequal variances)
(ii) Tests of significance of difference between sample S.D and population S.D.
(iii) Tests of significance difference between sample proportion and population proportion & difference between two sample proportions.
Small sample tests:
Student t-distribution, its properties; Test of significance difference between sample mean and population mean; difference between means of two small samples, Snedecor's F- distribution and it's properties. Test of equality of two population variances, Chi-square distribution , it's properties, Chi-square test of goodness of fit

UNIT-IV
QUEUING THEORY: Structure of a queuing system, Operating Characteristics of queuing system, Transient and steady states, Terminology of Queuing systems, Arrival and service processes- Pure Birth-Death process

Deterministic queuing models- M/M/1 Model of infinite queue, M/M/1 model of finite queue.

UNIT-V
STOCHASTIC PROCESSES: Introduction to Stochastic Processes –Classification of Random processes, Methods of description of random processes, Stationary and non-stationary random process, Average values of single random process and two or more random processes. Markov process, Markov chain, classification of states – Examples of Markov Chains, Stochastic Matrix.

Course Outcomes:

1. Students would be able to identify distribution in certain realistic situation. It is mainly useful for circuit as well as non-circuit branches of engineering. Also able to differentiate among many random variables Involved in the probability models. It is quite useful for all branches of engineering.
2. The student would be able to calculate mean and proportions (small and large sample) and to make Important decisions from few samples which are taken out of unmanageably huge populations . It is mainly useful for non-circuit branches of engineering.
3. The students would be able to find the expected queue length, the ideal time, the traffic intensity and the waiting time. These are very useful tools in many engineering and data management problems in the industry. It is useful for all branches of engineering.
4. The student would able to understand about the random process, Markov process and Markov chains which are essentially models of many time dependent processes such as signals in communications, time series analysis, queuing systems. The student would be able to find the limiting probabilities and the probabilities in nth state. It is quite useful for all branches of engineering

TEXT BOOKS:

1. Probability & Statistics for Engineers & Scientists –Walpole Myers Myers Ye
2. Higher Engineering Mathematics by Dr. B.S. Grewal, Khanna Publishers
3. Probability and Statistics for Engineers and Scientists by Sheldon M.Ross, Academic Press
4. Operations Research by S.D. Sarma,

REFERENCE BOOKS:

1. Mathematics for Engineers by K.B.Datta and M.A S.Srinivas,Cengage Publications
2. Probability and Statistics by T.K.V.Iyengar & B.Krishna Gandhi Et
3. Fundamentals of Mathematical Statistics by S C Gupta and V.K.Kapoor
4. Probability and Statistics for Engineers and Scientists by Jay l.Devore.

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ELECTRICAL AND ELECTRONICS ENGINEERING

Course Objectives: The will expose basic knowledge on electrical engineering, Network theorems, DC and AC Machines, Basics of electronic devices and circuits

UNIT – I

INTRODUCTION TO ELECTRICAL ENGINEERING: Electric field; electric current, potential and potential difference, electromotive force, electric power, ohm's law, basic circuit components, electromagnetism related laws, Faradays laws of electromagnetic induction. Types of induced EMF's, Kirchhoff's laws, Simple problems.

NETWORK ANALYSIS: Basic definitions, types of elements , types of sources, resistive networks, inductive networks, capacitive networks, series, parallel circuits, star- delta and delta - star transformation
Network theorems- Superposition , Reciprocity, Thevenins's, Nortons & Maximum power transfer theorems and simple problems.

UNIT-II

MAGNETIC CIRCUITS: Basic definitions, analogy between electric and magnetic circuits.
Transformers: Principles of operation, Constructional Details, EMF equation, OC and SC test on transformer simple problems.

UNIT-III

D.C MACHINES: Principle of operation of D.C machines, armature windings, e.m.f equation in a D.C machine, Torque production in a D.C machine, Operation of a D.C machine as a generator, operation of a D.C machine as a motor.
A.C Machines: principle of operation, slip and rotor frequency, torque (simple Problems).

UNIT - IV

DIODE AND IT'S CHARACTERISTICS: P-N junction diode, symbol, V-I Characteristics, Diode Applications,
Zener diode characteristics, Rectifiers – Half wave, Full wave and Bridge rectifiers with filters and without filters(simple Problems)
TRANSISTORS: PNP and NPN Junction transistor, Transistor as an amplifier, SCR characteristics and applications

UNIT-V

CATHODE RAY OSCILLOSCOPE: Principles of CRT (Cathode Ray Tube), Deflection, Sensitivity, electrostatic and Magnetic deflection, Applications of CRO - Voltage, Current and frequency measurements.

OSCILLATORS: Condition for oscillations. RC-phase shift oscillators with Transistor , Hartley and Colpitts oscillators, Wein bridge oscillator,

TEXT BOOKS:
1. Essentials of Electrical and Computer Engineering by David V. Kerns, JR. J. David Irwin/Pearson.
2. Principles of Electrical and Electronics Engineering by V.K.Mehta, S.Chand & Co.

REFERENCES:

1. Introduction to Electrical Engineering – M.S Naidu and S. Kamakshaiah, TMH Publ.
2. Basic Electrical Engineering by Kothari and Nagarath, TMH Publications, 2nd Edition

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II YEAR II SEMESTER	L	T/P/D C
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HYDRAULICS AND HYRAULIC MACHINERY

Course Objectives:

- Ability to apply the knowledge of hydraulics in the practical civil engineering problems and to identify, formulate and solve problems in hydraulics.
- Ability to analyze the application of fluid mechanics principles to problems dealing with the collection, storage, control, transport, regulation, measurement, and use of water
- Ability to use the techniques, skills to formulate and solve engineering problems and to engage in lifelong learning with the advance in hydraulics.

UNIT – I

OPEN CHANNEL FLOW : Types of flows - Type of channels – Velocity distribution – Energy and momentum correction factors – Chezy's, Manning's; and Bazin formulae for uniform flow – Most Economical sections. Critical flow: Specific energy-critical depth – computation of critical depth – critical sub-critical and super critical flows. Non uniform flow-Dynamic equation for G.V.F., Mild, Critical, Steep, horizontal and adverse slopes-surface profiles-direct step method- Rapidly varied flow, hydraulic jump, energy dissipation.

UNIT – II

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.

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-cavitations.

UNIT – V

CENTRIFUGAL-PUMP: Pump installation details-classification-work done- Manometric head-minimum starting speed-losses and efficiencies-specific speed multistage pumps-pumps in parallel- performance of pumps-characteristic curves- NPSH-cavitations.
HYDROPOWER ENGINEERING: Classification of Hydropower plants – Definition of terms – load factor, utilization factor, capacity factor, estimation of hydropower potential.

Course Outcomes:

- Demonstrate understanding of the basic principles of fluid mechanics including fluid statics, kinematics and dynamics;
- Demonstrate the knowledge of the basic methods in analysing various flow phenomena including the application of dimensional analysis;
- Apply analytical methods to the solution of typical hydraulic engineering problems such as flow in pipes and open channels

TEXT BOOKS:
1. Fluid Mechanics, Hydraulic and Hydraulic Machines by Modi & Seth, Standard book house.
2. Open Channel flow by K,Subramanyam . Tata Mc.Grawhill Publishers.
3. Fluid Mechanics & Fluid machines by Narayana pillai, Universities press.

REFERENCES:
1. A text of Fluid mechanics and hydraulic machines by Dr. R.K. Bansal - Laxmi Publications (P) ltd., New Delhi
2. Elements of Open channel flow by Ranga Raju, Tata Mc.Graw Hill, Publications.
3. Open Channel flow by V.T.Chow, Mc.Graw Hill book company.

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II YEAR II SEMESTER

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STRENGTH OF MATERIALS – II

Course Objectives:

- To provide the basic concepts of Columns and Struts.
- To give an ability to calculate stresses and deformations of Direct and Bending Stresses.
- To give an ability to apply the knowledge of strength of materials on engineering applications and design problems.

UNIT – I

TORSION OF CIRCULAR SHAFTS : Theory of pure torsion – Derivation of Torsion equations : $T/J = q/r = N\theta/L$ – Assumptions made in the theory of pure torsion – Torsional moment of resistance – Polar section modulus – Power transmitted by shafts – Combined bending and torsion and end thrust – Design of shafts according to theories of failure.

SPRINGS: Introduction – Types of springs – deflection of close and open coiled helical springs under axial pull and axial couple – springs in series and parallel – Carriage or leaf springs.

UNIT – II

COLUMNS AND STRUTS: Introduction – Types of columns – Short, medium and long columns – Axially loaded compression members – Crushing load – Euler's theorem for long columns- assumptions- derivation 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 – Gordon formula – Long columns subjected to eccentric loading – Secant formula – Empirical formulae – Straight line formula – Prof. Perry's formula.

BEAM COLUMNS: Laterally loaded struts – subjected to uniformly distributed and concentrated loads – Maximum B.M. and stress due to transverse and lateral loading.

UNIT – III

DIRECT AND BENDING STRESSES: Stresses under the combined action of direct loading and bending moment, core of a section – determination of stresses in the case of chimneys, retaining walls and dams – conditions for stability – stresses due to direct loading and bending moment about both axis. **UNSYMETRICAL**

BEAMS CURVED IN PLAN: Introduction – circular beams loaded uniformly and supported on symmetrically placed columns – Semi- circular beam simply-supported on three equally spaced supports.

UNIT – IV

THIN CYLINDERS: Thin seamless cylindrical shells – Derivation of formula for longitudinal and circumferential stresses – hoop, longitudinal and volumetric strains – changes in dia, 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 spherical shells.

UNIT – V

UNSYMMETRICAL 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.

SHEAR CENTRE: Introduction-shear centre for symmetrical and unsymmetrical (Channel, I, T & L) Sections

Course Outcomes:

1. Analyze and design structural members subjected to tension, compression, torsion, bending and combined stresses using the fundamental concepts of stress, strain and elastic behaviour of materials.
2. Analyze columns and pressure vessels under various loadings.
3. Conduct himself or herself professionally and with regard to his or her responsibilities toward society, especially with respect to designing machine parts and structures to prevent failure.

TEXT BOOKS:
1. A Text book of Strength of materials by R.K.Bansal –Laxmi Publications (P) ltd., New Delhi
2. Strength of materials by Basavarajaiah and Mahadevappa, University press
3. Strength of Materials by Bhavikatti, Vikas Publications

REFERENCES:
1. Mechanics of Solid, by Ferdinandp Beer and others – Tata Mc.Grawhill Publications 2000.
2. Strength of Materials by S. Ramakrishna and R.Narayan – Dhanpat Rai publications.
3. Strength of Materials by A.R.Basu, Dhanpat Rai & Co, Nai Sarah, New Delhi.
4. Strength of Materials by L.S.Srinath et al., Macmillan India Ltd., Delhi.

MALLA REDDY ENGINEERING COLLEGE
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STRUCTURAL ANALYSIS – I

Course Objectives:

- Ability to apply knowledge of mathematics and engineering in calculating slope, deflection, bending moment and shear force using various methods of approach.
- Ability to identify, formulate and solve problems in structural analysis.
- Ability to analyse structural system and interpret ate data.
- Ability to use the techniques, skills to formulate and solve engineering problem.
- Ability to communicate effectively in design of structural elements.
- Ability to engage in life-long learning with the advances in structural problems.

UNIT – I

ANALYSIS OF PERFECT FRAMES: Types of frames- perfect, imperfect and redundant pin jointed frames.. Analysis of determinate pin jointed frames using method of joints, method of sections and tension coefficient method for vertical loads horizontal and inclined loads.

UNIT – II

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.

THREE HINGED ARCHES: Introduction, types of arches- comparison between three hinged and two hinged arches. Linear arch. Eddy's theorem analysis of three hinged arches. normal thrust and radial shear in an arch geometrical properties of parabolic and circular arch. Three hinged circular arch at different levels. Absolute maximum bending moment diagram for a three hinged arch.

UNIT – III

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-IV

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. Derivation of slope deflection equation, application to continuous beams with and without settlement of supports. Analysis of continuous beams with and without settlement of supports using moment distribution method. Shear force and bending moment diagrams, Elastic curve.

UNIT – V

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-Equivalent uniformly distributed load-Focal length.

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- Influence lines for forces in members of Pratt and Warren trusses.

Course outcomes:

- Understands what different types of displacement methods are.
- Understands how to solve different deflection related problems in beams, arches, cables.
- Understands how to control the deflections and displacements under different loading conditions.
- Understands the concept of influence lines.
- Understands how to predict different mitigation problems by drawing shear force and bending moments.

TEXT BOOKS:

1. Analysis of Structures-Vol I & Vol II by V.N. Vazirani & M.M.Ratwani, Khanna Publications, New   Delhi.
2. Analysis of Structures by T.S. Thandavamoorthy, Oxford University Press, New Delhi
3. Structural Analysis by S S Bhavikatti – Vikas Publishing House.

REFERENCES:

1. Mechanics of Structures by S.B.Junnarkar, Charotar Publishing House, Anand, Gujrat
2. Theory of Structures by Pandit & Gupta; Tata Mc.Graw – Hill Publishing Co.Ltd., New Delhi.
3. Strength of Materials and Mechanics of Structures- by B.C.Punmia, Khanna Publications, New Delhi.

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MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS

UNIT I

INTRODUCTION TO MANAGERIAL ECONOMICS: Definition, Nature and Scope of Managerial Economics– Demand Analysis: Demand Determinants, Law of Demand and its exceptions.

ELASTICITY OF DEMAND: Definition, Types, Measurement and Significance of Elasticity of Demand. Demand Forecasting, Factors governing demand forecasting, methods of demand forecasting (survey methods, statistical methods, expert opinion method, test marketing, controlled experiments, judgmental approach to demand forecasting)

UNIT II

THEORY OF PRODUCTION AND COST ANALYSIS: Production Function – Isoquants and Isocosts, MRTS, Least Cost Combination of Inputs, Cobb-Douglas Production function, Laws of Returns, Internal and External Economies of Scale.

COST ANALYSIS: Cost concepts, Opportunity cost, fixed vs. Variable costs, explicit costs Vs. Implicit costs, Out of pocket costs vs. Imputed costs. 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. Price-Output Determination in case of Perfect Competition and Monopoly.

OBJECTIVES AND POLICIES OF PRICING- **METHODS OF PRICING:** Cost Plus Pricing, Marginal Cost Pricing, Sealed Bid Pricing, Going Rate Pricing, Limit Pricing, Market Skimming Pricing, Penetration Pricing, Two-Part Pricing, Block Pricing, Bundling Pricing, Peak Load Pricing, Cross Subsidization.

UNIT IV

BUSINESS & NEW ECONOMIC ENVIRONMENT:
Characteristic features of Business, Features and evaluation of Sole Proprietorship, Partnership, Joint Stock Company, Public Enterprises and their types, Changing Business Environment in Post-liberalization scenario.

CAPITAL AND CAPITAL BUDGETING: Capital and its significance, Types of Capital, Estimation of Fixed and Working capital requirements, Methods and sources of raising finance.Nature and scope of capital budgeting, features of capital budgeting proposals, Methods of Capital Budgeting: Payback Method, Accounting Rate of Return (ARR) and Net Present Value Method (simple problems)

UNIT V

INTRODUCTION TO FINANCIAL ACCOUNTING: Double-Entry Book Keeping, Journal, Ledger, Trial Balance- Final Accounts (Trading Account, Profit and Loss Account and Balance Sheet with simple adjustments).

FINANCIAL ANALYSIS THROUGH RATIOS: Computation, Analysis and Interpretation of Liquidity Ratios (Current Ratio and quick ratio), Activity Ratios (Inventory turnover ratio and Debtor Turnover ratio), Capital structure Ratios (Debt- Equity ratio, Interest Coverage ratio), and Profitability ratios (Gross Profit Ratio, Net Profit ratio, Operating Ratio, P/E Ratio and EPS).

TEXT BOOKS:

1.   Aryasri: Managerial Economics and Financial Analysis, 2/e, TMH, 2005.
2.   Varshney & Maheswari: Managerial Economics, Sultan Chand, 2003.

REFERENCE BOOKS:

1.   Ambrish Gupta, Financial Accounting for Management, Pearson Education, New Delhi.
2.   H. Craig Peterson & W. Cris Lewis, Managerial Economics, PHI, 4th Ed.
3.   Suma Damodaran, Managerial Economics, Oxford University Press.
4.   Lipsey & Chrystel, Economics, Oxford University Press.
5.   S. A. Siddiqui & A. S. Siddiqui, Managerial Economics & Financial Analysis, New age International Space Publications.
6.   Domnick Salvatore: Managerial Economics In a Global Economy, 4th Edition, Thomson.
7.   Narayanaswamy: Financial Accounting—A Managerial Perspective, PHI.
8.   Raghunatha Reddy & Narasimhachary: Managerial Economics& Financial Analysis, Scitech.
9.   S.N.Maheswari & S.K. Maheswari, Financial Accounting, Vikas.
10.   Truet and Truet: Managerial Economics:Analysis, Problems and Cases, Wiley.
11.   Dwivedi:Managerial Economics, 6th Ed., Vikas.

