ACADEMIC REGULATIONS (R-25)
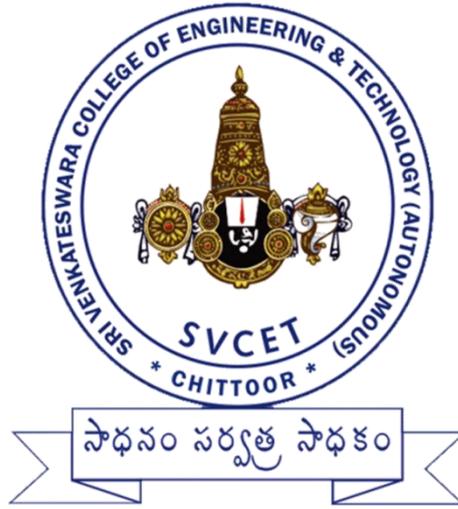# COURSE STRUCTURE AND DETAILED SYLLABI

M.TECH REGULAR TWO YEAR DEGREE PROGRAMME
(*FOR THE BATCHES ADMITTED FROM THE ACADEMIC YEAR 2025-26*)

MASTER OF TECHNOLOGY
(STRUCTURAL ENGINEERING)

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY

(AUTONOMOUS)

Accredited by NBA, New Delhi & NAAC, Bengaluru │Affiliated to JNTUA, Ananthapuramu, Recognized by the UGC under Section 12(B) and 12(F)│ Approved by AICTE, New Delhi

R.V.S. NAGAR, TIRUPATI ROAD, CHITTOOR – 517127 (A.P) – INDIA

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY
(AUTONOMOUS)
(AFFILIATED TO JNTUA, ANANTAPUR)
ACADEMIC REGULATIONS – R25
MASTER OF TECHNOLOGY (M. TECH)
REGULAR (Full-Time) TWO YEAR POST GRADUATE DEGREE PROGRAMME
(For the batches admitted from the Academic Year 2025-2026)

The Jawaharlal Nehru Technological University Anantapur, Ananthapuramu shall confer M.Tech Post Graduate degree to candidates who are admitted to the Master of Technology Program and fulfill all the requirements for the award of the degree.

1.0   **Applicability:** All the rules specified herein, approved by the Academic Council, shall be in the force and applicable to the students admitted from the Academic Year 2025-2026 onwards. Any reference to "College" in these rules and regulations stands for SVCET.

2.0   **Extent:** All the rules and regulations, specified hereinafter shall be read as a whole for the purpose of interpretation. As and when a doubt arises, the interpretation of the Chairman, Academic Council shall be final and ratified by the Academic Council in the forthcoming meeting. As per the requirements of statutory bodies, Principal, Sri Venkateswara College of Engineering and Technology shall be the Chairman, Academic Council.

3.0   **Admission:** Admission into the first year of two year M.Tech degree programme is based on the eligibility conditions detailed below.

4.0   **Eligibility:**
Admission to the above programme shall be made subject to the eligibility, qualifications and specialization prescribed by the competent authority for each programme, from time to time. Admissions shall be made either on the basis of merit rank obtained by the qualified candidates at an Entrance Test conducted by the University or on the basis of GATE / PGECET score, subject to reservations and policies prescribed by the Government from time to time.

4.1   **Admission Procedure:**
As per the existing stipulations of AP State Council for Higher Education (APSCHE), Government of Andhra Pradesh, admissions are made into the first year as follows:
a) Category –A seats are to be filled by Convenor through APPGECET / GATE score.
b) Category-B seats are to be filled by Management as per the norms stipulated by Government of A.P.

5.0   **Specializations:**

S. No.	Branch	Specialization
1	CE	Structural Engineering
2	EEE	PE&ED
3	ME	CAD/CAM
4	ECE	VLSI Design
5	CSE	Computer Science and Engineering
6	CSE	CSE (Data Science)

6.0   **Course Work:**
A Candidate after securing admission must pursue the M.Tech course of study for Four Semesters duration. Each semester shall have a minimum of 16 instructional weeks.
A candidate admitted to a programme should complete it within a period equal to twice the prescribed duration of the programme from the date of admission.

7.0   **Contact Periods:**
Depending on the complexity and volume of the course, the numbers of contact periods per week are assigned.

7.1 **Credit Courses:** Courses are to be registered by a student in a Semester to earn Credits. Credits shall be assigned to each Course in an L: T: P: C (Lecture Hours: Tutorial Hours: Practical Hours: Credits) structure, based on the following pattern.

7.2 **Theory Courses:** One hour Lecture (L) per Week in a Semester = 01 Credit.

7.3 **Practical Courses:** One Practical hour (P) per Week in a Semester = 0.5 Credit.

7.4 **Audit Courses (AC) = NOCREDITS** are awarded

7.5 **Technical Seminar:** For Technical Seminar, where formal contact periods are not specified, credits are assigned based on the complexity of the work to be carried out.

7.6 **Cocurricular Activities:** For Cocurricular Activities, where formal contact periods are not specified, credits are assigned based on the complexity of the work to be carried out.

7.7 **Dissertation Work:** For Dissertation Work, where formal contact periods are not specified, credits are assigned based on the complexity of the work to be carried out.

7.8 The Two year curriculum of Post Graduate Degree Program M. Tech shall have total of 70 credits.

8.0 **Choice Based Credit System (CBCS):**
8.1 Choice Based Credit System (CBCS) is introduced in line with UGC guidelines in order to promote:
- Student centered learning
- Students to learn courses of their choice

A Student has a choice of registering for courses comprising basic science, program core and professional elective.

9.0 **Evaluation:**
The performance of the candidate in each semester shall be evaluated subject wise, with a maximum of 100 marks for Theory and 100 marks for practical's, on the basis of Internal Evaluation and End Semester Examination.

For the theory subjects, 60% of the marks will be for the External End Examination. While 40% of the marks will be for Internal Evaluation. Internal marks for midterm examinations shall be arrived at by considering the marks secured by the student in both the midterm examinations with 80% weightage to the better midterm exam and 20% to the other. First midterm examinations will be conducted in the middle of the Semester (first two units) and second midterm examinations immediately after the completion of instruction (last three units) with four questions with internal choice, either or type, are to be answered in 2 hours, evaluated for 40 marks.

For semester end examination five questions shall be given for a maximum of 60 marks with one question from each unit with internal choice i.e. either or type. All questions carry equal marks.

For practical subjects, 60 marks shall be for the End Semester Examinations and 40 marks will be for internal evaluation based on the day to day performance (25 marks) and practical test at the end of the semester (15 marks).

For Technical Seminar, there will be an internal evaluation for 100 marks. A candidate has to secure a minimum of 50% to be declared successful. The assessment will be made by a board consisting of HOD, supervisor/mentor and one senior faculty of the department.

For Cocurricular Activities, The credits assigned for co-curricular activities shall be given by the principals of the colleges and the same shall be submitted to the University.
A Student shall earn 02 credits under the head of co-curricular activities, viz., attending Conference, Scientific Presentations and Other Scholarly Activities.

A Following are the guidelines for awarding Credits for Co-curricular Activities

Name of the Activity	Maximum Credits / Activity
Participation in National Level Seminar/ Conference / Workshop /Training programs (related to the specialization of the student)	1
Participation in International Level Seminar / Conference/ workshop / Training programs held outside India (related to the specialization of the student)	2
Academic Award/Research Award from State Level / National Agencies	1
Academic Award/Research Award from International Agencies	2
Research / Review Publication in National Journals (Indexed in Scopus / Web of Science)	1
Research / Review Publication in International Journals with Editorial board outside India (Indexed in Scopus / Web of Science)	2

Note:
i) Credit shall be awarded only for the first author. Certificate of attendance and participation in a Conference/Seminar is to be submitted for awarding credit.
ii) Certificate of attendance and participation in workshops and training programs (Internal or External) is to be submitted for awarding credit. The total duration should be at least one week.
iii) Participation in any activity shall be permitted only once for acquiring required credits under cocurricular activities.

Candidate shall be deemed to have secured the minimum academic requirement in a subject if he secures a minimum of 40% of marks in the End Examination and a minimum aggregate of 50% of the total marks in the End Semester Examination and Internal Evaluation taken together.

In case the candidate does not secure the minimum academic requirement in any of the subjects, he has to reappear for the Semester Examination either supplementary or regular in that subject, or repeat the subject when next offered or do any other specified subject as may be required.