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II YEAR II SEMESTER   **L   T/P/D C**
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COMPUTER AIDED DRAFTING OF BUILDINGS

Course Objectives:

- To train the students with CAD packages like PRO-E.
- To impart the 2D and 3D modeling of structures to the students

LIST OF EXERCISES:

1. Introduction to computer aided drafting

2. Software for CAD – Introduction to different software's

3. Practice exercises on CAD software

4. Drawing of plans of buildings using software

   a) Single storyed buildings

   b) Multi storyed buildings

5. Developing sections and elevations for

   a) Single storyed buildings

   b) Multi storyed buildings

6. Detailing of building components like Doors, Windows, Roof Trusses etc. using CAD software's

7. Exercises on development of working of buildings

Course Outcomes:

- Be able to use computer aided drafting tools for engineering design and analysis problems.
- Be able to graphically present design ideas using technical drawings produced manually and by CAD software.
- Through team work, be able to produce a set of three-dimensional models, integrate them and produce a set of technical drawings for display.

TEXT BOOKS:

1. Computer Aided Design Laboratory by M. N. Sesha Praksh & Dr. G. S. Servesh – Laxmi Publications.

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(Autonomous)

II YEAR II SEMESTER   **L   T/P/D   C**
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SURVEYING LAB – II

Course Objectives:

- Ability to apply knowledge of mathematics in surveying field to calculate areas and volumes for different projects.
- Ability to operate different types of instruments in surveying.
- Ability to analyze survey data and design civil engineering projects.
- Ability to work in a team

LIST OF EXERCISES:

1. Study of Theodolite in detail - practice for measurement of horizontal and vertical angles.

2. Measurement of horizontal angles by method of repetition and reiteration.

3. Trigonometric Leveling - Heights and distance problem (Two Exercises)

4. Heights and distance using Principles of tacheometric surveying (Two Exercises)

5. Curve setting – different methods. (Two Exercises)

6. Setting out works for buildings & pipe lines.

7. Determine of area using total station

8. Traversing using total station

9. Contouring using total station

10. Determination of remote height using total station

11. State-out using total station

12. Distance, gradient, Diff, height between tow inaccessible points using total stations

LIST OF EQUIPMENT:

1. Theodolite and leveling staffs.

2. Tachometers.

3. Total station.

Course Outcomes:

- Have the ability to use techniques, skills, and modern engineering tools necessary for engineering practice
- Gain an appreciation of the need for lifelong learning through the discussion of recent changes in survey procedures and equipment.
- Appreciate the need for licensed surveyors to establish positioning information for property and structures.

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(Autonomous)

III YEAR I SEMESTER   **L**   **T/P/D**   **C**
                                                                       4   **-/-/-**   **4**

CONCRETE TECHNOLOGY

Course Objectives:

- To provide the basic knowledge of science and engineering of concrete properties related to civil engineering problems.
- To imbibe the culture of professional and ethical responsibilities by following codal provisions in concrete mix design for strength and durability.
- Ability to identify, formulate and solve problems in concrete mix design and to use the techniques, skills to formulate and solve engineering problems.
- Ability to effectively present research to professional and engage in lifelong learning with the advances in concrete technology.
- Ability to communicate effectively in the design of concrete structures.

UNIT I

CEMENT: Portland cement – chemical composition – Hydration, Setting of cement – Structure of hydrate cement – Test on physical properties – Different grades of cement.

ADMIXTURES: Types of admixtures – mineral and chemical admixtures – properties – dosages – effects - usage

UNIT – II

AGGREGATES: Classification of aggregate – Particle shape & texture – Bond, strength & other mechanical properties of aggregate – Specific gravity, Bulk density, porosity, adsorption & moisture content of aggregate – Bulking of sand – Deleterious substance in aggregate – Soundness of aggregate – Alkali aggregate reaction – Thermal properties – Sieve analysis – Fineness modulus – Grading curves – Grading of fine & coarse Aggregates – Gap graded aggregate – Maximum aggregate size.

UNIT – III

FRESH CONCRETE: Workability – Factors affecting workability – Measurement of workability by different tests – Setting times of concrete – Effect of time and temperature on workability – Segregation & bleeding – Mixing and vibration of concrete – Steps in manufacture of concrete – Quality of mixing water.

HARDENED CONCRETE : Water / Cement ratio – Abram's Law – Gelspaoe ratio – Nature of strength of concrete – Maturity concept – Strength in tension & compression – Factors affecting strength – Relation between compression & tensile strength - Curing.

UNIT – IV

TESTING OF HARDENED CONCRETE: Compression tests – Tension tests – Factors affecting strength – Flexure tests – Splitting tests – Pull-out test, Nondestructive testing methods – codal provisions for NDT.

ELASTICITY, CREEP & SHRINKAGE – Modulus of elasticity – Dynamic modulus of elasticity – Poisson's ratio – Creep of concrete – Factors influencing creep – Relation between creep & time – Nature of creep – Effects of creep – Shrinkage – types of shrinkage.

UNIT – V

MIX DESIGN: Factors in the choice of mix proportions – Durability of concrete – Quality Control of concrete – Statistical methods – Acceptance criteria – Proportioning of concrete mixes by various methods – BIS method of mix design.

SPECIAL CONCRETES: Light weight aggregates – Light weight aggregate concrete – Cellular concrete – No-fines concrete – High density concrete – Fiber reinforced concrete – Polymer concrete – Types of Polymer concrete – High performance concrete – Self compacting concrete.

Course Outcomes:

- To understand the importance and to develop systematic knowledge of concrete technology.
- To familiarize with the fundamental of concrete
- To understand the design principles of concrete to achieve the desired strength.

TEXT BOOKS:

1. Properties of Concrete by A.M.Neville – Low priced Edition – 4th edition
2. Concrete Technology by M.S.Shetty. – S.Chand & Co. ; 2004

REFERENCES:

1. Concrete Technology by M.L. Gambhir. – Tata Mc. Graw Hill Publishers, New Delhi
2. Concrete Technology by A.R. Santha Kumar, Oxford university Press, New Delhi
3. Concrete: Micro structure, Properties and Materials – P.K.Mehta and J.M.Monteiro, Mc-Graw Hill Publishers

REFERENCES COCE:

1. IS: 10262-2009 for BIS Mix Design

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(Autonomous)

III YEAR I SEMESTER   L   T/P/D   C
                                            4   -/-/-   4

REINFORCED CONCRETE STRUCTURES DESIGN AND DRAWING

Course Objectives:

- To provide basic knowledge of mathematics, science and engineering in the areas of limit state of collapse and serviceability of R C elements.
- Enable the students to identify, formulate and solve engineering problems of R C elements subjected to flexure, shear and torsion.
- To give procedural knowledge to design a system, component or process as per needs and specifications of R C elements such as beams, slabs, columns and footings subjected to various load combinations with different boundary conditions.
- To imbibe the culture of professional and ethical responsibilities by following codal provisions in the analysis, design and detailing of R C elements for strength and durability.
- To show the impact of engineering solutions on the society and also will be aware of contemporary issues regarding failure of structures due to wrong design, use of poor quality of materials and faulty construction methods.
- To provide factual knowledge on analysis and design of R C elements who can participate and succeed in competitive examinations.

UNIT –I

CONCEPTS OF RCC DESIGN– Limit State method – Material Stress- Strain Curves – Safety factors – characteristic values. Stress Block parameters – IS – 456 – 2000 – Working Stress Method.

BEAMS: Limit state analysis design and drawings of singly reinforced, doubly reinforced, T and L beam sections.

UNIT –II

SHEAR, TORSION AND BOND: Limit state analysis design and drawings of section for shear and torsion – concept of bond, anchorage and development length, I.S. code provisions. Design examples in simply supported and continuous beams, detailing. Design of Canopy

UNIT – III

Short and Long columns – under axial loads, uniaxial bending and biaxial bending – I S Code provisions.

UNIT – IV

Footings: Different types of footings – Design and drawings of isolated, square, rectangular, circular footings and combined footings.

UNIT – V

Design and drawings of Two-way slabs, one way slab, continuous slab Using I S Coefficients

Limit state design for serviceability for deflection, cracking and codal provision

Design dog legged stair

Note: All problems should be taught In Limit State Method IS CODE 456-2000

Course Outcomes:

- At the end of the course the student will come to know the needs and mode of the design of reinforced concrete structural elements like beams, columns, slabs, footings, piles and pile caps.
- Will have an idea on flexure, one way shear, two way shear, torsion, slenderness ratios, active and passive earth pressures, usage of bearing capacity of soils in the design of footings.
- The student will be able to design and detailing of RCC structures as per code provisions.

TEXT BOOKS:

1. Limit state designed of reinforced concrete – P.C.Varghese, Prentice Hall of India, New Delhi.
2. Reinforced concrete design by N. Krishna Raju and R.N. Pranesh, New age International Publishers, New Delhi
3. Reinforced concrete design by S.Unnikrishna Pillai & Devdas Menon, Tata Mc.Graw Hill, New Delhi.

REFERENCES:

1. Fundamentals of Reinforced concrete design by M.L. Gambhir, Printice Hall of India Private Ltd., New Delhi.
2. Reinforced concrete structural elements – behaviour, Analysis and design by P.Purushotham, Tata c.Graw-Hill.
3. Reinforced concrete structures, Vol.1, by B.C.Punmia, Ashok Kumar Jain and Arun Kumar Jain, Laxmi, publications Pvt. Ltd., New Delhi

NOTE:

Alternate weeks two periods of drawing class should be conducted. The end examination paper should consist of Part-A and Part-B. Part –A should consist of two questions in design and drawing out of which one question to be answered. Part-B should consist of five questions in design out of which three to be answered. Weightage for Part-A is 40 % and Part-B is 60%.

MALLA REDDY ENGINEERING COLLEGE
(Autonomous)

III YEAR I SEMESTER

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4	-/-/-	4

GEOTECHNICAL ENGINEERING

Course Objectives

- Students will be able to understand the formation of soils, their classification and what properties make them different from other soils, which soil is suitable for what application.
- Students will be able to analyze the field soil with respect to its ability to allow the passage of water through it, the effect of water on stresses caused in the soil at any depth and its practical significance
- Students would be able to appreciate the significance of field density, how to improve it using mechanical means so that it can support heavy buildings/ structures safely.
- Students will be able to predict the possible settlements of structures founded on clayey soils and how much time it takes to settle.
- Students will appreciate the most important engineering property of soils called shear strength and how to determine the same using different laboratory experiments, which is very essential while designing the foundations of structures.

UNIT – I

INTRODUCTION: Soil formation – soil structure and clay mineralogy – Adsorbed water – Mass- volume relationship – Relative density.

INDEX PROPERTIES OF SOILS: Grain size analysis – Sieve and Hydrometer methods – consistency limits and indices – I.S. Classification of soils.

UNIT – II

PERMEABILITY: Soil water – capillary rise – flow of water through soils – Darcy's law- permeability – Factors affecting permeability – laboratory determination of coefficient of permeability –Permeability of layered soils – Insitu permeability tests (Pumping in & Pumping out test).

EFFECTIVE STRESS & SEEPAGE THROUGH SOILS: Total, neutral and effective stress – principle of effective stress - quick sand condition – Seepage through soils – Flownets: Characteristics and Uses.

UNIT –III
STRESS DISTRIBUTION IN SOILS: Boussinesq's and Westergaard's theories for point load, uniformly loaded circular and rectangular areas, pressure bulb, variation of vertical stress under point load along the vertical and horizontal plane, and Newmark's influence chart for irregular areas.

COMPACTION: Mechanism of compaction – factors affecting compaction – effects of compaction on soil properties – Field compaction Equipment – compaction quality control.
UNIT – IV

CONSOLIDATION: Types of compressibility – Immediate Settlement, primary consolidation and secondary consolidation - stress history of clay; e-p and e-log p curves – normally consolidated soil, over consolidated soil and under consolidated soil - preconsolidation pressure and its determination - Terzaghi's 1-D onsolidation

theory – coefficient of consolidation: square root time and logarithm of time fitting methods.

UNIT – V

SHEAR STRENGTH OF SOILS: Importance of shear strength – Mohr's– Coulomb Failure theories – Types of laboratory strength tests – strength tests based on drainage conditions – Shear strength of sands - dilatancy – Critical Void Ratio – Liquefaction- shear strength of clays.

Course outcomes:

- Design simple earth retaining structures
- Assess the type of foundation required and design in terms of bearing capacity and settlement.
- Appreciate settlement limits and damage criteria.

TEXT BOOKS:

1. Basic and Applied Soil Mechanics by Gopal Ranjan & ASR Rao, New age International Pvt. Ltd, New Delhi
2. Principals of Geotechnical Engineering by Braja M.Das, Cengage Learning Publishers.
3. Geotechnical Engineering : Principles and practices of soil mechanics and foundation Engineering by VNS Murthy, Taylor & Francis Group.

REFERENCES:

1. Geotechnical Engineering by C. Venkataramiah, New age International Pvt .Ltd, (2002).
2. Geotechnical Engineering by Manoj Dutta & Gulati S.K – Tata Mc.Grawhill Publishers New Delhi.
3. Soil Mechanics and Foundation Engg. By K.R. Arora, Standard Publishers and Distributors, Delhi.
4. Soil Mechanics and Foundation by by B.C.Punmia, Ashok Kumar Jain and Arun Kumar Jain, Laxmi, publications Pvt. Ltd., New Delhi

MALLA REDDY ENGINEERING COLLEGE
(Autonomous)

III YEAR I SEMESTER   L   T/P/D   C
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WATER RESOURCES ENGINEERING-I

Course Objectives

- This course is designed to present
- The principles underlying surface and groundwater hydrology
- Literature, measurement techniques, data sources, analytical methods and theories used to understand flows of water on the earth's surface
- Mechanisms and pathways of water storage, transport and transformation in the landscape
- Application of these principles to solve hydrologic problems

UNIT I

Introduction to engineering hydrology and its applications, Hydrologic cycle, types and forms of precipitation, rainfall measurement, types of rain gauges, computation of average rainfall over a basin, processing of rainfall data - Adjustment of record - Rainfall Double Mass Curve. Runoff- Factors affecting Runoff – Runoff over a

Catchment- Empirical and Rational Formulae.

Abstraction from rainfall-evaporation, factors affecting evaporation, measurement of evaporation- vapotranspiration- Penman and Blaney & Criddle Methods - Infiltration, factors affecting infiltration, measurement of infiltration, infiltration indices..

UNIT-II

Distribution of Runoff – Hydrograph Analysis Flood Hydrograph – Effective Rainfall – Base Flow- Base Flow Separation - Direct Runoff Hydrograph - Unit Hydrograph, definition, and limitations of applications of Unit hydrograph, derivation of Unit Hydrograph from Direct Runoff Hydrograph and vice versa - S-hydrograph,

Synthetic Unit Hydrograph

UNIT-III

Ground water Occurrence, types of aquifers, aquifer parameters, porosity, specific yield, permeability, transmissivity and storage coefficient, Darcy's law, radial flow to wells in confined and unconfined aquifers. Types of wells,- Well Construction – Well Development.

UNIT-IV

Necessity and Importance of Irrigation, advantages and ill effects of Irrigation, types of Irrigation, methods of application of Irrigation water, Indian agricultural soils, methods of improving soil fertility –Crop Roation, preparation of land for Irrigation, standards of quality for Irrigation water.

Soil-water-plant relationship, vertical distribution of soil moisture, soil moisture constants, soil moisture tension, consumptive use, Duty and delta, factors affecting duty- Design discharge for a water course.Depth and frequency of Irrigation, irrigation efficiencies-Water Logging.

UNIT-V

Classification of canals, Design of Irrigation canals by Kennedy's and Lacey's theories, balancing depth of cutting, IS standards for a canal design canal lining.

Design Discharge over a catchment, Computation of design discharge-rational formula, SCS curve number method, flood frequency analysis- Introductory Part only. Stream Gauging – measurement and estimation of stream flow.

Course outcomes:

- At the end of the course, the student understands the need and importance of irrigation
- Knows the irrigation management practices of the past, present and future. Student familiarizes about the availability of the water resource with special reference to irrigation.
- Estimate the Flood for different years based on various methods

TEXT BOOKS:

1. Irrigation and water power engineering by Punmia & Lal, Laxmi publications pvt. Ltd., New Delhi
2. Engineering Hydrology by Jayaram Reddy, Laxmi publications pvt. Ltd., New Delhi

REFERENCES:

1. Irrigation and Hydraulic structures by S.K.Grag.
2. Irrigation and Water Resources & Water Power by P.N.Modi, Standard Book House.
3. Irrigation Water Management by D.K. Majundar, Printice Hall of India.
4. Elementary hydrology by V.P.Singh, PHI publications.
5. Applied hydrology by Ven Te Chow, David R. Maidment larry W. Mays Tata MC.Graw Hill.

MALLA REDDY ENGINEERING COLLEGE
(Autonomous)

III YEAR I SEMESTER   L   T/P/D   C
                                                          4   -/-/-   4

STRUCTURAL ANALYSIS – II

Course Objectives:

- Ability to apply knowledge of mathematics and engineering in calculating slope, deflection, bending moment and shear force using Slope deflection equation and Moment distribution method.
- Ability to identify, formulate and solve problems in structural analysis.
- Ability to analyse structural system and interpret ate data.
- Ability to use the techniques, such as stiffness and flexibility methods to solve engineering problem.
- Ability to communicate effectively in design of structural elements.

UNIT I

TWO HINGED ARCHES: Introduction-Classification of two hinged arches – Analysis of two hinged parabolic arches-secondary stresses in two hinged arches due to temperatures and Elastic shortening of Rib and tied arches – fixed arches

SLOPE-DEFLECTION METHOD FOR FRAMES: Determination of static and Kinematic indeterminacies for frames. Analysis of single bay- Single storey portal frames by slope deflection method including side sway.shear force and bending moment diagrams. Elastic curve.