In case of audit course, students will be able to register for courses outside the prescribed range of Credits for audit only, when interested to supplement their knowledge / skills; any student who wishes to pursue audit course can register for the same with the concerned teacher and attend to the classes regularly. No examination will be conducted; no grade will be given for the audit courses. However such of those students who have registered and got the requisite attendance of 75% in the audit course, it will be mentioned in their grade sheet.

10.0   **Dissertation Work:**
10.1   **Registration of Dissertation work**
A candidate shall register for the dissertation work at the beginning of the second year, only after satisfying the attendance requirement of all the courses up to II Semester. The duration of the dissertation work is for two semesters.
10.2   The candidate has to submit, in consultation with the supervisor, the title, objective and plan of action of dissertation work to the Department Evaluation Committee (DEC) for its approval. Only after obtaining the approval from DEC, the student can initiate the dissertation work.
11.0   **Evaluation of Dissertation Work**
11.1   The Department Evaluation Committee (DEC) consisting of HOD, Supervisor and one internal senior faculty member shall monitor the progress of the project work. The DEC is constituted by the Principal on the recommendation of the Head of the Department.
11.2   Dissertation work Phase – I is to be completed in the III Semester. The student has to identify the topic of the project work, collect relevant literature, preliminary data, implementation tools/methodologies etc., and perform a critical study and analysis of the problem identify and submit a report.
(i) Internal Evaluation: The internal evaluation of dissertation work phase – I shall be made by the DEC on the basis of two project reviews on the topic of the project. Each review shall be conducted for a maximum of 40 marks. For a total of 40 marks, 80% of better one of the two and 20% of the other one are added and finalized.
(ii) Semester-End Evaluation: The Semester end dissertation work phase – I Viva-Voce examination shall be conducted for 60 marks, by the HOD, concerned supervisor and a senior faculty member recommended by the HOD and appointed by the Principal.

11.3	The student shall continue to undertake the dissertation work phase – II during the IV Semester by conducting practical investigations, implementation, analysis of results, validation and report writing. The student shall submit a dissertation report at the end of the semester after approval of the DEC.

(i) Internal Evaluation: The internal evaluation of dissertation work phase – II shall be made by the DEC on the basis of two project reviews on the progress, presentation and quality of work. Each review shall be conducted for a maximum of 120 marks. For a total of 120 marks, 80% of better one of the two and 20% of the other one are added and finalized.

(ii) Semester-End Evaluation: A candidate shall be allowed to submit the dissertation on the recommendations of the DEC. Three copies of the Dissertation certified in the prescribed format by the concerned Supervisor and HOD shall be submitted to the department. The Department shall submit a panel of three experts for a maximum of 05 students to the principal for appointment of the external examiner. The Viva-voce examination shall be conducted by the board consisting of the Supervisor, Head of the Department and the external examiner nominated by the principal. The board shall jointly award the marks for 180.

11.4	A candidate shall be deemed to have secured the minimum academic requirement of project work if he secures a minimum of 40% marks in the viva-voce examination and a minimum aggregate of 50% of the total marks in the end viva-voce examination and the internal assessment marks taken together. If he fails to get the minimum academic requirement he has to appear for the viva-voce examination again to get the minimum marks. The viva voce examination may be conducted once in two months for all the candidates who have submitted thesis during that period.

12.0 Eligibility to appear for the Semester-End Examination (SEE)

12.1	A student shall be eligible to appear for semester-end examinations if he acquires a minimum of 75% of attendance in aggregate of all the courses in a semester.
12.2	Condonation of shortage of attendance in aggregate up to 10% (65% and above and below75%) in each semester may be granted by the College Academic Council.
12.3	Shortage of Attendance below 65% in aggregate shall **in no case be condoned**.
12.4	Student whose shortage of attendance is not condoned in any semester is not eligible to take their end examination of that class and their registration shall stand cancelled.
12.5	A student shall not be promoted to the next semester unless he satisfies the attendance requirements of the current semester, as applicable. The student may seek readmission for the semester when offered next. He will not be allowed to register for the courses of the semester while he is in detention. A student detained due to shortage of attendance, will have to repeat that semester when offered next.
12.6	A stipulated fee shall be payable to the College towards condonation of shortage of attendance.
12.7	The attendance in Student Development Activities shall be considered for finalization of aggregate attendance.
12.8	For the calculation of a student attendance in any semester, the total number of classes conducted shall be counted as scheduled in the class-work time table.

13.0 Conduct of Semester End Examination and Evaluation

13.1	Semester end examination shall be conducted by the Controller of Examination (COE) by inviting 50% Question Papers from the External and 50% Question papers from the Internal Subject Experts. Principal will decide the External and Internal subject experts.
13.2	The answer papers of semester end examination should be evaluated externally / internally.
13.3	Marks for components evaluated internally by the faculty shall be submitted to the Controller of Examinations one week before the commencement of the End examinations. The marks for the internal evaluation components shall be added to the external evaluation marks secured in the Semester-end examinations, to arrive at the total marks for any course in that semester.
13.4	Performance in all the subjects is tabulated program-wise and will be scrutinized by the office of the Controller of Examinations. Total marks obtained in each subject are converted into letter grades. Finally subject-wise marks and grades details, subject-wise and branch-wise pass percentages are calculated through software.

14.0   **Results Committee**

14.1   Results Committee comprising of Principal, Controller of Examinations, Additional Controller of Examinations (Confidential) and one Senior Professor nominated by the Principal and the University Nominee will oversee the details of marks, grades and pass percentages of all the subjects and branch-wise pass percentages.

14.2   Office of the Controller of Examinations will generate student-wise result sheets and the same will be published through college website.

14.3   Student-wise Grade Sheets are generated and issued to the students.

15.0   **Personal Verification / Recounting / Revaluation / Final Valuation**

15.1   **Personal Verification of Answer Scripts:**

Candidates appear in a particular semester end examinations may appeal for verification of their answer script(s) for arithmetic correction in totaling of marks and any omission / deletion in evaluation within 7 days from the date of declaration of results at the office of the Controller of Examinations on the prescribed proforma and by paying the prescribed fee per answer script.

It is clarified that personal verification of answer script shall not tantamount to revaluation of answer script. This is only a process of reverification by the candidate. Any mistake / deficiency with regard to arithmetic correction in totaling of marks and any omission / deletion in evaluation if found, the institution will correct the same.

15.2   **Recounting / Revaluation:**

Students shall be permitted for request for recounting/revaluation of the Semester-End examination answer scripts within a stipulated period after payment of prescribed fee. After recounting or revaluation, records are updated with changes if any and the student will be issued a revised grade sheet. If there are no changes, the same will be intimated to the students.

15.3   **Final Valuation:**

Students shall be permitted for request for final valuation of the Semester–End Examination answer scripts within a stipulated period after the publication of the revaluation results by paying the necessary fee. The final valuation shall be carried out by an expert not less than Associate Professor as per the scheme of valuation supplied by the examination branch in the presence of the student, Controller of Examinations and Principal. However, students are not permitted to discuss / argue with the examiner. If the increase in marks after final valuation is equal to or more than 15% of the previous valuation marks, the marks obtained after final valuation shall be treated as final. If the variation of marks after final valuation is less than 15% of the previous valuation marks, then the earlier valuation marks shall be treated as the final marks.

16.0   **Supplementary Examinations:** In addition to the regular semester-end examinations conducted, the College may also schedule and conduct supplementary examinations for all the courses of other semesters when feasible for the benefit of students. Such of the candidates writing supplementary examinations may have to write more than one examination per day.

17.0   **Re-Registration for improvement of Internal Marks**

17.1   Following are the conditions for Re-Registration of Theory Courses for improvement of Internal Marks:

17.2   The student should have completed all the course work and obtained examinations results from I to III semesters.

17.3   If the student has failed in the examination due to internal evaluation marks secured being less than 50%, he shall be given one chance for a maximum of 3 theory courses for improvement of internal evaluation marks.

17.4   The candidate has to register for the chosen courses and fulfill the academic requirements (i.e. a student has to attend the classes regularly and appear for the mid-examinations and satisfy the attendance requirements to become eligible for appearing at the semester-end examinations).

17.5   For each course, the candidate has to pay a fee equivalent to one third of the semester tuition fee and the amount is to be remitted in the form of D.D./ Challan in favour of the Principal, Sri Venkateswara College of Engineering & Technology, payable at Chittoor along with the requisition through the concerned Head of the Department.