UNIT-II

MOMENT DISTRIBUTION METHOD FOR FRAMES – Analysis of single bay single storey portal frames – including side Sway- analysis of inclined frames.

KANI'S METHOD: Analysis of continous beams including settlement of supports. Analysis of single bay- Single storey and single bay two storey portal frames by Kani's method including Side sway. shear force and bending moment diagrams. Elastic curve.

UNIT – III

APPROXIMATE METHOD OF STRUCTURAL ANALYSIS: Application to multi storey frames frames. (i) Portal method (ii) Cantilever method. (iii) Factor method : Derivation of slope deflection equation of supports application to continuous beams including settlement of supports single bay, single sway, portal frame including side sway.

UNIT – IV

MATRIX METHOD OF ANALYSIS (Flexibility method): Introduction, Axes and Coordinates, Flexibility matrix, Analysis of continuous beam and plane trusses using system approach, Analysis of simple orthogonal rigid frames using system approach.

MATRIX METHOD OF ANALYSIS (Stiffness method): Introduction, Stiffness matrix, Analysis of continuous beam and plane trusses using system approach, Analysis of simple orthogonal rigid frames using system approach.

UNIT – V

INFLUENCE LINES FOR INDETERMINATE BEAMS: Introduction-ILD for two span continuous beam with constant and different moments of inertia. ILD for propped cantilever Beams

INDETERMINATE TRUSSES: Determination of static and indeterminacies- analysis of trusses having single and two degrees of internal and external indeterminacies-Castiglianos-2 theorem

Course outcomes:

- Understands what different types of displacement methods in different concrete structures..
- Understands how to solve different deflection related to continuous and rigid beams.
- Understands how to control the deflections and displacements using matrix method of analysis.
- Understands the concept of plastic method of analysis for simple and continuous beams.

TEXT BOOKS:

1. Analysis of Structures – Vol. I & 2 by Bhavikathi, Vikas publications

2. Analysis of structures by Vazrani & Ratwani – Khanna Publications.

3. Comprehensive Structural Analysis-Vol.I&2 by Dr. R. Vaidyanathan & Dr. P.Perumal- Laxmi publications pvt. Ltd., New Delhi

REFERENCES:

1. Structural Analysis (Matrix Approach) by Pundit and Gupta – Tata Mc.Graw Hill publishers.

2. Theory of structures by Ramamuratam

3. Structural Analysis by C.S. Reddy, Tata Macgrawhill, New Delhi

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(Autonomous)

III YEAR I SEMESTER   L   T/P/D C
                                     4   -/-/-   4

DISASTER MANAGEMENT
(Open Elective)

Course Objectives

- To increase the knowledge and understanding of the disaster phenomenon, its different contextual aspects, impacts and public health consequences.
- To increase the knowledge and understanding of the International Strategy for Disaster Reduction and to increase skills and abilities for implementing the Disaster Risk Reduction (DRR) Strategy.
- To ensure skills and abilities to analyse potential effects of disasters and of the strategies and methods to deliver public health response to avert these effects.
- To ensure skills and ability to design, implement and evaluate research on disasters

UNIT-I

ENVIRONMENTAL HAZARDS & DISASTERS: Meaning of Environmental hazards, Environmental Disasters and Environmental stress. Concept of Environmental Hazards, Environmental stress & Environmental Disasters. Different approaches & relation with human Ecology - Landscape Approach - Ecosystem Approach -

Perception approach - Human ecology & its application in geographical researches.

TYPES OF ENVIRONMENTAL HAZARDS & DISASTERS: Natural hazards and Disasters – Man induced hazards & Disasters - Natural Hazards- Planetary Hazards/ Disasters - Extra Planetary Hazards/ disasters - Planetary Hazards- Endogenous Hazards - Exogenous Hazards

UNIT –II

ENDOGENOUS HAZARDS - Volcanic Eruption – Earthquakes – Landslides – Volcanic Hazards/ Disasters - Causes and distribution of Volcanoes - Hazardous effects of volcanic eruptions - Environmental impacts of volcanic eruptions – Earthquake Hazards/ disasters - Causes of Earthquakes - Distribution of earthquakes - Hazardous effects of - earthquakes - - Earthquake Hazards in India - - Human adjustment, perception & mitigation of earthquake.

EXOGENOUS HAZARDS/ disasters - Infrequent events- Cumulative atmospheric hazards/ disasters, Infrequent events: Cyclones – Lightning – Hailstorms, Cyclones: Tropical cyclones & Local storms - Destruction by tropical cyclones & local storms (causes , distribution human adjustment, perception & mitigation), Cumulative atmospheric hazards/ disasters : - Floods- Droughts- Cold waves- Heat waves Floods:- Causes of floods- Flood hazards India- Flood control measures (Human adjustment, perception & mitigation), Droughts:- Impacts of droughts- Drought hazards in India- Drought control measures- Extra Palnetary Hazards/ Disasters-

Man induced Hazards /Disasters- Physical hazards/ Disasters-Soil Erosion Soil Erosion:-- Mechanics & forms of Soil Erosion- Factors & causes of Soil Erosion- Conservation measures of Soil Erosion, Chemical hazards/ disasters:-- Release of toxic chemicals, nuclear explosion- Sedimentation processes, Sedimentation processes:- Global Sedimentation problems- Regional Sedimentation problems- Sedimentation & Environmental problems- Corrective measures of Erosion & Sedimentation, Biological hazards/ disasters:- Population Explosion.

UNIT –III:

EMERGING APPROACHES IN DISASTER MANAGEMENT- Three Stages

1. Pre- disaster stage (preparedness)

2. Emergency Stage

3. Post Disaster stage-Rehabilitation

Natural Disaster Reduction & Management

a) Provision of Immediate relief measures to disaster affected people

b) Prediction of Hazards & Disasters

c) Measures of adjustment to natural hazards

UNIT –IV

DISASTER MANAGEMENT- An integrated approach for disaster preparedness, mitigation & awareness.

Mitigation- Institutions- discuss the work of following Institution.

a. Meteorological observatory

b. Seismological observatory

c. Volcanology instituition

d. Hydrology Laboratory

e. Industrial Safety inspectorate

f. Institution of urban & regional planners

g. Chambers of Architects

h. Engineering Council

i. National Standards Committee

Integrated Planning- Contingency management Preparedness –

a) Education on disasters

b) Community involvement

c) The adjustment of Human Population to Natural hazards & disasters Role of Media Monitoring Management- Discuss the programme of disaster research & mitigation of disaster of following organizations.

a) International Council for Scientific Unions (ICSU)- Scientific committee on problems of the Environment (SCOPE), International Geosphere- Biosphere programme (IGBP)

b) World federation of Engineering Organizations(WFED)

c) National Academy of Sciences

d) World Meteorological organizations(WMO)

e) Geographical Information System(GIS)

f) International Association of Seismology & Physics of Earth's Interior (IASPEI)

g) Various U.N agencies like UNCRD, IDNDR, WHO, UNESCO, UNICEF, UNEP.

UNIT –V:

a. A regional survey of Land Subsidence, Coastal Disaster, Cyclonic Disaster & Disaster in Hills with particular reference to India

b. Ecological planning for sustainability & sustainable development in India- Sustainable rural development: A Remedy to Disasters -Role of Panchayats in Disaster mitigations

c. Environmental policies & programmes in India- Institutions & National Centres for Natural Disaster reduction, Environmental Legislations in India, Awareness, Conservation Movement, Education & training

Course Outcomes

- Capacity to integrate knowledge and to analyse, evaluate and manage the different public health aspects of disaster events at a local and global levels.
- Capacity to describe, analyse and evaluate the environmental, social, cultural, economic, legal and organisational aspects influencing vulnerabilities and capacities to face disasters.
- Capacity to work theoretically and practically in the processes of disaster management (disaster risk reduction, response, and recovery) and relate their interconnections, particularly in the field of the Public Health aspects of the disasters.
- Capacity to manage the Public Health aspects of the disasters.
- Capacity to obtain, analyse, and communicate information on risks, relief needs and lessons learned from earlier disasters in order to formulate strategies for mitigation in future scenarios with the ability to clearly present and discuss their conclusions and the knowledge and arguments behind them.

TEXT BOOK:

1. Disaster Mitigation: Experiences And Reflections by Pardeep Sahni

REFERENCES:

1. R.B.Singh (Ed) Environmental Geography, Heritage Publishers New Delhi,1990
2. Kates,B.I & White, G.F The Environment as Hazards, oxford, New York, 1978
3. R.B. Singh (Ed) Disaster Management, Rawat Publication, New Delhi, 2000
4. H.K. Gupta (Ed) Disaster Management, Universiters Press, India, 2003
5. Dr. Satender , Disaster Management t in Hills, Concept Publishing Co., New Delhi, 2003
6. A.S. Arya Action Plan For Earthquake,Disaster, Mitigation in V.K. Sharma (Ed) Disaster Management IIPA Publication New Delhi, 1994
7. R.K. Bhandani An overview on Natural & Manmade Disaster & their Reduction, CSIR, New Delhi
8. M.C. Gupta Manuals on Natural Disaster management in India, National Centre for Disaster Management, IIPA, New Delhi, 2001

MALLA REDDY ENGINEERING COLLEGE
(Autonomous)

III YEAR I SEMESTER	**L**	**T/P/D**	**C**
	4	**-/-/-**	**4**

HUMAN VALUES & PROFESSIONAL ETHICS

UNIT-I

HUMAN VALUES

Morals, Values and Ethics – Integrity – Work Ethic – Service Learning – Civic Virtue – Respect for Others – Living Peacefully – caring – Sharing – Honesty – Courage – Time management-Valuing Time – Cooperation – Commitment – Empathy – Self-Confidence – Character. Corporate Social responsibility, Social responsibility as a citizen of this great country.

UNIT-II

SELF MANAGEMENT,

SELF Concept Learning Enhancement Facilitation Centre, University of Weston Sydney, Australia. A New Idea of Self Constructs, Self discipline, understanding self, Self Exploration, need and purpose. Assessment procedures and types, importance of Self assessment/appraisal systems. Gardeners multiple intelligence concept. Key to success and road map to success. Untrained/Trained Memory.

UNIT-III
ENGINEERING ETHICS

Code of ethics for engineers, ASCE, ASME Codes of ethical conduct of engineers, Personal ethics, Professional ethics, Senses of 'Engineering Ethics' - variety of moral issued - types of inquiry – moral dilemmas - moral autonomy - Kohlberg's theory - Gilligan's theory –uses of ethical theories– Models of Professional Roles - theories about right action - Self-interest - customs and religion professional rights - employee rights - Intellectual Property Rights (IPR), Trade marks, Patents, copy rights. Some interesting case studies.

UNIT-IV
VALUE EDUCATION

Concept of Value education, its intensions, the need for value education in today's context, basic guidelines for value education, the contents of value education and the process of value education. Universal Brotherhood, spirituality, Basic human aspirations, harmony: self, family and society.

UNIT-V
STRESS MANAGEMENT

Types of Stress, Positive Stress (Eustress) and rewarding experiences, Negative Stress (Distress) and its influence on human health, Methods of Stress Management for better living. Meditation, Laughter is the best medicine, Anger management. Personality development. Study & Learning skills, need to develop a positive attitudes, brain & behaviour, respect for authority, responsibility, accountability, confidentiality etc..

TEXTBOOK

1. Govindarajan M, Natarajan S, Senthil Kumar V. S, "Engineering Ethics", Prentice Hall of India, New Delhi,
2. S.B.Gogate,"Human Values & Professional Ethics",Vikas Publishing House Pvt., Ltd., First edition-2011

REFERENCES

1. Charles D. Fleddermann, "Engineering Ethics", Pearson Education / Prentice Hall,
2. Charles E Harris, Michael S. Protchard and Michael J Rabins, "Engineering Ethics – Concepts and Cases",
3. Wadsworth Thompson Learning, United States, 2000 (Indian Reprint now available) 2003.
4. C.G.Krishnadas Nair, "Engineering Ethics", Harishree Publishing Company, Bangalore.
5. R.K.Shukla, Anuranjan Mishra,"Human Values and Professional Ethics" Published by A.B.Publication.

MALLA REDDY ENGINEERING COLLEGE
(Autonomous)

III YEAR I SEMESTER   L   T/P/D   C
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INTELLECTUAL PROPERTY RIGHTS
(Open Elective)

UNIT – I

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

UNIT – II

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

UNIT – III

Law of copy rights : Fundamental of copy right law, originality of material, rights of reproduction, rights to perform the work publicly, copy right ownership issues, copy right registration, notice of copy right, international copy right law.
Law of patents: Foundation of patent law, patent searching process, ownership rights and transfer

UNIT – IV
Trade Secrets: Trade secrete law, determination of trade secrete status, liability for misappropriations of trade secrets, protection for submission, trade secrete litigation.
Unfair competition: Misappropriation right of publicity, False advertising.

UNIT – V

New development of intellectual property: new developments in trade mark law ;
copy right law, patent law, intellectual property audits.
International overview on intellectual property, international – trade mark law, copy
right law, international patent law, international development in trade secrets law.

Course Outcomes:

- Students will have a basic competence in the core concepts of each of the forms of intellectual property
- Students will be familiar with all the important doctrines of the field of laws and treaties governing intellectual property
- Students will begin to see the connections between intellectual property rights protection and development of world economy

TEXT BOOKS:

1. Intellectual property right, Deborah. E. Bouchoux, cengage learing.

REFERENCES

1. Intellectual property right – nleashmy the knowledge economy, prabuddha ganguli, Tata Mc Graw Hill Publishing company ltd.,

MALLA REDDY ENGINEERING COLLEGE
(Autonomous)

III YEAR I SEMESTER   L   T/P/D   C
                                                                            0   -/3/-   2

FLUID MECHANICS & HYDRAULIC MACHINERY LAB

Course Objectives:

- Ability to apply the knowledge of hydraulics in the practical civil engineering problems.
- Ability to analyze the application of fluid mechanics principles to problems dealing with the
- Collection, storage, control, transport, regulation, measurement, and use of water.

LIST OF EXPIREMENTS

1. Calibration of Venturimeter & Orifice meter
2. Determination of Coefficient of discharge for a small orifice / mouthpiece by constant head method.
3. Calibration of contracted Rectangular Notch and / Triangular Notch
4. Determination of friction factor of a pipe.
5. Determination of Coefficient for minor losses.
6. Verification of Bernoulli's equation.
7. Impact of jet on vanes
8. Study of Hydraulic jump.
9. Performance test on Pelton wheel turbine
10. Performance test on Francis turbine.
11. Performance characteristics of a single stage/ multi-stage centrifugal pump.
12. Performance characteristics of a reciprocating pump.

Course Outcomes:

1. Measure pressure loss due to friction for pipe flow
2. Measure drag/lift forces on objects in a flow, or measure flow rate over a weir
3. Design and conduct an experiment, as well as analyze and interpret data
4. Function effectively as a member of a team

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(Autonomous)

III YEAR I SEMESTER   L   T/P/D   C
                                                                   0   -/3/-   2

ADVANCED COMMUNICATION SKILLS LAB

Introduction:

Effective Communication binds any progressive organization. At the B Tech third year level, the Advanced English Communication skills laboratory is introduced to help students succeed in attaining a challenging and a professional career. Each unit aims to reinforce learning and helps the learners perform well before and after they enter the world of work. The course is designed to be practical, stimulating and challenging providing opportunities to the learners to go beyond the classrooms and get empowered in language skills. The course also enables the students understand the employers' expectations that are varied from company to company while giving them insight into the acceptable norms of attitude, behavior and etiquette.

Course Objectives:

- To help the students understand the requisites to successfully deliver as professionals and the challenges they need to encounter

- To help them make a smooth transition from the academic world to the professional world

- To refine the style of individual communication

- To broaden and raise awareness about the dynamics of communication in the work environment

- To integrate the learning experience with the functional areas of communication

- Helping the students to become industry ready

Methodology:

Facilitator's role: Since classroom learning augments thinking process, helping them to develop written, spoken and non verbal communication, the facilitator / Faculty would briefly discuss the topics with the students and later on guide them while the students involve in activities, writing work and while making presentations. The facilitator is required to design a lot of practical/industry oriented project works for the students

*Students are required to participate, perform, write and submit the work in the form of written documents or Power Point Presentations to hone their spoken written and non verbal communication skills . Students are to take up field work and submit the project work.

UNIT I

Industry awareness- Introduction to the world of work- Collection of information about various sectors, companies, enterprises, organizations and conglomerates; field visit to the industry they wish to work for

 Instruction: Here the students are required to work in teams- Team players-participating and responding, team leader -delegates, plans and involves all the team members, Challenges the team faces -the report presented in the written form and making presentation

UNIT II

Job hunt process

- SWOT analysis, correspondence and browsing the internet , job application-cover letter drafting, drafting a winning resume', types of resume's -electronic, video and printed resume's

- Instruction: Students are required to prepare their video resume which will be assessed by the faculty member.

UNIT III

Group Discussion- Initiators- Contributor-Informer-Team Leader-Motivator-Creative Contributor , Importance of , Non verbal communication -eye contact, voice characters, posture, gestures, do's and don'ts, Role play and Simulation- Learners assuming the roles of characters and participating in Group discussion, analysis, or prediction with strictly defined goals.

UNIT IV

Interview skills- Preparing for the interview, types of interviews, interview session, importance of non verbal communication during the interview, do's and don'ts of interview, follow up and thanking letter. FAQ's.