17.6   A student availing the benefit for Improvement of Internal evaluation marks, the internal evaluation marks as well as the semester-end examinations marks secured in the previous attempt(s) for the re- registered courses stands cancelled.

18.0   Academic Requirements for completion of Post Graduate Degree Program M.Tech:
The following academic requirements have to be satisfied in addition to the attendance requirements for completion of Post Graduate Degree Program M.Tech.
For students admitted into Post Graduate Degree Program M.Tech for the Academic Year 2025-26:

18.1   A student shall be deemed to have satisfied the minimum academic requirements for each theory, laboratory course, and Internship and project work, if he secures not less than 40% of marks in the semester-end examination and a minimum of 50% of marks in the sum total of the internal evaluation and Semester-end examination taken together.
A student shall be deemed to have satisfied the minimum academic requirements of mini-project, if he secures not less than a minimum of 50% of marks.

18.2   A student shall register for all the **70** credits and earn all the **70** credits. Grade points obtained in all the 70 credits shall be considered for the calculation of the DIVISION based on CGPA.

18.3   A student who fails to earn **70** credits as indicated in the course structure within **four** academic years from the year of their admission shall forfeit his seat in M.Tech Program and his admission stands cancelled.

19.0   Grades, Semester Grade point Average, Cumulative Grade point Average:
19.1   **Grade System:** After all the components and sub-components of any subject (including laboratory subjects) are evaluated, the final total marks obtained will be converted to letter grades on a "10 point scale" described below.

% of Marks obtained	Grade	Grade Points (GP)
90 to 100	A+	10
80 to 89	A	9
70 to 79	B	8
60 to 69	C	7
50 to 59	D	6
Less than 50%in Sum of Internal & External (or) Less than 40% in External	F	0
Not Appeared	N	0

19.2   Computation of SGPA and CGPA
19.2.1   The Semester Grade Point Average (SGPA) is the ratio of sum of the product of the number of credits with the grade points scored by a student in all the courses taken by a student and the sum of the number of credits of all the courses undergone by a student, i.e.

$$\text{SGPA} = \Sigma\,(C_i \times G_i)\,/\,\Sigma\,C_i$$

where, C_i is the number of credits of the ith subject and G_i is the grade point scored by the student in the ith course

19.2.2   The Cumulative Grade Point Average (CGPA) will be computed in the same manner taking into account all the courses undergone by a student over all the semesters of a program, i.e.

$$\text{CGPA} = \Sigma\,(C_i \times S_i)\,/\,\Sigma\,C_i$$

where 'S_i' is the SGPA of the ith semester and C_i is the total number of credits in that semester

19.2.3   Both SGPA and CGPA shall be rounded off to 2 decimal points and reported in the transcripts.

19.2.4   While computing the SGPA/CGPA, the subjects in which the student is awarded Zero grade points will also be included.

19.2.5   Grade Point: It is a numerical weight allotted to each letter grade on a 10-point scale.

| 19.2.6 | **Letter Grade:** It is an index of the performance of students in a said course. Grades are denoted by letters A+, A, B, C, D, F and N. |

19.2.7   As per AICTE regulations, conversion of CGPA into equivalent percentage is as follows:

Equivalent Percentage to SGPA = (SGPA – 0.50) x 10
Equivalent Percentage to CGPA = (CGPA – 0.50) x 10

19.3   **Grade Sheet:** A grade sheet (Marks Memorandum) will be issued to each student Indicating his performance in all subjects registered in that semester indicating the GPA and CGPA. GPA and CGPA will be rounded off to the second place of decimal.

20.0   **Consolidated Grade Sheet:** After successful completion of the entire Program of study, a Consolidated Grade Sheet containing performance of all semesters will be issued as a final record. Duplicate Consolidated Grade Sheet will also be issued, if required, after payment of requisite fee.

21.0   **Award of Degree:** The Degree will be conferred and awarded by Jawaharlal Nehru Technological University Anantapur, Ananthapuramu on the recommendation of The Principal of SVCET (Autonomous). Student admitted in M.Tech 2Yrs programme shall register for all **70** credits and earn all the **70** credits. Marks obtained in all the **70** credits shall be considered for the award of the class based on CGPA.

21.1   **Eligibility:** A student shall be eligible for the award of M.Tech Degree if he fulfills all the following conditions:
- Registered and successfully completed all the components prescribed in the program of study for which he is admitted.
- Successfully acquired the minimum required credits as specified in the curriculum corresponding to the branch of study within the stipulated time.
- Obtained CGPA greater than or equal to 6.0 (Minimum requirement for declaring as passed.)

21.2   **Award of Class:** Declaration of Class is based on CGPA.

Cumulative Grade Point Average	Class
≥7.75	First Class with Distinction
≥6.75 and<7.75	First Class
≥6.0 and <6.75	Second Class

22.0   **With Holding of Results:**
If the candidate has not paid dues to the University / College or if any case of in-discipline is pending against him, the result of the candidate shall be withheld and he will not be allowed / promoted into the next higher semester. The issue of degree is liable to be withheld in such cases.

23.0   **Graduation Day:**
The institute shall have its own annual Graduation Day for the award of Provisional Certificates to students completing the prescribed academic requirements in each case, in consultation with the University and by following the provisions in the Statute. The college shall institute prizes and medals to meritorious students and award them annually at the Graduation Day. This will greatly encourage the students to strive for excellence in their academic work.

24.0   **Discipline:**
Every student is required to observe discipline and decorum both inside and outside the institute and not to indulge in any activity which will tend to bring down the honor of the institute. If a student indulges in malpractice in any of the theory / practical examination, continuous assessment examinations he shall be liable for punitive action as prescribed by the Institute from time to time.

25.0   **Grievance Redressal Committee:**
The institute shall form a Grievance Redressal Committee for each course in each department with the Course Teacher and the HOD as the members. This Committee shall solve all grievances related to the course under consideration.

26.0   **Transitory Regulations:**
Students who got detained for want of attendance (**or**) who have not fulfilled academic requirements

(**or**) who have failed after having undergone the Program in earlier regulations (**or**) who have discontinued and wish to continue the Program are eligible for admission into the unfinished semester from the date of commencement of class work with the same (**or**) equivalent courses as and when courses are offered and they will be in the academic regulations into which they are presently readmitted. A student has to satisfy all the eligibility requirements within the maximum stipulated period of **four years** for the award of M.C.A Degree.

27.0   **Medium of Instruction:**
The Medium of Instruction is **English** for all courses, laboratories, Internal and External examinations, Seminar Presentation and Project Reports.

28.0   **Mode of Learning:**
Preferably 50% course work for the theory courses in every semester shall be conducted in the blended mode of learning. If the blended learning is carried out in online mode, then the total attendance of the student shall be calculated considering the offline and online attendance of the student.

29.0   **General Instructions:**
i. The academic regulations should be read as a whole for purpose of any interpretation.
ii. Disciplinary action for Malpractice/improper conduct in examinations is appended.
iii. Where the words "he", "him", "his", occur in the regulations, they include "she", "her", "hers".
iv. In the case of any doubt or ambiguity in the interpretation of the above rules, the decision of the Principal is final.
v. The Principal may change or amend the academic regulations or syllabi at any time and the changes or amendments shall be made applicable to all the students on rolls with effect from the dates notified by the Principal.
vi. The above rules and regulations are to be approved / ratified by the College Academic Council as and when any modification is to be done.
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FAILURE TO READ AND UNDERSTAND THE REGULATIONS IS NOT AN EXCUSE

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY
(AUTONOMOUS)

Identification of Courses

M. Tech

Each course shall be uniquely identified by an alphanumeric code of width 7 characters as given below.