UNIT V

Office etiquette- Formal Conversation, elevator etiquette, table manners, office attire- do's and don'ts, gossips and rumors, greetings and meetings, speaking to seniors and handshakes , offering and taking visiting cards.

UNIT VI

E- Correspondence and Email etiquette

Common web mail services, yahoo, gmail etc, fields to pay attention- To:, Cc:, Bcc:, Reply All, Subject, Salutation, Body, Signature, Font, Caps Lock , Highlight, The 'KISS' strategy(Keep It Simple and Short,)Points to remember while signing off, Introduction to Technical Vocabulary

- This unit is purely for internal assessment/evaluation

UNIT VII

Report writing- types of report, project report writing, technical reports, importance of pictorial presentation- graphs , diagrams etc

Instruction: The students are required to work on a project. Field work and collection of information , prepare a project report, present the project in the form of Power Point Presentation and written document. This report will be given weightage during the external examination

Course Outcomes

- Since the communication skills cannot be taught but be developed through practice the student will be competent communicators through application and the use of the concepts and activities in different units.

- Students are competent to take a smooth transition from the academic world to the professional world

- Students are industry ready

REFERENCE BOOKS

- Handbook of practical Communication Skills by Chrissie Wright

- How to win friends and influence people by Dale |Carnegie

- Skills with people by Les Giblin

- Bringing out the best in people by Aubrey Daniels

- The definitive book on body Language by Barbara and Allan Pease

- Just Listen :Discover the Secret to getting through to absolutely anything by Mark Goulstone

- Ten Much by A G Krishna Murthy

- Communication skills for Professionals by Cambridge Publishers

- Good practice Student's book on Communication skills by Cambridge Publishers

- Word Power Made Easy by Norman Lewis

- Effective Technical Communication by Ashraf Rizbi

- Resume Magic: Trade Secrets of a Professional Resume by Susan Britton Whitcomb

MALLA REDDY ENGINEERING COLLEGE
(Autonomous)

III YEAR II SEMESTER

L   T/P/D   C
3   -/2/-   4

STEEL STRUCTURES DESIGN AND DRAWING

Course Objectives:

- To provide basic knowledge in the areas of limit state method and the concept of design of structural steel elements.
- Enable the students to identify, formulate and solve engineering problems in steel structural elements subjected to tension, compression and flexure.
- To give procedural knowledge to design a system, component or process as per needs and specifications of steel elements such as beams, tension members, compression members, bolted and welded connections subjected to various load combinations.
- To imbibe the culture of professional and ethical responsibilities by following codal provisions in the analysis, design and detailing of steel elements.
- To provide factual knowledge on analysis and design of structural steel elements who can participate and succeed in competitive examinations

UNIT – I

Materials – Making of iron and steel – types of structural steel – mechanical properties of steel – Concepts of plasticity – yield strength. Loads – and combinations local buckling behavior of steel. Concept of limit State Design – Limit States – Design Strengths- deflection limits – serviceability – stability check.

Bolted connections – Riveted connections – IS – 800 – 2007 - specifications – Design strength – efficiency of joint – prying action. Welded connections – Types of welded joints – specifications - design requirements.

UNIT – II

Design of tension members– Design strength – Design procedure splice - lug angle.

Design of compress in members – Buckling class – slenderness ratio / strength design – laced – battened columns – splice – column base – slab /

UNIT – III

Design of Beams – Plastic moment – Bending and shear strength / buckling – Builtup sections – laterally / supported beams. Design of eccentric connections – Framed – stiffened / seat connection.

UNIT – IV

Design of plate girders – elements – economical depth – design of main section – connections between web and flange – design of stiffness bearing – intermediate stiffeners – Design of Websplica & Flange splica.

UNIT – V

Design of roof trusses – Types of roof trusses, loads on trusses – purlin design – truss design, Design of joints and end bearings.

Course Outcomes:

- To learn properties of steel and design basics.
- To learn different types of connections in steel constructions.
- To develop knowledge in designing of structural elements in steel.

TEXT BOOKS:

1. Design of steel structures – N. Subramanian, Oxford University Press – 2009.
2. Limit State Design of steel structures, S.K. Duggal, Tata McGraw-Hill, 2010
3. Design of steel structures, Structures, S.S. Bhavikatti, IK int Publication House, New Delhi, 2010.

REFERENCE BOOKS:

1. Design of Steel Structures Edwin H. Gaylord, Jr. Charles N. Gaylord and
2. Design of Steel Structures Vol. 1 & 2 – Ramchandra, Standard Publications.

REFERENCE CODES:
1. IS Code 800-2007
2. IS Code 875 Part 1-5
3. IS Code 808- Steel Tables

NOTE:

Alternate weeks two periods of drawing class should be conducted. The end examination paper should consist of Part-A and Part-B. Part –A should consist of two questions in design and drawing out of which one question to be answered. Part-B should consist of five questions in design out of which three to be answered. Weightage for Part-A is 40 % and Part-B is 60%.

MALLA REDDY ENGINEERING COLLEGE
(Autonomous)

III YEAR II SEMESTER   L   T/P/D C
                                                 4   -/-/- 4

ENVIRONMENTAL ENGINEERING

Course Objectives:

- The aim of this course is to create awareness in water supply engineering.
- The students will learn about the importance of potable water and their distribution to the public.
- From the public health point of view, it is necessary that all water supplies must be invariably free from all types of impurities.
- In this respect this subject is introduced to civil engineers to acquire the knowledge of water supply engineering

UNIT – I

INTRODUCTION: Waterborne diseases – protected water supply – Population forecasts, design period – water demand – Types of demand – factors affecting – fluctuations – fire demand – storage capacity – water quality and testing – drinking water standards.

SOURCES OF WATER: Comparison from quality and quantity and other considerations – intakes – infiltration galleries, confined and unconfined aquifers distribution systems. – Requirements – methods and layouts.

UNIT II

LAYOUT AND GENERAL OUTLINE OF WATER TREATMENT UNITS – sedimentation, uniform settling velocity– principles – design factors – surface loading – Jar test – optimum dosage of coagulant - coagulation-flocculation clarifier design – coagulants – feeding arrangements.

FILTRATION – theory – working of slow and rapid gravity filters – multimedia filters – design of filters – troubles in operation comparison of filters – disinfection – types of disinfection - theory of chlorination - chlorine demand - other disinfection treatment methods.

UNIT- III

DISTRIBUTION SYSTEMS – types of layouts of Distribution systems – design of distribution systems - Hardy Cross and equivalent pipe methods service reservoirs – joints, valves such as sluice valves, air valves, scour valves and check valves water meters – laying and testing of pipe lines – pump house.

UNIT – IV

CONSERVANCY AND WATER CARRIAGE SYSTEMS – sewage and storm water estimation – time of concentration – storm water overflows combined flow – characteristics of sewage – cycles of decay – decomposition of sewage, examination of sewage – B.O.D. – C.O.D. equations. Design of sewers – shapes and materials – sewer appurtenances manholes – inverted siphon – catch basins – flushing tanks – ejectors, pumps and pump houses – house drainage – components requirements – sanitary fittings-traps – one pipe and two pipe systems of plumbing – ultimate disposal of sewage – sewage farming – dilution.

UNIT – V

PLANNING OF WASTE WATER EFFLUENT TREATMENT PLANT – primary treatment design of screens – grit chambers – skimming tanks – sedimentation tanks – principles and design of biological treatment – trickling filters – standard and high rate. Construction and design of oxidation ponds - Sludge digestion tanks – factors effecting – design of Digestion tank – Sludge disposal by drying – septic tanks working principles and design – soak pits.

Course Outcomes:

- The importance of protected water supply.
- How to consider a source of water for water supply to a town or city with respect to quality and quantity of water.
- Finally he will understand the value of drinking water in future and be a part of judicious use of it.

TEXT BOOKS:

1. Water supply and sanitary Engineering by G.S. Birdi, Dhanpat Rai & Sons Publishers.
2. Water Supply Engineering, Vol. 1, waste water Engineering, Vol. II, B.C.Punmia, Ashok Jain & Arun Jain, Laxmi Publications Pvt.Ltd, New Delhi

REFERENCS:

1. Water and Waste Water Technology by Mark J Hammar and Mark J. Hammar Jr. 2. Water and Waste Water Technology by Steel
2. Waste water engineering by Metcalf and Eddy.

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III YEAR II SEMESTER   **L   T/P/D   C**
                                                                      4   -/-/-   4

TRANSPORTATION ENGINEERING - I

Course Objectives:

- To provide the students with basic knowledge of different modes of transportation and planning stages for highways
- To provide students the knowledge on highway cross sections and sectional elements along with the geometric features of highways.
- To provide the students the knowledge on importance of subgrade soil and pavement construction materials and evaluation of their strength characteristics.
- To provide the students with knowledge design highway pavements using the knowledge of science and mathematics.
- To provide the knowledge about maintenance of highways, drainage problems and remedial measures for construction of safe and durable pavements

UNIT I

HIGHWAY DEVELOPMENT AND PLANNING: Highway development in India – Necessity for Highway Planning- Different Road Development Plans. Classification of Roads- Road Network Patterns – Highway Alignment- Factors affecting Alignment- Engineering Surveys – Drawings and Reports, Highway Projects.

UNIT – II

HIGHWAY GEOMETIC DESIGN: Importance of Geometric Design- Design controls and Criteria- Highway Cross Section Elements- Sight Distance Elements- Stopping sight Distance, Overtaking Sight Distance and intermediate Sight Distance- Design of Horizontal Alignment- Design of Super elevation and Extra widening- Design of Transition Curves- Design of Vertical alignment-Gradients- Vertical curves.

UNIT – III

TRAFFIC ENGINEERING AND REGULATIONS: 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. Traffic, infrastructural and safety audits. Road Traffic Signs – Types and Specifications – Road markings-Need for Road Markings-Types of Road Markings- Design of Traffic Signals –Webster Method

UNIT – IV

INTERSECTION DESIGN: Types of Intersections – Conflicts at Intersections- Types of At-Grade Intersections-Channelization: Objectives –Traffic Islands and Design criteria-Types of Grade Separated Intersections- Rotary Intersection – Concept of Rotary and Design Criteria- advantages and limitations of rotary intersections.

UNIT – V
PAVEMENT DESIGN:

Design of pavements: design of flexible pavements by CBR method as per IRC 37-2012 and theory of empirical mechanistic method. Stresses in rigid pavement by westergards and IRC methods. Design of overlay by Benkelman beam method.

Course Outcomes:

- The students will be able to understand different modes of transportation and planning stages for highways
- To make the students to design various highway geometric elements using the knowledge mechanics and applying the principles of equilibrium conditions.
- The students will be able to understand the behavior and performance of soil as subgrade and evaluate them for designing of pavements.
- The students will be able to assess the thickness and composition of pavement to withstand the traffic loads.
- The students will be able to understand the common maintenance problems of highways including drainage issues and suggest remedial measures for long life of pavements.

TEXT BOOKS:

1. Highway Engineering, S.K.Khanna & C.E.G.Justo, Nemchand & Bros., 7th edition (2000).
2. Railway Engineering, A text book of Transportation Engineering – S.P.chadula – S.Chand & Co. Ltd. 2001
3. Airport Planning and Design- S.K.Khanna and Arora,Nemchand Bros.

REFERENCES:

1. Traffic Engineering & Transportation Planning – Dr.L.R.Kadyali, Khanna publications – 6th Edition 1997.
2. Air Transportation Planning & design – Virendhra Kumar & Statish Chandhra – Gal Gotia Publishers 1999

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III YEAR II SEMESTER	L	T/P/D	C
	4	-/-/-	4

FOUNDATION ENGINEERING

Course Objectives:

- Students will be able to understand the significance of investigation of soil in the field and various methods to carry on the investigation

- Students will be able to analyze the stresses caused in the soil at various points below any structure/ foundation and how important it is to know this.

- Students would be able to appreciate why and where we need to provide retaining walls, how to design them to be stable and safe

- Students will be able to analyze and predict the possible instability of slopes, how to make them stable.

- Students will appreciate the most important parameter called SBC of soils, which is used while designing the shallow foundations of structures. In case the soil is soft or loads are too heavy, they will be able to design pile foundations.

UNIT – I

SOIL EXPLORATION: Need – Methods of soil exploration – Boring and Sampling methods – Penetration Tests – Plate load test – Pressure meter – planning of Programme and preparation of soil investigation report.

UNIT – II

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

UNIT – III

EARTH PRESSURE THEORIES: Rankine's theory of earth pressure – earth pressures in layered soils – Coulomb's earth pressure theory – Culmann's graphical method.

RETAINING WALLS: Types of retaining walls – stability of retaining walls against overturning, sliding, bearing capacity and drainage from backfill

UNIT –IV

SHALLOW FOUNDATIONS - Bearing Capacity Criteria - Types - choice of foundation – Location of depth – Safe Bearing Capacity – Terzaghi, Meyerhof, Skempton and IS Methods Safe bearing pressure based on N- value – allowable bearing pressure; safe bearing capacity - plate load test – allowable settlements of structures.

UNIT – V

PILE FOUNDATION: Types of piles – Load carrying capacity of piles based on static pile formulae – Dynamic pile formulae – Pile load tests - Load carrying capacity of pile groups in sands and clays – Settlement of pile groups.

WELL FOUNDATIONS: Types – Different shapes of wells – Components of wells – functions and Design Criteria – Sinking of wells – Tilts and shifts.

Course Outcomes:

- Will be able to analyze any field situation with the knowledge gained.
- Will be able to design the foundations for any structure in any field/soil.
- Will be in a position to assess the stability of slopes & retaining walls.
- Will be confident to say how safe or stable is a structures.

TEXT BOOKS:

1. Basic and Applied Soil Mechanics by Gopal Ranjan & ASR Rao, New Age International Pvt. Ltd, (2004).
2. Das, B.M., - (1999) Principles of Foundation Engineering –6th edition (Indian edition) Thomson Engineering
3. Geotechnical Engineering: Principles and practices of soil mechanics and foundation Engineering by VNS Murthy, Taylor & Francis Group.

REFERENCES:

1. Analysis and Design of Substructures – Swami Saran, Oxford and IBH Publishing company Pvt Ltd 1998
2. Geotechnical Engineering by S. K.Gulhati & Manoj Datta – Tata Mc.Graw Hill Publishing company New Delhi. 2005.
3. Soil Mechanics and Foundation Engg. By K.R. Arora, Standard Publishers and Distributors, Delhi.
4. Soil Mechanics and Foundation by by B.C.Punmia, Ashok Kumar Jain and Arun Kumar Jain, Laxmi, publications Pvt. Ltd., New Delhi

MALLA REDDY ENGINEERING COLLEGE
(Autonomous)

III YEAR II SEMESTER

L	T/P/D	C
4	-/-/-	4

ENGINEERING GEOLOGY

Course Objectives:

- Students will be able to analyse representations of key concepts from geology(earth science), policy, and values as they appear in geophysics, geochemistry and other natural sciences & technological sciences.

- Students will be able to elucidate the key points of a complex article or research work in concrete technology, material sciences in building construction, and management & conservation of natural building materials.

- Students will be able to appreciate the naturally occurring potable surface and subsurface water its origin, accumulation migration & management of water resources.

- Students will be able to demonstrate ability to effectively present research to professional and lay audiences in written project reports for major & minor projects such as dams & reservoirs, tunnels, highways, multi-storey buildings and mineral based industries.

UNIT – I

INTRODUCTION: Importance of geology from Civil Engineering point of view. Brief study of case histories of failure of some Civil Engineering constructions due to geological draw backs. Importance of Physical geology, Petrology and Structural geology. weathering of rocks **:** Its effect over the properties of rocks importance of weathering with REFERENCE to dams, reservoirs and tunnels weathering of common rock like "Granite"

UNIT – II

MINERALOGY: Definition of mineral, Importance of study of minerals, Different methods of study of minerals. Advantages of study of minerals by physical properties.Role of study of physical properties of minerals in the identification of minerals. Study of physical properties of following common rock forming minerals: Feldsper , Quartz , Flint , Jasper, Olivine , Augite , Hornblende , Muscovite , Biotite , Asbestos, Chlorite , Kyanite ,Garnet, Talc , Calcite. Study of other common economics minerals such as Pyrite, Hematite , Magnetite, Chrorite ,Galena , Pyrolusite , Graphite, Magnesite, and Bauxite.

PETROLOGY: Definition of rock: Geological classification of rocks into igneous, Sedimentary and metamorphic rocks. Dykes and sills, common structures and textures of igneous. Sedimentary and etamorphic rocks. Their distinguishing features, Megascopic and microscopic study of Granite, Dolerite, Basalt, Pegmatite,

Laterite, Conglomerate, Sand Stone, Shale, Limestone, Gneiss, Schist, Quartzite, Marble and Slate. Rock excavation, stone aggregates.

UNIT – III

STRUCTURAL GEOLOGY: Indian stratigraphy, and geological time scale**,** Out crop, strike and dip study of common geological structures associating with the rocks such as folds, faults unconformities, and joints - their important types.

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

importance of Electrical resistivity methods, and seismic refraction methods. Improvement of competence of sites by grouting etc. Fundamental aspects of Rock mechanics and Environmental Geology.

UNIT – IV

GEOLOGY OF DAMS AND RESERVOIRS : Types of dams and bearing of Geology of site in their selection, Geological Considerations in the selection of a dam site. Analysis of dam failures of the past. actors Contributing to the success of a reservoir. Geological factors influencing water tightness and life of reservoirs, Geo hazards, ground subsidence.

TUNNELS : Purposes of tunneling, Effects of Tunneling on the ground Role of Geological Considerations (lithological, structural and ground water) in tunneling over break and lining in tunnels, Tunnels in rock, subsidence over old mines , mining substances.

UNIT – V

GROUND WATER: Water table, common types of ground water, springs, cone of depression, ecological controls of ground water movement, ground water exploration. Earth quakes, their causes and effects, shield areas and seismic belts. Seismic waves, Richter scale, precautions to be taken for building construction in

seismic areas. Land slides, land slides hazards, water in land slides their causes and effect; measures to be taken to prevent their occurrence. Importance of study of ground water, Earthquake and landslides.

Course Outcomes:

- Demonstrate an advanced knowledge of how geological principles can be applied to engineering practice
- Critically assess data collected in the field and the laboratory and recognize their geological importance
- Understands structure and composition of earth.
- Understands how precious earth natural resources in the management of construction industry and mineral based industries.
- Understands how human activities in construction of major projects such as dams, tunnels, highways and reservoirs and its impact on earth environment & its economics.
- Understands natural fossil fuels and nuclear minerals of present day to solve energy crisis of the world.
- Understands how by way of geotechnical education, public participation, scientific practice, awareness, law and by engineered systems, the damage to the earth environment can be reduced or mitigated by scientific mining & quarrying methods

TEXT BOOKS:

1. Engineering Geology by N.Chennkesavulu, Mac-Millan, Publishers 2nd Edition India Ltd. 2010.
2. Engineering Geology by Parbin singh.

REFERENCES:

1. F.G. Bell, Fundamental of Engineering Geology Butterworths, Publications, New Delhi, 1992.
2. Krynine & Judd, Principles of Engineering Geology & Geotechnics, CBS Publishers & Distribution,
3. Foundations of Engineering Geology – Tony Waltham – Spon press/ Cry press Taylor & Francis.

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III YEAR II SEMESTER   **L   T/P/D C**
                                                          4   -/-/-   4

ELEMENTS OF EARTHQUAKE ENGINEERING
(ELECTIVE-I)

Course Objectives:

- To provide a graduate level comprehensive earthquake engineering education.

- Produce graduates equipped to pursue careers in seismic analysis and design in industry, the public sector and non-governmental organizations;

- Provide the basis for the recognition and understanding of the major features of structural engineering;

- Develop an understanding of how this knowledge may be applied in practice in an economic and environmentally sustainable manner;

- Foster the acquisition and implementation of broad and analytical skills related to structural engineering;

- Provide an introduction to the subject for students from other relevant disciplines

UNIT-I

ENGINEERING SEISMOLOGY: Earthquake phenomenon cause of earthquakes-Faults- Plate tectonics- Seismic waves- Terms associated with earthquakes- Magnitude/Intensity of an earthquake-scales-Energy released-Earthquake measuring instruments-Seismoscope, Seismograph, accelerograph-strong ground
motions- Seismic zones of India.

UNIT - II

THEORY OF VIBRATIONS: Elements of a vibratory system- Degrees of Freedom- Continuous system-Lumped mass idealization-Oscillatory motion-Simple Harmonic Motion-Free vibration of single degree of freedom (SDOF) system-undamped and damped-critical damping-Logarithmic decrement-Forced vibrations.

CONCEPTUAL DESIGN: Introduction-Functional planning-Continuous load path-Overall form-simplicity and symmetry-elongated shapes-stiffness and strength-Horizontal and Vertical members-Twisting of buildings- flexible buildings-framing systemschoice of construction materials-unconfined concrete-confined concrete-masonryreinforcing steel - Lateral load resisting systems.

UNIT – III

INTRODUCTION TO EARTHQUAKE RESISTANT DESIGN: Seismic design requirements-regular and irregular configurations-basic assumptions-design earthquake loads-basic load combinations-permissible stresses-seismic methods of analysis-factors in seismic analysis-equivalent lateral force method.

UNIT – IV

REINFORCED CONCRETE BUILDINGS: Principles of earthquake resistant deign of RC members- Structural models for frame buildings- IS code (IS 1893) based methods for seismic design- rofitting- Vertical irregularities- Plan configuration problems- Determination of design lateral forces- Equivalent lateral force procedure- Lateral
distribution of base shear.
MASONRY BUILDINGS: Introduction- Elastic properties of masonry assemblage- Categories of masonry buildings-Behaviour of unreinforced and reinforced masonry walls- Behaviour of walls- Box action and bands- Behaviour of infill walls- Improving seismic behaviour of masonry buildings- Load combinations and permissible stresses- Seismic design requirements- Lateral load analysis of masonry buildings.

UNIT – V

STRUCTURAL WALLS AND NON-STRUCTURAL ELEMENTS: Strategies in the location of structural walls-sectional shapes- variations in elevation- cantilever walls without openings –Failure mechanism of non-structures-Effects of non-structural elements on structural system- Analysis of non-structural elements- Prevention of non-structural damage- Isolation of non-structures.

DUCTILITY CONSIDERATIONS IN EARTHQUAKE RESISTANT DESIGN OF RC BUILDINGS: Introduction- Ductility-definition-ductility relationships-Impact of Ductility- Requirements for Ductility- Assessment of Ductility- Factors affecting Ductility-Ductile detailing considerations as per IS 13920. Behaviour of beams and columns in RC buildings during earthquakes-Vulnerability of open ground storey and short columns during earthquakes.

Course Outcomes:

- The student is able to estimate the lateral loads on structures and design the structures for gravity and lateral load combinations.

TEXT BOOKS:

1. Earthquake Resistant Design of structures – S. K. Duggal, Oxford University Press
2. Earthquake Resistant Design of structures – Pankaj Agarwal and Manish Shrikhande, Prentice Hall of India Pvt. Ltd.

REFERENCE BOOKS

1. Advanced Reinforced Concrete Design – P. C Varghese. Prentice Hall of India Pvt. Ltd.
2. Earthquake Tips – Learning Earthquake Design and Construction C.V.R. Murty
3. Seismic Design of Reinforced Concrete and Masonry Building – T. Paulay and M.J.N. Priestly, John Wiley & Sons
4. Geotechnical Engineering By Sahashi K Gulhati Manoj Datta, Tata McGraw-Hill-2008

REFERENCE CODES:

1. IS: 1893 (Part-1) -2002. "Criteria for Earthquake Resistant – Design of structures." B.I.S., New Delhi.
2. IS:4326-1993, " Earthquake Resistant Design and Construction of Building", Code of Practice B.I.S., New Delhi.
3. IS:13920-1993, " Ductile detailing of concrete structures subjected to seismic force" – Guidelines, B.I.S., New Delhi.

MALLA REDDY ENGINEERING COLLEGE
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III YEAR II SEMESTER   **L   T/P/D   C**
                                                      4   -/-/-   4

GROUND IMPROVEMENT TECHNIQUES
(ELECTIVE-I)

Course Objectives:

- Student is expected to identify basic deficiencies of various soil deposits
- Student will be in a position to decide various ways and means of improving the soil and implementing techniques of improvement.

UNIT – I

DEWATERING: methods of de-watering- sumps and interceptor ditches- single, multi stage well points - vacuum well points- Horizontal wells-foundation drains-blanket drains- criteria for selection of fill material around drains –Electro-osmosis.
GROUTING: Objectives of grouting- grouts and their properties- grouting methodsascending, descending and stage grouting- hydraulic fracturing in soils and rockspost, grout test.

UNIT – II

IN – SITU DENSIFICATION METHODS IN GRANULAR SOILS:– Vibration at the ground surface, Impact at the Ground Surface, Vibration at depth, Impact at depth.
IN – SITU DENSIFICATION METHODS IN COHESIVE SOILS:– preloading or dewatering, Vertical drains – Sand Drains, Sand wick geodrains – Stone and lime columns – thermal methods.

UNIT – III

REINFORCED EARTH: PRINCIPLES – Components of reinforced earth – factors governing design of reinforced earth walls – design principles of reinforced earth walls.

UNIT – IV

GEOSYNTHETICS : Description, properties, functions and applications of geosynthetics
GEOENVIRONMENTAL APPLICATION OF GEOSYNTHETICS: Geomembranes for landfills and ponds, Geosynthetic clay liner, Designing with GCL;s, Filtration, Erosion control, slope protection.

UNIT – V

STABILIZATION: Methods of stabilization-mechanical-cement- lime-bituminouschemical stabilization with calcium chloride, sodium silicate and gypsum. Expansive soils: Problems of expansive soils – tests for identification – methods of determination of swell pressure. Improvement of expansive soils – Foundation techniques in expansive soils – under reamed piles.

Course Outcomes:

- Solve the field problems related to problematic soils and solve the problems using the above ground improvement techniques
- Design drainage, dewatering for the field problems
- Design and construct reinforced earth retaining structures

TEXT BOOKS:

1. Purushotham Raj. Ground Improvement Techniques, Laxmi Publications, New Delhi
2. Hausmann M.R. (1990), Engineering Principles of Ground Modification, McGraw-Hill International Edition.

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

MALLA REDDY ENGINEERING COLLEGE
(Autonomous)

III YEAR II SEMESTER

L	T/P/D	C
4	1/-/-	4

GROUND WATER HYDROLOGY
(ELECTIVE-I)

Course Objectives:

- The students will able to Know the Characteristics of porous media, hydrologic cycle and Darcy's law of fluid flow in porous media

- The students will able to Know the Continuity principles, Well hydraulics; aquifer and borehole testing

- Students will get the Engineering applications of groundwater hydraulics, Characteristics of water in the vadose zone; unsaturated flow, Infiltration, redistribution, evaporation, and the water balance

UNIT-I

INTRODUCTION: Ground water in the hydrologic cycle, vertical distribution of ground Water. Types of aquifers - unconfined, confined and leaky aquifers, porosity, void ratio, storage coefficient, permeability, Transmissivity, specific yield, safe yield. General equation of ground water flow, steady undirectional flow, steady radial flow to a well in unconfined and confined aquifers. Steady flow with uniform recharge.

UNIT-II

UNSTEADY RADIAL FLOW TO A WELL: Non equilibrium equation for pumping tests, Theis method of solution, Cooper Jacob method, Chow's methods of solution, law of times, well flow near acquifer boundaries. Image wells, multiple well systems, partially penetrating wells, steady radial flow in leaky artersion aquifer. Well completion and well development.

UNIT-III

GEOPHYSICAL EXPLORATION: Surface investigations of ground water -Electrical Resistivity method, seismic refraction method, gravity and magnetic methods, geologic methods, Dowsing. Subsurface Investigations - Test drilling, resistivity logging, potential logging, Temperature logging, calliper logging, Interpretation oflogs and selection of site as a well.

UNIT-IV

ARTIFICIAL RECHARGE OF GROUND WATER: Methods ofrecharge, water spreading, sewage discharge, Recharge through pits and shafts, Recharge through well, Induced recharge. Sea water intrusion in coastal aquifers; occurrence, Ghyben - Herzberg relation, shape of fresh - salt water interface, length ofthe intreded sea water wedge, oceanic island aquifers, upcoming, prevention and control of sea water intrusion.

UNIT-V

GROUND WATER BASIN MANAGEMENT: Conjunctive use of surface and ground waters, Hydrologic balance equation. Ground water analog models-Sand models, electric analog models, viscous flow models, numerical analysis models - Finite difference method.

Course Outcomes:

- Create a conceptual model of an area's hydrogeology that can be used to guide a site investigation or engineering design project.
- Selecting the most appropriate modeling techniques based on an engineering project's goals and evaluating how their weaknesses may impact the final conclusions.
- Develop a preliminary consulting report for a groundwater development of minor project

TEXT BOOKS:

1. H.M. Ragunath, Ground Water, Wiley Eastern Limited, New Delhi.

2. D.K. Todd, Ground Water Hydrology, John Wiley & Sons, Inc.,USA.

REFERENCES:

1. K.P. Karnath, Ground Water Ananment, Development and Management, Tata McGraw Hill Publishing Company, New Delhi.
2. Walton, Ground Evaluation and Management, McGraw Hill.
3. Bouwer, Ground Water Hydrology, McGraw Hill.

MALLA REDDY ENGINEERING COLLEGE
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III YEAR II SEMESTER   **L   T/P/D   C**
                                                             4   -/-/-   4

ENVIRONMENTAL IMPACT ASSESSMENT AND MANAGEMENT
(ELECTIVE-I)

Course Objectives:

- The students will get them. Close link between environment and natural resources with development and proficient at:
- Planning and undertaking of impact assessment leading multi-disciplinary EIA.
- Teams Reviewing Environmental Impact Statements
- Preparing. Environmental Impact Statements
- Undertaking environmental audits
- Integrating EIA in project planning
- Designing environmental management systems.

UNIT – I

BASIC CONCEPT OF EIA : Initial environmental Examination, Elements of EIA, - factors affecting E-I-A Impact evaluation and analysis, preparation of Environmental Base map, Classification of environmental parameters.
E I A METHODOLOGIES: introduction, Criteria for the selection of EIA Methodology, E I A methods, Ad-hoc methods, matrix methods, Network method Environmental Media Quality Index method, overlay methods, cost/benefit Analysis.

UNIT – II

IMPACT OF DEVELOPMENTAL ACTIVITIES AND LAND USE: Introduction and Methodology for the assessment of soil and ground water, Delineation of study area, Identification of actives. Assessment of Impact of development Activities on Vegetation and wildlife, environmental Impact of Deforestation – Causes and effects of deforestation.

UNIT-III

Procurement of relevant soil quality, Impact prediction, Assessment of Impact significance, Identification and Incorporation of mitigation measures. E I A of surface water, Air and Biological environment: Methodology for the assessment of Impacts on surface water environment, Air pollution sources, Generalized approach for assessment of Air pollution Impact.

UNIT – IV

Environmental Audit & Environmental legislation objectives of Environmental Audit, Types of environmental Audit, Audit protocel, stages of Environmental Audit, onsite activities, evaluation of Audit data and preparation of Audit report, Post Audit activities.

UNIT – V

The Environmental Protection Act, The water Act, The Air (Prevention & Control of pollution Act.), Motor Act, Wild life Act. Case studies and preparation of Environmental Impact assessment statement for various Industries.

Course Outcomes:

- Appreciation of the contexts and role of EIA in environmental management;
- Understanding of the elements of EIA and the processes by which they are applied;
- Confidence to apply the framework of EIA to relevant situations.

TEXT BOOKS:

1. Environmental Impact Assessment Methodologies, by Y. Anjaneyulu, B.S.Publication, Sultan Bazar, Hyderabad.

REFERENCES:

1. Environmental Pollution and Control, by Dr H.S. Bhatia – Galgotia Publication (P) Ltd, Delhi
2. Environmental Impact Assessment & Management . **Publisher:** Daya **Author:** B B Hosetti, A Kumar
3. Environmental Science and Engineering, by J. Glynn and Gary W. Hein Ke –Prentice Hall Publishers

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III YEAR II SEMESTER   L   T/P/D   C
                                                          4   -/-/-   4

PRINCIPLES OF ENTREPRENEURSHIP
(ELECTIVE-I)

Course Objectives

- Students will be able to analyse the feasibility of a project and calculate rate of interest, taxes and capital recovery for different civil engineering projects.
- Students will be able to perform critical sensitivity analysis which is extremely important for decision making and for solving problems with many variables in transportation and assignment models so that the problems are readily solvable.
- Students will be able to know the selection of different equipment its performance and efficiency in different kinds of Work Activities, Scheduling and controlling along with resource allocation, time-cost tradeoff.
- Students will be able to know the process and purpose of planning, organization along with leadership qualities and co-ordination of projects.

UNIT-I

INDIAN INDUSTRIAL ENVIRONMENT: Competence, opportunities and challenges. Entrepreneurship and economic growth.Small scale industry in India, Objectives, Linkage among small, medium and heavy industries.Types and forms of enterprises.

UNIT-II

IDENTIFICATION AND CHARACTERISTICS OF ENTREPRENEURS: Emergence of first generation entrepreneurs, environmental influence and women entrepreneurships.Conception and evaluation of ideas and their sources.Choice of technology - Collaborative interaction for technology development.

UNIT-III

PROJECT FORMULATION: Analysis of market and demand.Financial and profitability analysis and Technical analysis.Project financing in India.

UNIT-IV

PROJECT MANAGEMENT: Project organization, project planning and control using CPM, PERT techniques.Human aspects of project management. Assessment of tax burden.

UNIT-V

BEHAVIOR ASPECTS OF ENTREPRENEURS: Personality - determinants, attributes and models. Leadership concept and models.Values and attitudes.Motivation aspects. Change behaviour. Time management.Various approaches of time management, their strengths and weaknesses.Urgency addition and time management matrix.

Course outcomes:

- Understands what construction projects.
- Understands how to tackle different construction projects and solving it.
- Understands how to manage the locally available resources and allocating them.

- Understands different planning techniques at present day and possible solutions in the in the present and in the future.
- Understands how by way of education, public participation, scientific practice, awareness, law and by engineered systems, so that the construction completes in planned way.

TEXT BOOKS:

1. Vasant Desai, Dynamics of Entrepreneurial Development and Management, Himalaya Publishing House, 1997.

REFERENCES:
1. Prasanna Chandra, Projects-Planning. Analysis, Selection, Implementation and Review, Tata McGraw Hill Publishing Company Ltd., 1995.
2. Stephen R. Covey and Roger Merrill A., First Things First Simon, Schuster Publication, 1994.
3. Sudha (G.S.) Organizational Behaviour, National Publishing House, 1996.