No. of Digits	Description
First two digits	Year of regulations Ex:25
Next one letter	Type of program: A: B. Tech B: M. Tech C: M.B.A D: M.C.A
Next two letters	Code of program: ST: Structural Engineering, P.E: Power Electronics & Electric Drives, CM: CAD/CAM, VL: VLSI, CS: Computer Science and Engineering, DS: Data Science
Last two digits	Indicate serial numbers: ≥ 01

Ex:
25BST01
25BPE01
25BCM01
25BVL01
25BCS01
25BDS01

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY
(AUTONOMOUS)
(AFFILIATED TO JNTUA, ANANTHAPURAMU)
RULES FOR DISCIPLINARY ACTION FOR MALPRACTICE / IMPROPER CONDUCT IN EXAMINATIONS

Sl.No.	Nature of Malpractices / Improper conduct If the candidate	Punishment
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 or related 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.
3.	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 to appear for the remaining examinations of the subjects of that Semester / year.
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 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 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.	Leaves the exam hall taking away answer script or intentionally tears of the script or any part thereof inside or outside 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 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.
6.	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 of seat.
7.	Impersonates any other candidate in connection with the examination.	The candidate who has impersonated shall be expelled from 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 practicals and project work) already appeared and shall not be allowed to appear for examinations of the remaining 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. If the impostor is an outsider, he will be handed over to the police and a case is registered against him.
8.	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 his person or to any of his relations whether by words, 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 or 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 case is registered against them.
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.	Uses objectionable, abusive or offensive language in the answer paper or in letters to the examiners or	Cancellation of the performance in that subject.

	writes to the examiner requesting him to award pass marks.	
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 Examination committee for further action to award suitable punishment.	

Malpractices identified by squad or special invigilators

1. Punishments to the candidates as per the above guidelines.

<div align="center">**VISION**</div>

To be a centre of excellence in Civil Engineering education by making every effort continuously for improvement in education and undertaking research as well as to contribute to the technology for the infrastructure development leading to sustainable development of the society.

<div align="center">**MISSION**</div>

To provide quality education for successful career and higher studies in Civil Engineering that emphasizes academic and technical excellence in profession and research, effective communication, team work and leadership to meet the challenges of the society.

Program Education Objectives of the PG Civil Engineering (PEO's) :
(M.Tech Structural Engineering Course)

PEO 1: To expose the graduate students to advanced Structural Analysis, Structural Dynamics, allied theory in elasticity and plasticity, FEM etc.,

PEO 2 : To impart training to graduate students in behavior and design of Advanced RC structures, behavior and design of Advanced Steel Structure, latest procedures in earthquake resistant design practices and earthquake resistant design philosophies.

PEO 3 : To expose the graduate students to latest design codes, current national and international scenario on Structural Engineering and to motivate them in interdisciplinary involvement in problems related to Structural Engineering. To orient the graduate students to high value research related to structural engineering so that they get umpetus to pursue research and lifelong learning.

Program Outcomes (PO's) (M.Tech. Structural Engineering)

PO 1.   Graduates of the program will be able to demonstrate in-depth knowledge of Structural Engineering discipline and build capability to apply that knowledge to real problems.

PO 2.   Program graduates will gain knowledge and skill in integrating Structural Engineering concepts across multiple disciplines.

PO 3.   Graduates will have the ability to employ technical knowledge and leadership skills to Structural Engineering research and consultancy problems.

PO 4.   Graduates of the Structural Engineering program will demonstrate the ability to carry out original and useful research in key areas of Structural Engineering.

PO 5. Program graduates will be able to identify and analyze the impact of Structural Engineering in development project and find a suitable solution from number of alternatives.

PO 6. Graduates of the program will develop skills to communicate technical values of Structural Engineering research with the public, learners, practitioners and other community members of concern.

PO 7. Program graduates will develop confidence in Structural analysis and management with high ethical value towards social, environmental and economic issues.

PO 8. Graduates will develop enthusiasm and confidence to pursue lifelong learning for professional advancement.

PO 9. Program graduates will develop the spirit of working in team for common objectives.

PO 10 Graduates of the program will develop interest of pursue higher studies and research.

PO 11 Able to critically analyze, scrutinize and rectify one's decisions and actions and apply self-corrective measures.

PO 12 Post Graduate should have aptitude for learning new innovative technologies in structural Engineering.

Programe Specific Outcomes (PSOs)

1. To expose the graduate students to advanced courses in Analysis, and Design of RC, PSC and Steel Structures as per the latest design codes, current national and international scenario on Structural Engineering.

2. To motive the graduate students to address the societal needs by interdisciplinary approach through advanced courses such as Finite Element Analysis, Plates & Shell structures, Structural Dynamics, Structural Dynamics and allied courses.

3. To enrich the graduate students to get hands on training on latest equipment/software to be industry ready/pursue advanced research.

Scheme of Instruction and Examination under R23 Regulations

I-M.Tech., I Semester (SE)

S.No	Course Code	Subject	Hours/Week			Credits	Scheme of Examination Maximum Marks		
			L	T	P/D		Internal	External	Total
1	25BST01	Theory of Elasticity	3	0	0	3	40	60	100
2	25BST02	Advanced Structural Analysis	3	0	0	3	40	60	100
3	25BST03 25BST04 25BHS01	**Program Elective - I** Theory and Analysis of Plates and Shells Advanced Concrete Technology Advanced Mathematical Methods	3	0	0	3	40	60	100
4	25BST05 25BST06 25BST07	**Program Elective – II** Design of Prestressed Concrete Maintenance and Rehabilitation of Structures Design of Bridges	3	0	0	3	40	60	100
5	25BST08	Advanced Concrete Laboratory	0	0	4	2	40	60	100
6	25BST09	Advanced Structural Engineering Laboratory	0	0	4	2	40	60	100
7	25BMB01	Research Methodology and IPR	2	0	0	2	40	60	100
8	25BHST02 25BST27 25BHS01	**Audit Course – I** English for Research Paper Writing Disaster Management Sanskrit for Technical Knowledge	2	0	0	-	-	-	-
		TOTAL	16	0	8	18	280	420	700

I M.Tech., II Semester (SE)

S.No	Course Code	Subject	Hours/Week			Credits	Scheme of Examination Maximum Marks		
			L	T	P/D		Internal	External	Total
1	25BST10	Structural Dynamics	3	0	0	3	40	60	100
2	25BST11	Finite Element Methods for Structural Engineering	3	0	0	3	40	60	100
3	25BST12 25BST13 25BST14	**Program Elective – III** Design of Reinforced Concrete Foundations Experimental Stress Analysis Stability of Structures	3	0	0	3	40	60	100
4	25BST15 25BST16 25BST17	**Program Elective – IV** Advanced Steel Design Fracture Mechanics Advanced Reinforced Concrete Design	3	0	0	3	40	60	100
5	25BST18	Computer Aided Design Laboratory	0	0	4	2	40	60	100
6	25BST19	Advanced Structural Design Laboratory	0	0	4	2	40	60	100
7	25BST20	Technical seminar	0	0	4	2	100	-	100
8	25BMB03 25BHS04 25BHS05	**Audit Course – II** Pedagogy Studies Stress Management for Yoga Personality Development through Life Enlightenment Skills	2	0	0	0	-	-	-
		TOTAL	**14**	**0**	**12**	**18**	**340**	**360**	**700**

II M.Tech., III & IV-Semester (SE)

S.No	Course Code	Subject	L	T	P	Credits	Internal	External	Total
			Hours/Week				**Maximum Marks**		
1	25BST21 25BST22 25BST23	**Program Elective – V** Earthquake Resistant Design of Buildings Low-Cost Housing Techniques Building Construction Management	3	0	0	3	40	60	100
2	25BMB02 25BCM27 25BMB04	**Open Elective** Cost Management of Engineering Project Industrial Safety Business Analytics	3	0	0	3	40	60	100
	25BST24	Dissertation Phase – I	0	0	20	10	40	60	100
		Co-curricular Activities	-	-	-	2			
		Total	6	0	20	18	120	180	300

IV-Semester (SE)

S.No	Course Code	Subject	L	T	P	Credits	Internal	External	Total
			Hours/Week				**Maximum Marks**		
1	25BST25	Dissertation Phase – II	0	0	32	16	120	180	300
		Total				16	120	180	300

SRI VENKATESWARA COLLEGE OF ENGINEERING & TECHNOLOGY (AUTONOMOUS)

M.Tech.   **(STRUCTURAL ENGINEERING)**

M.Tech – I-Semester

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(25BST01)   THEORY OF ELASTICITY

Course Objectives: This course will enable students:

• To make students understand the principles of elasticity.

• To familiarize students with basic equations of elasticity.

• To expose students to two-dimensional problems in Cartesian and polar coordinates.

• To make students understand the principle of torsion of prismatic bars.

Course Outcomes (CO): Students will be able to:

• Apply elastic analysis to study the fracture mechanics.

• Apply linear elasticity in the design and analysis of structures such as beams, plates, shells, and sandwich composites.

• Apply hyper elasticity to determine the response of elastomer-based objects.

• Analyze the structural sections subjected to torsion.