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III YEAR II SEMESTER   **L   T/P/D   C**
                                                                              0   -/3/-   2

GEOTECHNICAL ENGINEERING LAB

Course Objectives:

- Provide students with the basic knowledge to carry out field investigations and to indentify soils in geotechnical engineering practice.
- Students perform CBR tests on local soils to determine subgrade properties needed for temporary and permanent roadways.

List of experiments

1. Atterberg's Limits (LL & PL)

2. Field density-core cutter and sand replacement method

3. Grain size analysis (Sieve and Hydrometer analysis)

4. Permeability of soil, constant and variable head test

5. Compaction test

6. CBR Test

7. Consolidation test

8. Unconfined compression test

9. Tri-axial Compression test

10. Direct shear test.

11. Vane shear test

Note: Any eight experiments may be completed.

Course Outcomes:

1. Describe the laboratory consolidation test and interpret laboratory test results to obtain consolidation parameters.
2. Determine the shear strength of soils and describe the differences between drained and untrained shear strength
3. Describe laboratory shear testing of soils and interpret laboratory and field test results to obtain shear strength parameters

MALLA REDDY ENGINEERING COLLEGE
(Autonomous)

III YEAR II SEMESTER   L   T/P/D C
                                                  0   -/3/-   2

ENGINEERING GEOLOGY LAB

Course Objectives:

- The student will get the fundamentals of the engineering properties of Earth materials,
- Student will examine the role of geologists in engineering projects,
- To develop the quantitative skills for solving basic engineering geology problems.

LIST OF EXPERIMNETS

1. Study of physical properties and identification of minerals referred under theory.
2. Megascopic and microscopic description and identification of rocks referred under theory.
3. Megascopic and microscopic identification of rocks & minerals.
4. Interpretation and drawing of sections for geological maps showing tilted beds, faults, uniformities etc.
5. Simple Structural Geology problems.

LAB EXAMINATION PATTERN:

1. Description and identification of SIX minerals

2. Description and identification of Six (including igneous, sedimentary and metamorphic rocks)

3. Interpretation of a Geological map along with a geological section.

4. Simple strike and Dip problems

Course Outcomes:

- To know and understand the properties of common rock forming minerals and rock types.
- To understand and able to interpret structural geological map.
- To understand the basic knowledge in rock engineering and be able to carry out common tests on rock samples.

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IV YEAR I SEMESTER   **L   T/P/D C**
                                                                 4   -/-/-   4

REMOTE SENSING AND GIS

Course Objectives:

- To understand the principles, applications, trends, and pertinent issues of geographical information systems and sciences, including remote sensing (RS), Photogrammetry, cartography, and global positioning systems (GPS).

- To provide learning and teaching experiences with real world problems.

- To develop technical skills and competence in data and information acquisition, extraction, management and analysis; spatial and statistical modelling; mapping and visualization.

- To increase awareness of GIS and modelling tools for improving competition and business potential.

- To describe how geographical information is used, managed, and marketed globally.

- To gain an understanding of how to manipulate and apply vector and raster spatial data, particularly with regard to local/state/national issues, emphasizing lands in and near it.

UNIT – I
INTRODUCTION TO PHOTOGRAMMETRY: Principle and types of aerial photographs, stereoscopy, Map Vs Mosaic, ground control, Parallax measurements for height, determinations.

REMOTE SENSING – I: Basic concepts and foundation of remote sensing – elements involved in remote sensing, electromagnetic spectrum, remote sensing terminology and units.

UNIT – II
REMOTE SENSING – II: Energy resources, energy interactions with earth surface features and atmosphere, resolution, sensors and satellite visual interpretation techniques, basic elements, converging evidence, interpretation for terrain evaluation, spectral properties of water bodies, introduction to digital data analysis.

UNIT – III
GEOGRAPHIC INFORMATION SYSTEM: Introduction, GIS definition and terminology, GIS categories, components of GIS, fundamental operations of GIS, A theoretical framework for GIS.
TYPES OF DATA REPRESENTATION: Data collection and input overview, data input and output. Keyboard entry and coordinate geometry procedure, manual digitizing and scanning, Raster GIS, Vector GIS – File management, Spatial data – Layer based GIS, Feature based GIS mapping.

UNIT – IV
GIS SPATIAL ANALYSIS: Computational Analysis Methods (CAM), Visual Analysis Methods (VAM), Data storage-vector data storage, attribute data storage, overview of the data manipulation and analysis. Integrated analysis of the spatial and attribute data.

UNIT – V

APPLICATIONS OF GIS: Land use/Land cover in water resources, Surface water mapping and inventory, Rainfall – Runoff relations and runoff potential indices of watersheds, Flood and Drought impact assessment and monitoring, Watershed management for sustainable development and Watershed characteristics.Reservoir sedimentation, Fluvial Geomorphology, water resources management and monitoring, Ground Water Targeting, Identification of sites for artificial Recharge structures, Drainage Morphometry, Inland water quality survey and management, water depth estimation and bathymetry.

Course Outcomes:

- The present course is an introductory course in RS & GIS. The course is designed in such a way has to provide some of basics required for civil engineering and to solve the civil engineering problems.

TEXT BOOKS:

1. Remote Sensing and its applications by LRA Narayana University Press 1999.
2. Principals of Geo physical Information Systems – Peter A Burragh and Rachael A. Mc Donnell, Oxford Publishers 2004.

REFERENCES:

1. Concepts & Techniques of GIS by C.P.Lo Albert, K.W. Yonng, Prentice Hall (India) Publications.
2. Remote Sensing and Geographical Information systems by M.Anji Reddy JNTU Hyderabad 2001, B.S.Publications.
3. Basics of Remote sensing & GIS by S.Kumar, Laxmi Publications.

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IV YEAR I SEMESTER	L	T/P/D	C
	4	-/-/-	4

TRANSPORTATION ENGINEEREING-II

Course Objectives:

- To provide the students with basic knowledge of different components of railway track and their requirements.
- To provide students the knowledge on the geometric features of railways along with computational capabilities of the same.
- To provide the students the knowledge on importance of airway system and characteristics of aircrafts and planning for geometric details of runways.
- To provide the students with knowledge about harbors and components
- To provide the knowledge about problems that exists in urban transportation system. Various mass transport facilities

UNIT – I

INTRODUCTION TO RAILWAY: Permanent way components – Cross Section of Permanent Way - Functions of various Components like Rails, Sleepers and Ballast –Rail Fastenings – Creep of Rails- Theories related to creep – Ageing of Sleepers- Sleeper density.

UNIT – II

GEOMETRIC DESIGN OF RAILWAY TRACK: Gradients- Grade Compensation- Cant and Negative Super elevation- Cant Deficiency – Degree of Curve, Points and crossing, Rail joints & Welding of joints, Railway station & Yards, Signalizing & Interlocking.

UNIT – III

AIRPORT ENGINEERING: Airport Site Selction- Runway Orientation-Basic Runway Length-Corrections For Elevation, Temperature- Airport Classification-Runway Geometric Design, Factors Controlling Taxiway Layout, Terminal Area, Apron, Hangar, Blast Considerations, Typical Airport Layouts Wind Rose Diagram, Runway Lightening System & Marking.

UNIT – IV

PORT AND HARBOUR ENGINEERING: Requirements Of Port And Harbor, Classification Of Port & Harbor, Features Of A Harbor, Planning Of Harbor, Breakwaters, Dry Docks, Jetties, Aprons, Transit Shed And Warehouses, Navigational Aids, Maintenance Of Port And Harbours, Inland Water Transport.

UNIT – V

INTELLIGENT TRANSPORT SYSTEMS: ITS Definition, Benefits Of ITS, User Services, Dectors, Automatic Vehicle Location (AVL), Automatic Vehicle Identification (AVI), Introduction to ITS Applications: Advanced Traffic Management Systems (ATMS), Advanced Public Transportation Systems (APTS), ITS Architecture Components And Standards, Overview Of ITS Implementations In Developed Countries.

Course Outcomes:

- The students will be able to identify different components of railway track and select right materials for construction
- The students will be able to compute the various geometric features of railways for a given set of requirements.
- The students will be able to understand the importance of airway system and characteristics of aircrafts and involve in planning of airport facilities.
- The students will be able to understand the facilities at harbors construct the same.
- The students will be able to understand the problems that exist in urban transportation system. Also involve in planning of urban transport facilities.

TEXT BOOKS:

2. Satish Chandra and agarwal, M.M.(2007)"Railway Engineering" Oxford Higher education, university press New Delhi
3. Airport Planning and Design- S.K.Khanna and M.G. Arora, Nemchand Bros.
4. Transportation Engineering and Planning-C.S Papacostas, P.D.Prevedouros

REFERENCES:
1. A Text book of Railway Engineering – S.C Sexena and S Arora. Dhanpathrai and sons, New Delhi.
2. Highway, Railway, Airport and Harbour Engineering- K.P.Subramanian
3. Harbour,Dock and Tunnel Engineering – Hasmukh P Oza Gutam H Oza

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IV YEAR I SEMESTER	L	T/P/D	C
	4	-/-/-	4

ESTIMATING AND COSTING

Course Objectives:

- This course has courses Quantity Surveying 1 and 2 as prerequisites and as such its main objective is to develop in the student the art and skill whereby a monetary value can be placed on the volume of work previously measured.
- To develop an awareness of those factors that affect the cost of construction work and to analyze the influences that effect change in these factors.
- To encourage the habit of systematically recording all those statistics which are the stock in trade of the good estimator

UNIT – I

General items of work in Building – Standard Units Principles of working out quantities for detailed and abstract estimates – Approximate method of Estimating.

UNIT – II

Detailed Estimates of RCC Buildings, Steel Structures, Composite Structures, Reinforcement bar bending and bar requirement schedules.
.

UNIT - III

Earthwork for roads and canals

UNIT-IV

Rate Analysis – Working out data for various items of work over head and contingent charges.

UNIT – V

Contracts – Types of contracts – Contract Documents – Conditions of contract. Valuation of buildings.

Standard specifications for different items of building construction.

Course Outcomes:

- Will have knowledge on various methods of valuations and different methods for estimating cost depreciations.
- Will be able to estimate labor required stage wise
- Will have complete knowledge on various types of contracts and tenders

TEXT BOOKS

1. Estimating and Costing by B.N. Dutta, UBS publishers, 2000.

REFERENCES:

1. Estimating and Costing by G.S. Birdie
2. Estimation, Costing and Specifications by M. Chakraborthi; Laxmi publications.

REFERENCE CODES:

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

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IV YEAR I SEMESTER   **L   T/P/D C**
                                                                                  4   -/-/-   4

WATER RESOURCES ENGINEERING-II

Course Objectives:

- The student's will get the background in hydrology and hydraulics an understanding of the engineering of water resource systems in general and urban hydrologic systems in particular.

- The student will able to develop skills in the mathematical modelling of both natural and engineered water resource systems that are used to analyze system components.

- The student will able to incorporate these analytical abilities into the planning and design of water resource systems primarily employing representative examples from urban runoff quantity/quality control systems. There is a strong emphasis on engineering decision making throughout the course.

UNIT-I

STORAGE WORKS-RESERVOIRS - 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 –Life of Reservoir. Types of dams, factors affecting selection of type of dam, factors governing selection of site for a 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, Factors of Safety - Stability Analysis, Foundation for a Gravity Dam, drainage and inspection galleries.

UNIT-III

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 - Spillway gates.Energy Dissipaters and Stilling Basins Significance of Jump Height Curve and Tail Water Rating Curve - USBR and Indian types of Stilling Basins.

.**UNIT-IV**

CANAL FALLS - types of falls and their location, Design principles of Notch Fall and Sarada type Fall. Canal regulation works, principles of design of distributory and head regulators, Canal Cross Regulators -canal outlets, types of canal modules, proportionality, sensitivity and flexibility.

DIVERSION HEAD WORKS: Types of Diversion head works- weirs and barrages, layout of diversion head work - components. Causes and failure of Weirs and Barrages on permeable foundations,-Silt Ejectors and Silt Excluders

UNIT-V

CROSS DRAINAGE WORKS: types, selection of site, Design principles of aqueduct, siphon aqueduct and super passage. Design of Type II Aqueduct (Under Tunnel)

WEIRS ON PERMEABLE FOUNDATIONS – Creep Theories - Bligh's, Lane's and Khosla's theories, Determination of uplift pressure- Various Correction Factors – Design principles of weirs on permeable foundations using Creep theories - exit gradient, U/s and D/s Sheet Piles - Launching Apron

Course Outcomes:

- At the end of the course, the student will understand the need and mode of irrigation and also knows the irrigation management practices of the past, present and future.
- The student will be able to handle and plan any type of irrigation project.

TEXT BOOKS:

1. Irrigation and water power engineering by Punmia & Lal, Laxmi publications pvt. Ltd., New Delhi
2. Irrigation engineering and hydraulic structures by S.K Garg, Khanna publishers.

REFERENCES:

1. Theory and Design of Hydraulic structures by Varshney, Gupta & Gupta
2. Irrigation engineering by K.R.Arora
3. Irrigation Engineering by R.K. Sharma and T.K. Sharma, S. Chand Publishers

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IV YEAR I SEMESTER   **L   T/P/D C**
                                                                         4   -/-/-   4
FINITE ELEMENT METHODS
(Elective II)

Course Objectives:

- To equip the students with the Finite Element Analysis fundamentals.
- To enable the students to formulate the design problems into FEA.
- To introduce basic aspects of finite element technology, including domain discretization, polynomial interpolation, application of boundary conditions, assembly of global arrays, and solution of the resulting algebraic systems.

UNIT – I

INTRODUCTION TO FINITE ELEMENT METHOD – Basic Equations in Elasticity - equation – concept of plane stress – plane strain advantages and disadvantages of FEM.
ELEMENT SHAPES – nodes – nodal degree of freedom – strain displacement relations.

UNIT – II
FINITE ELEMENT ANALYSIS (FEA) of – one dimensional problems – Bar element – Shape functions stiffness matrix – stress – strain
FEA Two dimessional problem – CST – LST element – shape function – stress – strain

UNIT – III
FEA BEAM ELEMENTS – stiffness matrix - shape function – continuous beams.
.Lagrangian – Serenalipity elements – Hermit polynomials – regular, Irregular 2 D & 3D – Element –shape functions.

UNIT – IV
ISOPARAMETRIC FORMULATION – Concepts of, isoparametric elements for 2D analysis - formulation of CST element, 4 –noded and 8-noded iso-parametric quadrilateral elements.

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

Course Outcomes:

- To know the analysis of Complicated structures and to have a basic idea to work with software packages like ANSYS and SAP
- To analyse the problem using complicated procedures using FEM

TEXT BOOK:

1. Finite element analysis by S.S. Bhavakatti-New age international publishers
2. Introduction to Finite element method by J N Reddy
3. Finite element analysis theory and programming by C S Krishna murthy.

REFERENCES:

1. Finite element method by chandrupatta, belegunda
2. Finite element analysis by p. seshu, TMH

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(Autonomous)

IV YEAR I SEMESTER
L   T/P/D   C
4   -/-/-   4

ADVANCED FOUNDATION ENGINEERING
(Elective -II)

Course Objectives:

- The students will able to select the best foundation solution for different types of civil engineering problems.
- The students should be able to design deep and shallow foundations and supervise their construction.
- To provide the students with the information they need to design foundations at the state of the art.

UNIT – I

INTRODUCTION-Bearing capacity of Footings subjected to Eccentric and inclined loading – Meyerhoff's, Hansen's, Vesic theories – Foundations on layered soils.

UNIT - II

Elastic settlement of Footings embedded in sands and clays of Infinite thickness – Footings on soils of Finite thickness-Schmertamaunn's method, Janbu method.

UNIT – III

PILE FOUNDATIONS – static and dynamic methods-pile groups-negative skin friction-under reamed piles.
Settlement of Pile groups resting in sands and clays –laterally loaded piles ultimate capacity of laterally loaded piles.

UNIT – IV

LATERAL EARTH PRESSURES-RANKINE - Coloumb's and graphical methods – Stability of cantilever and counterfort retaining walls, Reinforced earth retaining walls.
Cantilever sheet piles and anchored bulkheads, Earth pressure diagram - Determination of Depth of embedment in sands and clays – Timbering of trenches- Earth pressure diagrams – Forces in struts.

UNIT – V

CAISSONS AND WELL FOUNDATIONS: Types of caissons – well foundations - Different shapes of wells – Components of wells – functions and Design – Design Criteria – Sinking of wells – lateral stability by Terzaghi's analysis.
Foundations in Expansive soils – Problems in Expansive soils – Mechanism of swelling–Swell Pressure and Swelling potential–Heave–foundation practices–Sand cushion–CNS technique – under – reamed pile Foundations – Granular pile – anchor technique, stabilization of expansive soils.

Course Outcomes:

- A student learn and able to find out the Soil Profile in a given location.
- A student able to select suitable foundation for a given structure and site.
- Expertise in the calculation of load carrying capacity of selected foundation.

TEXT BOOKS:
1. Das, B.M., - (1999) Principles of Foundation Engineering –4th edition PWS Publishing, Singapore.
2. Bowles, J.E., (1988) Foundation Analysis and Design – 4th Edition,McGraw-Hill International.
3. Geotechnical Engineering : Principles and practices of soil mechanics and foundation Engineering by VNS Murthy, Taylor & Francis Group

4. Geotechnical Engineering by C. Venkataramah, New Age International Pvt.Ltd, Publishers (2002).

REFERENCE BOOKS:

1. Analysis and Design of Substructures – Swami Saran, Oxford & IBH Publishing Company Pvt.Ltd (1998).
2. Basics and Applied Soil Mechanics by Gopal Ranjan & ASR Rao, New Age International Pvt.Ltd, Publishers (2002).

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(Autonomous)

IV YEAR I SEMESTER   **L**   **T/P/D   C**
                                                                      4   **-/-/-   4**

WATERSHED MANAGEMENT
(Elective -II)

Course Objectives:

- Introduce students to watershed processes and functions and to the principles underpinning watershed management and decision-making.
- Examine strategies for planning and management of watershed resources in general, and in the particular contexts of developing countries.
- Provide exposure to watershed management issues for a wide range of conditions from watersheds relatively non-impacted by human development to those heavily impacted by development and to the restoration techniques and issues required.
- Provide an opportunity for in-depth practical teamwork in the formulation of watershed management strategies and plans.

UNIT-I

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

Watershed delineation – Runoff Computations from a watershed – Flood Frequency Analysis – Gumbell, Log Pearson and Weibull Methods of Analysis.

UNIT-III

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-IV

WATER HARVESTING: Rainwater Harvesting, catchment harvesting, harvesting structures, soil moisture conservation, check dams, artificial recharge, farm ponds, percolation tanks.
FOREST AND GRASS LAND MANAGEMENT: Interpretation of Satellite Imageries- Land use and Land Cover. 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. Planning of watershed management activities, peoples participation, preparation of action plan, administrative requirements- Reservoir Routing..

Course Outcomes:

- Formulate a vision and design a sustainable watershed management plan that shows an integrated approach towards multiple use of land- and water resources and social equity and economic viability

- Work in multidisciplinary and multicultural groups with respect for different views, expertise and culture
- Reflect on own contribution to group work and on group processes.

TEXT BOOKS:

1. Watershed Management by JVS Murthy, - New Age International Publishers.
2. Water Resource Engineering by R.Awurbs and WP James, - Prentice Hall Publishers.

REFERENCE:

1. Land and Water Management by VVN Murthy, - Kalyani Publications.
2. Irrigation and Water Management by D.K.Majumdar, Printice Hall of India.

MALLA REDDY ENGINEERING COLLEGE
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IV YEAR I SEMESTER   **L   T/P/D C**
                                                                4   -/-/-   4

AIR POLLUTION AND CONTROL
(Elective -II)

Course Objectives:

- The students will learn the Introduction of major problems in indoor air pollution and control, regulations
- Students will become Familiar with regulations pertinent to air pollutions
- Students can able to describe general air pollution problems, meteorological definitions, air transport equations and pollution control matters and devices

UNIT – I

AIR POLLUTION – Definitions, Scope, Significance and Episodes, Air Pollutants – Classifications – Natural and Artificial – Primary and Secondary, point and Non- Point, Line and Areal Sources of air pollution- stationary and mobile sources. Effects of Air pollutants on man, material and vegetation: Global effects of air pollution – Green House effect, Heat Islands, Acid Rains, Ozone Holes etc.

UNIT-II

THERMODYNAMICS AND KINETICS OF AIR-POLLUTION – Applications in the removal of gases like SOx, NOx, CO, HC etc., air-fuel ratio. Computation and Control of products of combustion.
METEOROLOGY AND PLUME DISPERSION; properties of atmosphere; Heat, Pressure, Wind forces, Moisture and relative Humidity, Influence of Meteorological phenomena on Air Quality-wind rose diagrams.

UNIT-III

Lapse Rates, Pressure Systems, Winds and moisture plume behaviour and plume Rise Models; Gaussian Model for Plume Dispersion.

UNIT-IV

CONTROL OF PARTICULATES – Control at Sources, Process Changes, Equipment modifications, Design and operation of control.Equipment's – Settling Chambers, Centrifugal separators, filters Dry and Wet scrubbers, Electrostatic precipitators.

UNIT – V

GENERAL METHODS OF CONTROL OF NO$_X$ AND SO$_X$ EMISSIONS – In-plant Control Measures, process changes, dry and wet methods of removal and recycling. Air Quality Management – Monitoring of SPM, SO; NO and CO Emission Standards.

Course Outcomes:

- Explain the role transportation systems play in the development of communities.
- Understand in general terms, the major issues and challenges facing and air transportation in the 21st century.

TEXT BOOKS:

1. Air pollution By M.N.Rao and H.V.N.Rao – Tata Mc.Graw Hill Company.
2. An introduction to Air pollution by R.K. Trivedy and P.K. Goel, B.S. Publications

REFERENCES:
1. Air pollution by Wark and Warner.- Harper & Row, New York.

MALLA REDDY ENGINEERING COLLEGE
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IV YEAR I SEMESTER	L	T/P/D	C
	4	-/-/-	4

ADVANCED STRUCTURAL DESIGN
(ELECTIVE –III)

Course Objectives:

- To study and design the components of industrial buildings such as purlins, girts, rafter, tie runner, side runner, Eaves strut ,truss members and Vierendeel girder.
- To study various connections (welded and riveted) , seated connections (Unstiffened and Stiffened connections) and to design them.
- To focus on the study and design of various steel towers and steel chimneys.
- To study the analysis of structures.
- To study the design concepts and design Light gauge steel structures

UNIT – I

Design of Retaining walls, cantilever and counter fort Design of RCC water tanks, Circular and rectangular types.

UNIT – II

Design of steel water tanks, Introduction to bunkers, silos and Chimney, concepts of loading and Design.

UNIT – III

Introduction to concrete bridges, IRC loading, slab bridges and T - beam bridges design concepts.

UNIT – IV

Design of plate girder railway bridges and gantry girders.

UNIT – V

Design of steel truss bridges for railway loading. Multistory building system – detailing for Ductility, Design for earthquake and wind forces.

Course Outcomes:

- Able to design a bridge, culverts and water tanks
- Able to design the sub structure.
- Able to design the bunkers, silos and chimneys.

TEXT BOOKS:

1. Essentials of Bridge Engineering by D.John son Victor, Oxford and IBM publication Co., Pvt. Ltd.
2. Advanced Reinforced concrete structures by Vargheesh, Pranties Hall of India Pvt. Ltd.
3. Design drawing of concrete and steel structures by N.Krishna Raju University Press 2005.
4. Reinforced concrete structures Vol-2 by by B.C.Punmia, Ashok Kumar Jain and Arun Kumar Jain, Laxmi, publications Pvt. Ltd., New Delhi

REFERENCES:

1. Reinforced concrete design by S.U,Pillai and D.Menon, Tata Mc.Ghrawhill Publishing company
2. Advanced Reinforced Concrete Design by P.C. Varghese, Prentice Hall India.

MALLA REDDY ENGINEERING COLLEGE
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IV YEAR I SEMESTER

	L	T/P/D	C
	4	-/-/-	4

EARTH & ROCKFILL DAMS
(Elective -III)

Course Objectives:

- Have an understanding of seismic design concepts and current practices for earth dams and other similar structures to enable them to plan and direct the construction activity appropriately.
- To understand the soil dynamic testing procedure and methodology of seismic design to be able to execute a proper design.
- To have a clear understanding of design methodology and the interpretation in the seismic codes.
- To create ability to identify, formulates, and solve soil stability related problems.
- Understanding the impact of engineering solutions in economic and environmental context.

UNIT-I

EARTH AND ROCKFILL DAMS: General features, Selection of site; Merits and demerits of the earth and rock fill dams, Classification of earth dams, Materials of construction and requirements, Causes of failure, Safe design criteria. Instrumentation in earth dams: Pore pressure measurements, Settlement gauges, Inclinometers, Stress measurements, Seismic measurements.

UNIT-II

FAILURES, DAMAGES AND PROTECTION OF EARTH DAMS: Nature and importance of failure, Piping through embankment and foundations, Methods of seepage control through embankments and foundations, Design Criteria for filters, Treatment of upstream and down stream of slopes, Drainage control, Filter design.

UNIT-III

SLOPE STABILITY ANALYSIS: Types of Failure: Failure surfaces - Planar surfaces, Circular surfaces, Non-circular surfaces, Limit equilibrium methods, Total stress analysis versus effective Stress analysis, Use of Bishop's pore pressure parameters, Short term and Long term stability in slopes.

UNIT-IV

METHODS OF SLOPE STABILITY: Taylor Charts, Method of Slices, Effect of Tension Cracks, Vertical Cuts. Bishop's Analysis, Bishop and Morgenstern Analysis, Noncircular Failure Surfaces: Morgenstern and Price Analysis, Janbu Analysis, Spencer Analysis, Sliding Block Analysis, Seismic stability, Stabilization of slopes: Drainage measures, Soil reinforcement (geosynthetics/soil nailing/micro piles etc), soil treatment (cement/lime/thermal treatment), surface protection (vegetation/erosion control mats/shotcrete).

UNIT-V

ROCKFILL DAMS: Requirements of compacted rockfill, Shear strength of rockfill, Rockfill mixtures, Rockfill embankments, Earth-core Rockfill dams, Stability, Upstream & Downstream slopes.

Course Outcomes:

- Develop an ability to apply knowledge of geotechnical engineering to solve problems related to dams and stability.
- An ability to design a embankment or sloped land for economic and safe aspects for the society.
- An ability to identify, formulate and solve stability related problems.

TEXT BOOKS:

1. Sherard – Earth and Earth Rock Dams.
2. Sowers, G. F. and Salley, H. I. – Earth and Rockfill Dams
3. Bharat Singh and Sharma, H. D. – Earth and Rockfill Dams.

REFERENCES:

1. Abramson, L. W., Lee, T. S. and Sharma, S. - Slope Stability and Stabilisation methods – John Wiley & sons.
2. Bromhead, E. N. (1992). The Stability of Slopes, Blackie academic and professional, London.
3. Christian, Earth & Rockfill Dams – Principles of Design and Construction, Kutzner Published Oxford and IBH.

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IV YEAR I SEMESTER   L   T/P/D   C
                                                                    4   -/-/-   4

WATER RESOURCES SYSTEMS ANALYSIS
(ELECTIVE –III)

Course Objectives:

- Students will know the planning and management of water resource systems.
- The course will cover the topics of water planning and management by providing in depth coverage of the tools of analysis, namely optimization and simulation, and by providing the theoretical framework for analysis based on the economics of water and the design of water systems.

UNIT – I

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

UNIT – II

Linear programming –I: Formulation linear programming models, graphical method, simplex method, application of Linear
programming in water resources.
Linear programming – II: Revised simplex method, duality in linear programming, sensitivity and past optimality analysis.

UNIT – III

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

UNIT – IV
Non-linear optimatization techniques: Clerical of method optimization, Kuch-Tucleer, gradential based research techniques for simple unconstrained optimization.
Simulation: application of simulation techniques in water resources.

UNIT – V
Water –resources economics: Principles of Economics analysis, benefit cost analysis socio economic intuitional and pricing of water resources.
Water resources management: Planning of reservoir system, optimal operation of single reservoir system, allocation of water resources, optimal cropping pattern, conjunctive use of surface and sub-surface water resources.

Course Outcomes:

- Understand the fundamentals of economic theory as applied to water resources,
- Be familiar with optimization and simulation modeling,
- Be able to design and solve optimization models of water systems,
- Be able to conduct model-based analysis of integrated water resource systems
- Understand current issues of importance in water resources management, including water scarcity, eco hydrology and climate change

TEXT BOOKS:

1. Water Resources System Analysis – Vedula & Mujumdar – Tata Mc.Graw Hill Company Ltd. 2005.
2. Water Resources Economics - James & Lee. Oxford Publishers 2005.

REFERENCES:

1. Optimal design of water distribution networks P.R.Bhave, Narosa Publishing house 2003.

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IV YEAR I SEMESTER   L   T/P/D C
                                                                         4   -/-/-   4

INDUSTRIAL WASTE WATER TREATMENT
(ELECTIVE –III)

Course Objectives:

- Understand the public health consequences of water supply and use.
- Describe the basics of water and waste water, the hydrological cycle, waterborne diseases, and water quality
- Describe the basic fundamentals of water reuse and desalination.
- Understand the basic elements of risk, epidemiology and sustainability as they relate to water and waste water.
- Understand the importance of water in solving local, regional and international community problems.

UNIT – I

Quality requirements of boiler and cooling waters – Quality requirements of process water for Textiles – Food processing and Brewery Industries – Boiler and Cooling water treatment methods.

UNIT – II

Basic Theories of Industrial Waste water Management – Volume reduction – Strength reduction – Neutralization – Equalization and proportioning. Joint treatment of industrial wastes and domestic sewage – consequent problems.

UNIT – III

Industrial waste water discharges into streams. Lakes and oceans and problems.
Recirculation of Industrial Wastes – Use of Municipal Waste Water in Industries.

UNIT – IV

Manufacturing Process and design origin of liquid waste from Textiles, Paper and Pulp industries, Thermal Power Plants and Tanneries, Special Characteristics, Effects and treatment methods.
Manufacturing Process and design origin of liquid waste from Fertilizers, Distillers, and Dairy, Special Characteristics, Effects and treatment methods.

UNIT – V

Manufacturing Process and design origin of liquid waste from Suger Mills, Steel Plants, Oil Refineries, and Pharmaceutical Plants, Special Characteristics, Effects and treatment methods.
Common Effluent Treatment Plants – Advantages and Suitability, Limitations, Effluent Disposal Methods.

Course Outcomes:

- Ability to understand the technological processes of industrial wastewater treatment.
- Design of industrial wastewater treatment plants from food processing industry.
- Provide calculation of wastewater production and quality of wastewater and dimensioning of basic technological stages.
- The capability to work with project documentations of industrial wastewater treatment plants.

TEXT BOOK:

1. Waste Water Treatment by M.N. Rao and Dutta, Oxford & IBH, New Delhi.

REFERENCES:

1. Liquid waste of Industry by Newmerow.
2. Water and Waste Water technology by Mark J. Hammer and Mark J. Hammer (Jr)

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IV YEAR I SEMESTER	L	T/P/D	C
	0	-/3/-	2

CONCRETE AND HIGHWAY MATERIALS LAB

Course Objectives:

- To provide the basic knowledge of science and engineering of concrete properties related to civil engineering problems.
- Ability to identify, formulate and solve problems in strength of concrete.
- Ability to effectively present research to professional and engage in lifelong learning with the advances in concrete technology.
- Ability to communicate effectively in the design of concrete structures.

I. 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

II. BITUMINOUS MATERIALS:

1. Penetration Test.

2. Ductility Test.

3. Softening Point Test.

4. Flash and fire point tests.

III. CEMENT AND CONCRETES:

TESTS ON CEMENTS:

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.

6. Young's modulus and compressive strength of concrete.

7. Bulking of sand.

8. Non-Destructive testing on concrete (for demonstration)

9. Benkelmen Beam Demo

Course Outcomes:

- Understand and perform various tests on cement, aggregates and concrete.
- Test fine and coarse aggregates according to IS codes of Practice
- Judge the soil, road aggregate suitability in pavement construction
- Able to design the mix proportions of the Bituminous mixes.

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IV YEAR I SEMESTER   L   T/P/D C
                                                           0   -/3/- 2

ENVIRONMENTAL ENGINEERING LAB

Course Objectives:

- Ability to apply knowledge of mathematics and engineering in the calculation of Characteristics of water and waste water(pH, Acidity, Alkalinity, Total solids, Dissolved oxygen, BOD, COD etc)
- Understanding of professional and ethical responsibility in the areas of testing.
- Ability to communicate effectively the charcteristics of samples.
- The broad education to understand the impact of engineering solutions in a global and societal context with respect to problems
- Ability to life-long learning with the advances in testing.

LIST OF EXPERIMENTS

1. Determination of pH and Turbidity

2. Determination of Conductivity and Total dissolved solids (Organic and Inorganic)

3. Determination of Alkalinity/Acidity.

4. Determination of Chlorides.

5. Determination of iron.

6. Determination of Dissolved Oxygen.

7. Determination of Nitrates.

8. Determination of Optimum dose of coagulant

9. Determination of total Phosphorous.

10. Determination of B.O.D

11. Determination of C.O.D

12. Determination of Optimum coagulant dose.

13. Determination of Chlorine demand.

14. Presumptive coliform test.

NOTE: At least 8 of the above experiments are to be conducted.

Course Outcomes:

- Ability to analyze the water and waste water samples and classify them.
- Ability to identify the potable water.
- Ability to provide the type of treatment required.

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IV YEAR II SEMESTER   **L   T/P/D   C**
                                                           4   -/-/-   4

PRESTRESSED CONCRETE STRUCTURS

Course Objectives:

- Analysis of deflection for the types and systems of prestressing using the principles of prestressing.
- Design the flexural members for shear, bond and torsion and design the end blocks.
- Analysis and Design the continuous beams using the concept of linear transformation and cable profile.
- Design the tension and compression members and their application in design of pipes, water tanks, piles and flag mast.
- Analysis and design of composite section and their application in design of prestressed concrete bridges.

UNIT – I

INTRODUCTION: Historic development – General principles of prestressing pre tensioning and post tensioning – Advantages and limitations of prestressed concrete – Materials – High strength concrete and high tensile steel and their characteristics.