UNIT - I

INTRODUCTION TO PLANE STRESS AND PLANE STRAIN ANALYSIS:

Elasticity – Notation for Forces and Stresses – Components of Stresses – Components of Strain – Hooke's Law. Plane Stress– Plane Strain – Differential Equations of Equilibrium – Boundary Conditions – Compatibility Equations – Stress Function – Boundary Conditions.

UNIT - II

TWO DIMENSIONAL PROBLEMS IN RECTANGULAR COORDINATES:

Solution by polynomials – Saint Venant's principle – Determination of displacements – Bending of simple beams – Application of Fourier series for two-dimensional problems – Gravity loading.

UNIT - III

TWO DIMENSIONAL PROBLEMS IN POLAR COORDINATES :

General Equation in Polar Coordinates - Stress distribution symmetrical about an axis – Pure bending of curved bars – Strain components in polar coordinates – Displacements for symmetrical stress distributions – Simple symmetric and asymmetric problems – General solution of two-

dimensional problems in polar coordinates – Application of the general solution of two-dimensional problems in polar coordinates – Application of the general solution in polar coordinates

UNIT - IV

ANALYSIS OF STRESS AND STRAIN IN THREE DIMENSIONS:

Principal Stress-Ellipsoid and stress-director surface – Determination of principal stresses – Maximum shear stresses – Homogeneous deformation – Principal axis of strain rotation.

General Theorems - Balance laws – Differential equations of equilibrium – Conditions of compatibility – Determination of displacement – Equations of equilibrium in terms of displacements – Principle of superposition – Uniqueness of solution – The reciprocal theorem

UNIT - V

TORSION OF PRISMATIC BARS:

Torsion of Prismatic Bars - Elliptical cross-section – Other elementary solutions – Membrane analogy – Torsion of rectangular bars – Solution of torsional problems by energy method – Use of soap films in solving torsional problems – Hydrodynamical analogies – Torsion of shafts, tubes, and bars.

Text Books:

1. Theory of Elasticity and Plasticity by Timoshenko, S., McGraw-Hill Book Company.
2. Advanced Strength of Materials by Papoov, McGraw-Hill Book Company.
3. Theory of Elasticity and Plasticity by Sadhu Singh, Khanna Publishers.

Reference Books

1. Plasticity for Structural Engineers – Chen, W.F. and Han, D.J., Springer-Verlag, New York.
2. Plasticity Theory – Lubliner, J., Macmillan Publishing Co., New York.
3. Foundations of Solid Mechanics – Y.C. Fung, PHI Publications.
4. Advanced Mechanics of Solids – L.S. Srinath, Tata McGraw-Hill Book Company.

SRI VENKATESWARA COLLEGE OF ENGINEERING & TECHNOLOGY (AUTONOMOUS)

M.Tech.   **(STRUCTURAL ENGINEERING)**

M.Tech – I-Semester

L	T	P	C
3	0	0	3

(25BST02)   ADVANCED STRUCTURAL ANALYSIS

Course Objectives: This Course Will Enable Students:

•   To understand the static and kinematic indeterminacy of the structures

•   To understand the concepts of matrix methods of analysis of structures

•   To understand the analysis of continuous beams.

•   To understand the analysis of rigid and pin jointed frames

Course Outcomes (CO): Student will be able to

•   Distinguish determinate and indeterminate structures.

•   Identify the method of analysis for indeterminate structures.

•   Apply matrix methods of analysis for continuous beams.

•   Apply matrix methods of analysis for rigid and pin jointed frames.

UNIT - I

Introduction to Matrix Methods of Analysis - Statical indeterminacy and kinematical indeterminacy – Degree of freedom – Coordinate system – Structure idealization – Stiffness and flexibility matrices – Suitability of element stiffness equations – Element flexibility equations – Mixed force-displacement equations for truss element, beam element, and torsional element.

Transformation of Coordinates - Element stiffness matrix and load vector – Local and global coordinates.

UNIT - II

Assembly of Stiffness Matrix from Element Stiffness Matrix - Direct stiffness method – General procedure – Banded matrix – Semi-bandwidth – Assembly by direct stiffness matrix method.

UNIT - III

Analysis of plane truss - continuous beams with and without settlement - plane frame including side sway single storey, single – bay and gable frame by flexibility method using system approach.

UNIT - IV

Analysis of plane truss - continuous beams with and without settlement - plane frame including sides sway, grids and gable frames by stiffness methods, single bay – two storey, two bay single – storey.

UNIT - V

Special analysis procedures - static condensation and sub structuring - initial and thermal stresses.

Textbooks:

1. Matrix Analysis of Frames structures by William Weaver J.R and James M.Gere, CBS publications.

2. Advanced Structural Analysis by Ashok.K.Jain, New Channel Brothers.

3. Matrix method of S.A by Pandit & Gupta

Reference Books:

1. Matrix Structural Analysis by Madhu B. Kanchi.

2. Matrix Methods of Structural Analysis by J.Meek.

3. Structural Analysis by Ghali and Neyveli.

4. Structural Analysis by Devdas Menon, Narosa Publishing Housing Pvt Ltd.

SRI VENKATESWARA COLLEGE OF ENGINEERING & TECHNOLOGY (AUTONOMOUS)

M.Tech.   **(STRUCTURAL ENGINEERING)**

M.Tech – I-Semester

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(25BST03)   THEORY AND ANALYSIS OF PLATES AND SHELLS (PE-I)

Course Objectives: This Course Will Enable Students:

• Introduce with concept of plate theory, the behaviour and analysis

• Knowledge about classification of shell surfaces

• To analyse the plate with different boundary conditions

• To understand the classical theory oh shells based on the Kirchoff-Love assumptions

Course Outcomes (CO): Student will be able to:

• Assess the strength of plate panels under point, linearly varying and uniformly distributed loads

• Analyze plates under different boundary conditions by various classical methods and approximated methods

• Familiar with classification of shells and classical shell theories and apply them in engineering design

• Exposed to single curved shells, doubly curved shells and cylindrical shells

UNIT - I

Introduction:

Space curves, surfaces, shell coordinates, strain-displacement relations, assumptions in shell theory, displacement field approximations, stress resultants, equation of equilibrium using the principle of virtual work, boundary conditions.

UNIT - II

Small Deflection Theory of Thin Rectangular Plates:

Assumptions – Derivation of governing differential equation for thin plates – Boundary conditions – Simply supported plate under sinusoidal load – Navier solution – Application to different cases – Levy's solution for various boundary conditions subjected to different loadings like uniform and hydrostatic pressure.

UNIT - III

Circular Plates:

Differential equation for symmetrical bending of laterally loaded circular plates – Uniformly loaded circular plates – Circular plate concentrically loaded – Circular plate loaded at center.

UNIT - IV

Shells - Functional behaviour – Examples – Structural behaviour of shells – Classification of shells – Definitions – Various methods of analysis of shells – Merits and demerits of each method – 2D membrane equation.

Equations of Equilibrium - Derivation of stress resultants – Cylindrical shells – Flugge's simplified equations.

UNIT - V

Introduction to Shells of Double Curvature:

Geometry, analysis, and design of elliptic paraboloid, conoid, and hyperbolic paraboloid shapes, including inverted umbrella type.

Axi-Symmetrical Shells:

General equation – Analysis of axi-symmetrical shells by membrane theory – Application to spherical shells and hyperboloid of revolution cooling towers.

Textbooks:

1. Theory of Plates & Shells – Stephen P. Timoshenko, S. Woinowsky-Krieger, Tata McGraw-Hill Edition

2. Analysis and Design of Concrete Shell Roofs – G.S. Ramaswami, CBS Publications

3. Design of Concrete Shell Roofs – Billington, Tata McGraw-Hill, New York

4. Shell Analysis – N.K. Bairagi, Khanna Publishers, New Delhi

5. Design of Shells and Folded Plates – P.C. Varghese, PHI Learning Pvt. Ltd

6. Design of Concrete Shell Roofs – Chatterjee, Oxford and IBH

SRI VENKATESWARA COLLEGE OF ENGINEERING & TECHNOLOGY (AUTONOMOUS)

M.Tech.   **(STRUCTURAL ENGINEERING)**

M.Tech – I-Semester

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(25BST04)   ADVANCED CONCRETE TECHNOLOGY (PE-I)

Course Objectives: This Course Will Enable Students:

• To study the properties of concrete-making materials

• To do mix design and become familiar with the methods of concrete production

• To gain knowledge about advanced tests on concrete

Course Outcomes (CO): Students will be able to:

• Be familiar with the properties of concrete-making materials

• Identify the influence and compatibility of chemical and mineral admixtures in concrete

• Update their knowledge on recent advances in special concretes

• Understand various methods of concrete production

• Analyse the performance of concrete structures through microstructure analysis

UNIT - I

Cements and Admixtures: Portland cement – Chemical composition – Hydration, setting, and fineness of cement – Structure of hydrated cement – Mechanical strength of cement gel – Water held in hydrated cement paste – Heat of hydration of cement – Influence of compound composition on properties of cement – Tests on physical properties of cement – I.S. specifications – Different types of cements – Admixtures.

UNIT - II

Aggregates: Classification of aggregate – Particle shape and texture – Bond strength and other mechanical properties of aggregate – Specific gravity, bulk density, porosity, absorption, and moisture in aggregate – Soundness of aggregate – Alkali-aggregate reaction – Thermal properties. Sieve analysis – Fineness modulus – Grading curves – Grading requirements – Practical grading – Road Note No. 4 – Grading of fine and coarse aggregates – Gap graded aggregate – Maximum aggregate size.

UNIT - III

Fresh Concrete: Workability – Factors affecting workability – Measurement of workability by different tests – Effect of time and temperature on workability – Segregation and bleeding – Mixing and vibration of concrete – Quality of mixing water.

Hardened Concrete: Water/cement ratio – Abram's law – Gel space ratio – Effective water in mix – Nature of strength of concrete – Strength in tension and compression – Griffith's hypothesis –

Factors affecting strength – Autogeneous healing – Relation between compression and tensile strength – Curing and maturity of concrete – Influence of temperature on strength – Steam curing – Testing of hardened concrete – Compression tests – Tension tests – Factors affecting strength – Flexure tests – Splitting tests – Non-destructive testing methods.

UNIT - IV

Elasticity, Shrinkage, and Creep: Modulus of elasticity – Dynamic modulus of elasticity – Poisson's ratio – Early volume changes – Swelling – Drying shrinkage – Mechanism of shrinkage – Factors affecting shrinkage – Differential shrinkage – Moisture movement – Carbonation shrinkage – Creep of concrete – Factors influencing creep – Relation between creep and time – Nature of creep – Effect of creep.

UNIT - V

Mix Design: Proportioning of concrete mixes by various methods – Fineness modulus – Trial and error – Mix density – Road Note No. 4 – ACI and ISI code methods – Factors in the choice of mix proportions – Durability of concrete – Quality control of concrete – Statistical methods – High strength concrete mix design.

Special Concretes: Lightweight concretes – Lightweight aggregate concrete – Cellular concrete – No-fines concrete – High-density concrete – Fiber reinforced concrete (FRC) – Different types of fibers – Factors affecting properties of FRC – Applications of FRC – Polymer concrete – Types of polymer concrete – Properties of polymer concrete and applications.

Textbooks:

1. Properties of Concrete by A.M.Neville – Pearson Publication – 4th Edition
2. Concrete Technology by M.S.Shetty. – S.Chand & Co. ; 2004
3. Concrete Technology by A.R. Santha Kumar, Oxford University Press, New Delhi

Reference Books:

1. Concrete: Micro Structure, Properties and Materials – P.K.Mehta and J.M.Monteiro, McGraw-Hill Publishers
2. Design of Concrete Mix by Krishna Raju, CBS Publishers.
3. Concrete Technology by A.M.Neville – Pearson Publication
4. Concrete Technology by M.L. Gambhir. – Tata Mc. Graw Hill Publishers, New Delhi
5. Non-Destructive Test and Evaluation of Materials by J.Prasad & C.G.K. Nair, Tata McGraw-Hill Publishers, New Delhi

SRI VENKATESWARA COLLEGE OF ENGINEERING & TECHNOLOGY (AUTONOMOUS)

(STRUCTURAL ENGINEERING)

M.Tech – I-Semester

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(25BHS01)   **ADVANCED MATHEMATICAL METHODS**

(ELECTIVE-I)

Course Objectives: This Course Will Enable Students:

•   With calculus of variation, numerical methods of solving ordinary and partial differential equations.

•   To impart knowledge in basic concepts of finite element methods and applications.

Course Outcomes (CO): Student will be able to

•   Solve functionals using Hamilton's principle .

•   Numerically solve ordinary and partial differential equations that are initial value or boundary value problems.

•   Apply the concepts of finite element method for 1-D and 2-D problems.

UNIT - I   CALCULUS OF VARIATION

Calculus of Variation **-** Functionals – Euler's equation – Solution of Euler's equation – Isoperimetric problems – Several dependent variables – Functionals involving higher order derivatives – Hamilton's principle – Lagrange's equations

UNIT - II   NUMERICAL SOLUTION OF ORDINARY DIFFERENTIAL EQUATIONS & EIGEN VALUES AND EIGEN VECTORS

Eigenvalues and eigenvectors – General method – Power method – Spectral method.

Numerical solution of ordinary differential equations – Taylor series method – Picard's method – Euler's method – Modified Euler's method – Runge-Kutta (R.K.) method.

UNIT – III NUMERICAL SOLUTION OF PARTIAL DIFFERENTIAL EQUATIONS

Numerical solution of partial differential equations –elliptical equations standard five Points

formula, Diagonal five point formula –Solution of Laplace equation by Leibmann's iteration method, Poisson's equation and its applications.

UNIT - IV   NUMERICAL SOLUTION OF PARTIAL DIFFERENTIAL EQUATIONS

Numerical solution of partial differential equations – Elliptical equations – Standard five-point formula – Diagonal five-point formula – Solution of Laplace equation by Leibmann's iteration method – Poisson's equation and its applications.

UNIT - V FINITE ELEMENT METHOD

Finite Element Method – Weighted residual methods, least square method, Galerkin's method – Finite elements – Interpolating over the whole domain – One-dimensional case, two-dimensional case – Application to boundary value problems.

Textbooks:

1. Higher Engineering Mathematics By B.S. Grewal Khanna Publishers.

2. Numerical Methods For Engineers By Steven C.Chapra And Raymond P.Canale – Mc Graw Hill Book Company.

Reference Books:

1. Applied Numerical Analysis By Curtis. F.Gerald- Addeson Wesely Publishing Company.

2. C-Language And Numerical Methods By C-Xavier. New Age International Publishers.

3. Computational Methods For Partial Differential Equations By M.K.Jain, SKR

Iyengar, R.K.Jain.

Online Learning Resources:

After completion of this course the student should be able to :

• Understand the concept and steps of calculus of variation.

• Solve ordinary and partial differential equations numerically.

• Solve the initial and boundary value problems numerically.

• Solve the 1-D and 2-D problems using finite element method.

• Identify, formulate and solve structural engineering problems.

SRI VENKATESWARA COLLEGE OF ENGINEERING & TECHNOLOGY (AUTONOMOUS)

(STRUCTURAL ENGINEERING)

M.Tech – I-Semester

(25BST05) DESIGN OF PRESTRESSED CONCRETE (PE-II) (ELECTIVE-II)

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Course Objectives: This Course Will Enable Students:

- Familiarize students with concrept of prestressing and analysis of prestress

- Design and analysis of pretension and post tensioned concrete memebers

- Determination of deflections of prestressed members

- To calculate the losses of prestress,creep and shrinkage.

Course Outcomes (CO): Students will be able to

- To understand the basic concepts about prestressed concrete and analysis of prestress

- Estimate the effective losses in prestress

- Analyse the effect of prestressing force in the behavior of beams in flexure

- To design shear, torsion and transmission length in prestressed concrete members

- Design of compression and tension members as per codes of practice

UNIT - I

INTRODUCTION: Development of Prestressed Concrete –Advantages and Disadvantages of PSC Over RCC –General Principles of Pre-Stressing-Pre Tensioning and Post Tensioning –Materials Used in PSC-High Strength Concrete –High Tension Steel-Different Types /Methods/Systems of Prestressing.

UNIT - II

LOSSES OF PRESTRESS: Estimation of the loss of prestress due to various causes like elastic shortening of concrete, creep of concrete, shrinkage of concrete, relaxation of steel, slip in anchorage, and friction.

UNIT - III

Flexure & Deflections: Analysis of sections for flexure in accordance with elastic theory – Allowable stresses – Design criteria as per I.S. Code of Practice – Elastic design of beams (rectangular, I, and T sections) for flexure – Introduction to partial prestressing. Introduction –

Factors influencing deflections – Short-term and long-term deflections of un-cracked and cracked members.