UNIT – II

METHODS AND SYSTEMS OF PRESTRESSING: Pre tensioning and post tensioning methods and systems of pre stressing like Hoyer System, Magnel System Freyssinet system and Gifford – Udall System, Lee McCall system,

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

UNIT – III

FLEXURE; Analysis of sections for flexure- beams prestressed with straight, concentric, eccentric, bent and parabolic tendons. Stress diagrams - Elastic design of simple PSC slabs and beams of rectangular and I-sections-kern line-cable profile and cable layout
SHEAR: General considerations- principal tension and compression- improving shear resistance of concerete by horizontal and vertical pre stressing and by using inclined or parabolic cables- Analysis of rectangular and I-beams for shear- Design of shear reinforcement- I.S.Code Provisions.

UNIT – IV

TRANSFER OF PRESTRESS IN PRE TENSIONED MEMBERS: Tansmission of pre stressing force by bond- transmission length- flexural bond stresses- IS code provisions- Anchorage zone stresses in post tensioned members- stress distribution in end block- Analysis by Guyon's, Magnel, Zienlinski and Rowe's methods-Anchorage zone reinforcement- I.S.Code provisions.

UNIT – V

COMPOSITE BEAMS: Different types- propped and unpropped – stress distribution-Differential shrinkage – Analysis of composite beams-General designs considerations.
DEFLECTIONS: Importance of control of deflections – factors influencing deflections – short term deflections of uncracked members prediction of long term deflections-I.S.Code provisions.

Course Outcomes:

- Explain the principle, types and systems of prestressing and analyse the deflections.
- Determine the flexural strength and design the flexural members, end blocks.
- Analyse the statically indeterminate structures and design the continuous beam.

- Design the tension and compression members and apply it for design of piles.
- Analyse the stress, deflections, flexural and shear strength and apply it for the design of bridges.

TEXT BOOKS:

1. Prestressed Concrete by Krishna Raju; - Tata Mc.Graw Hill Publications.
2. Prestressed Concrete by N.Rajasekharan; - Narosa publications.

REFERENCE:

1. Prestressed Concrete by Ramamrutham; Dhanpatrai Publications.
2. Design of Prestressed concrete structures (Third Edition) by T.Y. Lin & Ned
3. H.Burns, John Wiley & Sons.

REFERENCE CODES:

1. BIS code on prestressed concrete, IS 1343-2012

MALLA REDDY ENGINEERING COLLEGE
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IV YEAR II SEMESTER   L   T/P/D   C
                                                                                 4   -/-/-   4

CONSTRUCTION MANAGEMENT

Course Objectives:

- Develop advanced competencies in the technical, management, and leadership aspects of professional construction management;
- Broaden the career potential of individuals through applied learning experiences in construction, management; and technology;
- Provide advanced preparation in the technical aspects and human factors of the construction industry; and
- Develop a broad perspective needed for those employed in or aspiring to middle and upper management positions within the construction industry.

UNIT-I

MANAGEMENT PROCESS: Roles-Management Theories-Social Responsibilies -Planning and Strategic Management-Strategy Implementation-Decision Making-Tools and Techniques-Organizational Structure-Human Resource Management-Motivation Performance-Leadership.

UNIT-II

CLASSIFICATION OF CONSTRUCTION PROJECTS: Construction Stages, Resources Functions Of Construction Management And Its Applications. Preliminary Planning-Collection Of Data-Contract Planning-Scientific Methods Of Management: Network Techniques In Construction Management- Bar Chart, Gant Chart, CPM, PERT-Cost & time optimization.

UNIT-III

RESOURCE PLANNING: Planning For Manpower, Materials, Costs, Equipment, Labour, Scheduling, Forms Of Scheduling, Resource Allocation, Budget And Budgetary Control Methods.

UNIT-IV

CONTRACTS: Types Of Construction Contract Document, Specification, and Important Conditions Of Contract-Tender And Tender Document- Deposits By The Contractor- Arbitration-Negoriation-M.Book-Muster Roll-Stories.

UNIT-V

MANAGEMENT INFORMATION SYSTEM: Labour Regulations, Social Security. Welfare Legislation, Laws Relating To Wages, Bonus And Industrial Disputes, Labour Administration. Insurance And Safety Regulations, Workmen's Compensation Act, Other Labour Laws, Safety In Construction, Legal And Financial Aspects Of Accidents In Construction, Occupational And Safety Hazard Assessment, Human Factors In Safety, Legal And Financial Aspects Of Accidents In Construction. Occupational and Safety Hazard Assessment.

Course Outcomes:

- Critical thinking and creativity in problem solving and decision making in construction.
- Effective and professional oral and written communications through the use of information and communication technology
- Principles of leadership in business and management including advanced construction management practices, complex project decision making, and associated risk management.

- Professional ethics including application to construction situations and choices.

TEXT BOOKS

1. Ghalot, P.S., Dhir, D.M., Construction Planning and Management Wiley Eastern Limited, 1992.
2. Chitkara, K.K., Construction Project Management, Tata McGraw Hill Publishing Co, Ltd., New Delhi, 1998.
3. B.C Punmia Project Planning and control with PERT and CPM, Laxmi Publications, New Delhi, 1987.

REFERNCES:

1. Punmia B.C., and Khandelwal, PERT and CPM, Lakshmi Publications, 1990.
2. Mahesh Varma, Construction Planning and Equipment, Metropolitan Book Co. Pvt. Ltd., 1985.

MALLA REDDY ENGINEERING COLLEGE
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IV YEAR II SEMESTER

L	T/P/D	C
4	-/-/-	4

REHABILITATION AND RETROFITING OF STRUCTURES
(ELECTIVE-IV)

Course Objectives:

- To get the knowledge on quality of concrete, durability aspects, causes of deterioration, assessment of distressed structures, repairing of structures and demolition procedures.
- The deterioration in health of the RCC structures over a period of time has necessitated the development of various techniques for study of residual service life of structures.
- As a large number of structures are in distressed condition all over the world, long term performance monitoring becomes a necessity.
- Development of other advanced structural materials and technologies for execution for providing durable repairs and strengthening is the need of the day.
- This course intends to bring together speakers from academia and industry to share their expertise on this vast area of civil engineering to abreast the practising and budding engineers of the latest in repair materials and technologies, in order to maintain the serviceability of the structures.

UNIT – I

Introduction – Deterioration of Structures – Distress in Structures – Causes and Prevention.

Mechanism of Damage – Types of Damage.

UNIT – II

Corrosion of Steel Reinforcement – Causes – Mechanism and Prevention. Damage of Structures due to Fire – Fire Rating of Structures – Phenomena of Desication.

UNIT – III

Inspection and Testing – Symptoms and Diagnosis of Distress – Damage assessment – NDT.

UNIT – IV

Repair of Structure – Common Types of Repairs – Repair in Concrete Structures – Repairs in Under Water Structures – Guniting – Shot Create – Underpinning.

UNIT – V

Strengthening of Structures – Strengthening Methods – Retrofitting – Jacketing. Health Monitoring of Structures – Use of Sensors – Building Instrumentation.

Course Outcomes:

- Understand the behavior of existing constructions.
- Understand the main causes of structural failures carry out calculations on load bearing capacity of structures be able to draw, read and understand diagrams, normal force, shear force and bending moments.
- Have skill to design repair interventions of different type of civil structures.

TEXT BOOKS:

1. Concrete Repair and Maintenance Illustrated, RS Means Company Inc W. H. Ranso, (1981)
2. Building Failures : Diagnosis and Avoidance, EF & N Spon, London, B. A. Richardson, (1991).

REFERENCES:
1. Concrete Technology by A.R. Shantakumar, Oxford University press
2. Defects and Deterioration in Buildingts, E F & N Spon, London
3. Non-Destructive Evaluation of Concrete Structures by Bungey
4. Maintenance and Repair of Civil Structures, B.L. Gupta and Amit Gupta, Standard Publications.

MALLA REDDY ENGINEERING COLLEGE
(Autonomous)

IV YEAR II SEMESTER   L   T/P/D   C
                                                                                      4   -/-/-   4

GEO-ENVIRONMENTAL ENGINEERING
(ELECTIVE-IV)

Course Objectives:

- To introduce traditional curriculum consisting mostly of practical courses in numerous special aspects of soil engineering.
- To accentuate the understanding of the basic principles and exposes the student to the latest developments, with a strong research orientation.
- To mould the students with broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context.

UNIT-I

SOURCES AND SITE CHARACTERIZATION: Scope of Geo-environmental Engineering, Various Sources of Contaminations, Need for contaminated site characterization; and Characterisation methods.

UNIT-II

SOLID AND HAZARDOUS WASTE MANAGEMENT: Classification of waste, Characterization solid wastes, Environmental Concerns with waste, waste management strategies.

UNIT-III

CONTAMINANT TRANSPORT: Transport process, Mass-transfer process, Modeling, Bioremediation, Phytoremediation.

UNIT-IV

REMEDIATION TECHNIQUES: Objectives of site remediation, various active and passive methods, remediation NAPL sites, Emerging Remediation Technologies.

UNIT-V

LANDFILLS: Types of landfills, Site Selection, Waste Containment Liners, Leachate collection system, Cover system, Gas collection system.

Course Outcomes:

- An understanding to function on multidisciplinary teams.
- A critical awareness of current issues in Geotechnical Engineering.
- Improvising techniques, skills, and modern engineering tools necessary for successful career in geotechnical engineering practice.

TEXT BOOKS:

1. Rowe, R. K. - Geotechnical & Geoenvironmental Engineering Handbook

REFERENCES:

1. Bedient, Refai & Newell - Ground Water Contamination
2. Sharma, H. D. and Reddy, K. R. - Geoenvironmental Engineering
3. Reddi, L. N. and Inyang, H. I. - Geoenvironmental Engineering
4. LaGrega, M. D., Buckingham, P. L. and Evans, J. C. - Hazardous Waste Management

MALLA REDDY ENGINEERING COLLEGE
(Autonomous)

IV YEAR II SEMESTER	L	T/P/D	C
	4	1/-/-	4

DESIGN AND DRAWING OF IRRIGATION STRUCTURES
(ELECTIVE-IV)

Course Objectives:

- Ability to apply the knowledge of Irrigation in the practical civil engineering problems.
- Ability to identify, formulate and solve problems in field Irrigation.
- Ability to analyze the behavior of systems of irrigation, head works, dams.
- Ability to use the techniques, skills to formulate and solve engineering problems.
- Ability to engage in lifelong learning with the advance in Irrigation.

Design and drawing of the following hydraulic structures.
Group A
1. Surplus weir.
2. Syphon Well Drop
3. Trapezoidal notch fall.
4. Tank sluice with tower head

Group B
1. Sloping glacis weir.
2. Canal regulator
3. Under Tunnel.
4. Type III Syphon aqueduct

Final Examination pattern:

The Question paper is divided into two parts with two questions in each part. The student has to answer ONE question from each part. Part I should cover the designs and drawings from Group A for 45 marks and Part II should cover only designs from group B carrying 30 marks. The duration of examination will be FOUR hours. However, the students are supposed to practice the drawings for Group B structures also for internal evaluation.

Course Outcomes:

- Graduate will develop the knowledge of applications of Irrigation Engineering in practical field.
- Graduate will demonstrate the ability to analyze, formulate and solve the problems related to civil engineering irrigation.
- Graduate will be able to communicate in both verbal and written form with the public.
- Graduate will develop confidence for self education and ability for lifelong learning and earning.
- Graduate can compete and succeed in competitive examinations.

TEXT BOOKS:

1. Water Resources Engineering – Principles and Practice by Challa Satyanarayana Murthy, New Age International Publishers.
2. Irrigation engineering and Hydraulic structures by S.K.Garg, Standard Book House.

MALLA REDDY ENGINEERING COLLEGE
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IV YEAR II SEMESTER   L   T/P/D   C
                                                       4   -/-/-   4

SOLID WASTE MANAGEMENT
(ELECTIVE-IV)

Course Objectives:

- Students will be able to characterize the waste and apply the knowledge of laws for municipal solid waste management, for handling of biomedical wastes and for handling of plastic wastes.
- Students will be able to apply the knowledge of mathematics, science, and engineering for effective solid wastes collection systems, for waste collection route optimization and for processing of solid waste.
- Students will be able to design composting systems, maintain and operate the aerobic and anaerobic composting process for effective organic waste recycling.
- Students will be able to manage construction and operations of landfill facilities, energy recovery systems and management of leachate systems.
- Students will understand the working, operation and maintenance of incinerators and air pollution control equipments.

UNIT – I

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

Basic theories of industrial waste water management – Volume reduction – Strength reduction – Neutralization – Equalization and proportioning. Joint treatment of industrial wastes and domestic sewage – consequent problems.

UNIT – II

Industrial waste water discharges into streams. Lakes and oceans and problems. Recirculation of Industrial Wastes – Use of Municipal Waste Water in Industries.

UNIT – III

Manufacturing Process and design origin of liquid waste from Textiles, Paper and Pulp industries, Thermal Power Plants and Tanneries, Special Characteristics, Effects and treatment methods.

UNIT – IV

Manufacturing Process and design origin of liquid waste from Fertilizers, Distillers, and Dairy, Special Characteristics, Effects and treatment methods.

UNIT – V

Manufacturing Process and design origin of liquid waste from Suger Mills, Steel Plants, Oil Refineries, and Pharmaceutical Plants, Special Characteristics, Effects and treatment methods. Common Effluent Treatment Plants – Advantages and Suitability, Limitations, Effluent Disposal Methods.

Course Outcomes:

- Understands components of solid waste management and the laws governing it.
- Understands the solid waste collection systems, route optimization techniques and processing of solid wastes.
- Understands the design, operation and maintenance of landfills and composting units.
- Understands the importance and techniques of operation and maintenance of incinerators.

TEXT BOOK:

1. Waste Water Treatment by M.N. Rao and Dutta, Oxford & IBH, New Delhi.

REFERENCES:

1. Liquid waste of Industry by Newmerow.
2. Water and Waste Water technology by Mark J. Hammer and Mark J. Hammer (Jr).

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IV YEAR II SEMESTER   L   T/P/D C
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PAVEMENT DESIGN
(ELECTIVE-IV)

Course Objectives:

- To design, analyze and interpret data related to the pavement engineering.
- An ability to identify, formulates, and solves engineering problems.
- To develop an ability to apply knowledge of science and engineering in the pavement designs.

UNIT – I

FACTORS AFFECTING PAVEMENT DESIGN: Variables Considered in Pavement Design, Types of Pavements, Functions of Individual Layers, Classification of Axle Types of Rigid Chassis and Articulated Commercial Vehicles, Legal Axle and Gross Weights on Single and Multiple Units, Tire Pressure, Contact Pressure, EAL and ESWL Concepts, Traffic Analysis: ADT, AADT, Truck Factor, Growth Factor, Lane, Directional Distributions & Vehicle Damage Factors, Effect of Transient & Moving Loads.

UNIT - II

STRESSES IN PAVEMENTS: Vehicle-Pavement Interaction: Transient, Random & Damping Vibrations, Steady State of Vibration, Experiments on Vibration, Stress Inducing Factors in Flexible and Rigid pavements

STRESSES IN FLEXIBLE PAVEMENTS: Visco-Elastic Theory and Assumptions, Layered Systems Concepts, Stress Solutions for One, Two and Three Layered Systems, Fundamental Design Concepts

STRESSES IN RIGID PAVEMENTS: Westergaard's Theory and Assumptions, Stresses due to Curling, Stresses and Deflections due to Loading, Frictional Stresses, Stresses in Dowel Bars & Tie Bars

UNIT – III

MATERIAL CHARACTERISTICS: CBR and Modulus of Subgrade Reaction of Soil, Mineral aggregates – Blending of aggregates, binders, polymer and rubber modified bitumen, Resilient, Diametral Resilient and Complex (Dynamic) Moduli of Bituminous Mixes, Permanent Deformation Parameters and other Properties, Effects and Methods of Stabilisation and Use of Geo Synthetics.

UNIT – IV

DESIGN OF FLEXIBLE PAVEMENTS: Flexible Pavement Design Concepts, Asphalt Institute's Methods with HMA and other Base Combinations, AASHTO, IRC Methods,

DESIGN OF RIGID PAVEMENTS: Calibrated Mechanistic Design Process, PCA, AASHTO & IRC Specifications, Introduction to Prestressed and Continuously Reinforced Cement Concrete Pavement Design.

UNIT – IV

DESIGN OF PAVEMENT FOR LOW VOLUME ROADS – Pavement design for low volume roads, Rural road designs – code of practices.

DESIGN OF OVER LAYS: Types of Overlays, Suitability, Design of Overlays

Course Outcomes:

- An ability to function on multidisciplinary areas
- An ability to design a system to meet the needs within the realistic constraints such as environment, safety, sustainability and economic viability.
- An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

TEXT BOOKS:

1. Principles of Pavement Design, Yoder.J. & Witzorac Mathew, W. John Wiley & Sons Inc
2. Pavement Analysis & Design, Yang H. Huang, Prentice Hall Inc.

REFERENCES:

1. Design of Functional Pavements, Nai C. Yang, McGraw Hill Publications
2. Concrete Pavements, AF Stock, Elsevier, Applied Science Publishers

REFERENCE CODES:

1. IRC: 37-2001. Guidelines for the Design of. Flexible Pavements
2. IRC: 58-2002. Guidelines for the Design of. Rigid Pavements
3. IRC: SP: 62-2004. Guidelines for low volume Rural road designs

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SEMINAR

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INDUSTRY ORIENTED MINI PROJECT

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PROJECT WORK

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COMPREHENSIVE VIVA