UNIT - IV

Shear, Bond, Bearing and Anchorage: Shear in PSC beams – Principal stresses – Conventional elastic design for shear – Transfer of prestress in pre-tensioned members – Transmission length – Bond stresses – Bearing at anchorage – Anchorage zone stresses in post-tensioned members – Analysis and design of end blocks by Guyon, Magnel, and approximate methods – Anchorage zone reinforcements.

UNIT - V

Statistically Indeterminate Structures: Introduction – Advantages and disadvantages of continuity – Layouts for continuous beams – Primary and secondary moments – Elastic analysis of continuous beams – Linear transformation – Concordant cable profile – Design of continuous beams.

Textbooks:

1. Prestressed Concrete by N. Krishna Raju, TMH Pubilishers.

2. Prestressed Concrete by K.U.Muthu, I.K. International Publishing House.

3. Prestressed Concrete Design by Praveen Nagarajan, Pearson Pubilications.

Reference Books:

1. Design of Prestressed Concrete Structures, T.Y.Lin, Asian Publishing House, Bombay, 1953.

2. Prestressed Concrete, Vol.I&II, Y.Guyon, Wiley and Sons, 1960.

3. Prestressed Concrete Design and Construction, F.Leohhardt,   Wilhelm Ernst and Shon, Berlin, 1964.

4. Reinforced concrete designers hand bood, A view point publication, C.E.Reynolds and J.C. Steedman, 1989.

5. Prestressed Concrete, Edward P.Nawy, Prentice Hall –.

6. Prestressed Concrete – by Raj Gopal, Narsoa Pubilications.

SRI VENKATESWARA COLLEGE OF ENGINEERING & TECHNOLOGY (AUTONOMOUS)

(STRUCTURAL ENGINEERING)

M.Tech – I-Semester

L	T	P	C
3	0	0	3

(25BST06)   MAINTENANCE AND REHABILITATION OF STRUCTURES (PE – II)
(ELECTIVE-II)

Course Objectives: This Course Will Enable Students:

• To judge the rate of corrosion in various exposure conditions

• To conduct non-destructive testing of structural elements

• To select a suitable bonding technique

• To judge the effect of fire and earthquake loads on discontinuities

Course Outcomes (CO): Students will be able to

• Estimate the causes for distress and deterioration of structures

• Apply the NDT for condition assessment of structures, identify damages in RC structures

• Select a repair material and a retrofitting strategy suitable for the distress

• Formulate guidelines for the repair management of deteriorated structures

• Strengthening of earthquake and fire-damaged elements using various techniques.

UNIT - I

Influence on serviceability and durability: General – Quality assurance for concrete construction – As-built concrete properties – Strength – Permeability – Volume changes – Thermal properties – Cracking. Effects due to climate, temperature, chemicals, wear and erosion – Design and construction errors – Corrosion mechanism – Effects of cover thickness and cracking – Methods of corrosion protection – Inhibitors – Resistant steels – Coatings – Cathodic protection.

UNIT - II

Maintenance and Repair Strategies :- Inspection – Structural appraisal – Economic appraisal – Components of quality assurance – Conceptual bases for quality assurance schemes.

UNIT - III

Materials for Repair :- Special concretes and mortar – Concrete chemicals – Special elements for accelerated strength gain – Expansive cement – Polymer concrete – Sulphur infiltrated concrete – Ferrocement – Fibre reinforced concrete.

UNIT - IV

Techniques for Repair :- Rust eliminators and polymer coatings for rebars during repair – Foamed concrete – Mortar and dry pack – Vacuum concrete – Gunite and shotcrete – Epoxy injection – Mortar repair for cracks – Shoring and underpinning.

UNIT - V

Case Studies:- Repairs to overcome low member strength, deflection, cracking, chemical disruption, weathering, wear, fire, leakage, and marine exposure

Textbooks:

1.   Dension Campbell, Allen and Harold Roper, Concrete Structures, Materials, Maintenance and Repair, Longman Scientific and Technical, U.K. 1991.

2.   RT.Allen and S.C. Edwards, Repair of Concrete Structures, Blakie and Sons, UK, 1987.

3.   MS. Shetty, Concrete Technology – Theory and Practice, S.Chand and Company, New Delhi, 1992.

Reference Books:

1.   Santhakumar, A.R.Training Course Notes on Damage Assessment and Repair in Low Cost Housing RHDC-NBO Anna University, Madras, July, 1992.

2.   Raikar, R.N.Learning From Failures – Deficiencies in Design, Construction and Service – R&D Centre (SDCPL), Raikar Bhavan, Bombay, 1987.

3.   N.Palaniappan, Estate Management, Anna Institute of Management, Madras Sep. 1992.

4.   F.K.Garas, J.L.Clarke, GST Armer, Structural Assessment, Butterworths, UK Aporil 1987.

SRI VENKATESWARA COLLEGE OF ENGINEERING &TECHNOLOGY (AUTONOMOUS)
(STRUCTURAL ENGINEERING)

M.Tech – I-Semester

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(25BST07)   DESIGN OF BRIDGES (PE-II) (ELECTIVE-II)

Course Objectives: This Course Will Enable Students:

•   To understand the various types of bridges

•   To understand the codal provisions for loading and design standards of bridges

•   To design the superstructure of bridge using different methods and loading conditions

•   To understand the design of bearings

Course Outcomes (CO): Student will be able to

•   Finalize with the usage of codal provisions in the design of bridges

•   Analyze and design substructure elements of bridges

•   Analyze and design various types of bridges like t-beam bridge,slab bridge ,box culvert.

•   To analyze and design of T beam bridge

UNIT - I

Introduction – Classification – Investigations and planning – Choice of type – Economic span length – IRC specifications for road bridges – Standard live loads – Other forces acting on bridges – General design considerations.

UNIT - II

Design of Box Culverts – General aspects – Design loads – Design moments, shears, and thrusts – Design of critical section.

Design of Slab Bridges – Effective width of analysis – Working stress design and detailing of slab bridges for IRC loading.

UNIT - III

T-Beam Bridges – Introduction – Wheel Load Analysis – B.M. in Slab – Pigaud's Theory – Analysis of Longitudinal Girders by Courbon's Theory Working Stress Design and Detailing of Reinforced Concrete T-Beam Bridges for IRC Loading.

UNIT - IV

Prestressed Concrete Bridges – General Features – Advantages of Prestressed Concrete Bridges – Pre-tensioned Prestressed Concrete Bridges – Post Tensioned Prestressed Concrete Bridge Decks. Design of Post Tensioned Prestressed Concrete Slab Bridge Deck. Bridge Bearings – General Features – Types of Bearings – Forces on Bearings Basis for Selection of Bearings – Design Principles of Steel Rocker and Roller Bearings and Its Design – Design of Elastometric Pad Bearing

Detailing of Elastomeric Pot Bearings.

UNIT - V

Piers and Abutments – General Features – Bed Block – Materials for Piers and Abutments – Types of Piers – Forces Acting on Piers – Design of Pier – Stability Analysis of Piers – General Features of Abutments – Forces Acting on Abutments – Stability Analysis of Abutments.

Textbooks:

1.   Essentials of Bridges Engineering – D.Hohnson Victor Oxford & IBH Publishers Co- Private Ltd.

2.   Design of Concrete Bridges MC Aswanin VN Vazrani, MM Ratwani, Khanna Publishers.

3.   Bridge Engineering – S.Ponnuswamy.

Reference Books:

1.   Concrete Bridge Design, Browe, R.E., C.R.Books Ltd., London, 1962.

2.   Reinforced Concrete Bridges, Taylor F.W., Thomson, S.E., and Smulski E., John Wiley and Sons, New York, 1955.

3.   An Introduction To Structural Design of Concrete Bridges, Derrick Beckett, Surrey University; Press, Henlely – Thomes, Oxford Shire, 1973

4.   Bridge Analysis Simplified, Bakht.B.And Jaegar, L.G. Mc Graw Hill, 1985.

5.   Design of Bridges – N.Krishna Raju – Oxford & IBH

6.   Design of Bridge Structures – FR Jagadeesh, M.A. Jaya Ram – Eastern Economy **Edition.**

SRI VENKATESWARA COLLEGE OF ENGINEERING & TECHNOLOGY
(STRUCTURAL ENGINEERING)

M.Tech – I-Semester

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(25BST08)   ADVANCED CONCRETE LABORATORY

Course Objectives: The students will acquire knowledge about

•   To learn the principles of workability in cement concrete.

•   To learn the preliminary tests on aggregates like flakiness test, elongation test, specific gravity, bulk density fineness modulus.

•   To know the compression test, Young's modulus test procedures

•   To learn the mix design procedure

Course Outcomes (CO): At the end of the course, students will be able to:

•   Assess the workability of cement concrete and its suitability, quality of concrete

•   Assess the quality of fine and coarse aggregates after testing the aggregates according to IS specifications.

•   Test the quality of cement concrete by conducting compressive strength on concrete cubes.

•   Design different grades of mix design and also asses the fineness of cement, flash, silica

List of Experiments:

1.   Mix Design of Concrete and Casting of Specimen
2.   Mix Design of High Strength Concrete Including Casting and Testing of Specimens.
3.   Fresh properties of self-compacting concrete
4.   Permeability of Hardened concrete
5.   Rapid chloride permeability of hardened concrete & Carbonations Studies.
6.   Compressive strength split tensile strength & flexural strength of self compacting
7.   concrete.
8.   Young's Modulus of Concrete
9.   Accelerated Curing Test on Concrete Cubes.
10.   Non Destructive Tests on Concrete.
11.   Mix Design of Concrete using Mineral Admixtures.
12.   Bending Test on A RCC Beam Under:
i.   Single Point Load
ii.   Two Point Load

References:

1.   Properties of Concrete, Neville A. M., 5th Edition, Prentice Hall, 2012.

2.   Concrete Technology, Shetty M. S., S. Chand and Co., 2006.

3.   Concrete Technology by A.R. Santha kumar, Oxford University Press.

SRI VENKATESWARA COLLEGE OF ENGINEERING & TECHNOLOGY (AUTONOMOUS)
(STRUCTURAL ENGINEERING)

M.Tech – I-Semester

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(25BST09)   ADVANCED STRUCTURAL ENGINEERING LABORATORY

Course Objectives: The students will acquire knowledge about Design of experiments,

- To investigate the performance of structural elements.
- To evaluate the different testing methods and equ ipments.

Course Outcomes (CO): At the end of the course, students will be able to:

- Achieve Knowledge of design and development of experimenting skills.
- Understand the principles of design of experiments
- Design and develop analytical skills.
- Summerize the testing methods and equipment.

List of Experiments:

1. Load deflection characteristics of under reinforced concrete beam.
2. Load Deflection characteristics of over reinforced concrete beam.
3. Comparison of reinforced concrete beam with and without shear reinforcement.
4. Detection of reinforcement in structural members using profometer.
5. Temperature effects on compressive strength of concrete.
6. Impact strength of concrete beam.
7. Testing of Brick masonry wall.
8. Load deflection characteristics of reinforced concrete beam under cyclic loading using 500kN actuator.
9. Load deflection characteristics of reinforced concrete column under cyclic loading using 1000kN actuator.
10. Load deflection characteristics of reinforced concrete beam under torsion.
11. Ambient Vibration Testing.

SRI VENKATESWARA COLLEGE OF ENGINEERING & TECHNOLOGY (AUTONOMOUS)

(STRUCTURAL ENGINEERING)

M.Tech – I-Semester

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(25BMB01) RESEARCH METHODOLOGY AND IPR

Course Objectives:

- Identify an appropriate research problem in their interesting domain.

- Understand ethical issues understand the Preparation of a research project thesis report.

- Understand the Preparation of a research project thesis report

- Understand the law of patent and copyrights.

- Understand the Adequate knowledge on IPR

Course Outcomes (CO): Student will be able to

- Analyze research related information

- Follow research ethics

- Understand that today's world is controlled by Computer, Information Technology, but tomorrow world will be ruled by ideas, concept, and creativity.

- Understanding that when IPR would take such important place in growth of individuals & nation, it is needless to emphasis the need of information about Intellectual Property Right to be promoted among students in general & engineering in particular.

- Understand that IPR protection provides an incentive to inventors for further research work and investment in R & D, which leads to creation of new and better products, and in turn brings about, economic growth and social benefits.

UNIT - I

Meaning of research problem – Sources of research problem – Criteria and characteristics of a good research problem – Errors in selecting a research problem – Scope and objectives of a research problem – Approaches for investigation of solutions for a research problem – Data collection – Analysis – Interpretation – Necessary instrumentations.

UNIT - II

Effective literature study approaches – Literature analysis – Plagiarism – Research ethics – Effective technical writing – How to write a report – Developing a research proposal – Format of a research proposal – Presentation and assessment by a review committee.

UNIT - III

Nature of intellectual property – Patents, designs, trade, and copyright.
Process of patenting and development – Technological research, innovation, patenting, and development.
International scenario – International cooperation on intellectual property.
Procedure for grant of patents – Patenting under PCT (Patent Cooperation Treaty).

UNIT - IV

Patent rights – Scope of patent rights – Licensing and transfer of technology – Patent information and databases – Geographical indications.

UNIT - V

New developments in IPR – Administration of patent system – IPR in biological systems, computer software, etc. – Traditional knowledge – Case studies – IPR and IITs.

Textbooks:

1. Stuart Melville and Wayne Goddard, "Research methodology: an introduction for science & engineering students'"

2. Wayne Goddard and Stuart Melville, "Research Methodology: An Introduction"

Reference Books:

1. Ranjit Kumar, 2nd Edition, "Research Methodology: A Step by Step Guide for beginners"

2. Halbert, "Resisting Intellectual Property", Taylor & Francis Ltd ,2007.

3. Mayall, "Industrial Design", McGraw Hill, 1992.

4. Niebel, "Product Design", McGraw Hill, 1974.

5. Asimov, "Introduction to Design", Prentice Hall, 1962.

6. Robert P. Merges, Peter S. Menell, Mark A. Lemley, " Intellectual Property in New Technological Age", 2016.

SRI VENKATESWARA COLLEGE OF ENGINEERING &TECHNOLOGY (AUTONOMOUS)
(STRUCTURAL ENGINEERING)

M.Tech – I-Semester

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AUDIT COURSE-I

(25BHS02) ENGLISH FOR RESEARCH PAPER WRITING

Course Objectives: This course will enable students:

• Understand the essentials of writing skills and their level of readability

• Learn about what to write in each section

• Ensure qualitative presentation with linguistic accuracy

Course Outcomes (CO): Student will be able to

• Understand the significance of writing skills and the level of readability

• Analyze and write title, abstract, different sections in research paper

• Develop the skills needed while writing a research paper

UNIT - I
Overview of a research paper – Planning and preparation – Word order – Useful phrases – Breaking up long sentences – Structuring paragraphs and sentences – Being concise and removing redundancy – Avoiding ambiguity.

UNIT - II
Essential components of a research paper – Abstracts – Building hypothesis – Research problem – Highlight findings – Hedging and criticizing – Paraphrasing and plagiarism – Cauterization.

UNIT - III
Introducing review of the literature – Methodology – Analysis of the data – Findings – Discussion – Conclusions – Recommendations.

UNIT - IV
Key skills needed for writing a Title, Abstract, and Introduction

UNIT - V
Appropriate language to formulate Methodology, incorporate Results, put forth Arguments and draw Conclusions

Suggested Reading

1. Goldbort R (2006) Writing for Science, Yale University Press (available on Google Books)

Model Curriculum of Engineering & Technology PG Courses [Volume-I]

2. Day R (2006) How to Write and Publish a Scientific Paper, Cambridge University Press

3. Highman N (1998), Handbook of Writing for the Mathematical Sciences, SIAM.

Highman'sbook

4. Adrian Wallwork , English for Writing Research Papers, Springer New York Dordrecht

Heidelberg London, 2011

SRI VENKATESWARA COLLEGE OF ENGINEERING &TECHNOLOGY (AUTONOMOUS)

M.Tech.   **(STRUCTURAL ENGINEERING)**

M.Tech – I-Semester	**L**	**T**	**P**	**C**
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(25BST27)   DISASTER MANAGEMENT

Course Objectives: This course will enable students to:

• Learn to demonstrate critical understanding of key concepts in disaster risk reduction and humanitarian response.

• Critically evaluate disaster risk reduction and humanitarian response policy and practice from multiple perspectives.

• Develop an understanding of standards of humanitarian response and practical relevance in specific types of disasters and conflict situations.

• Critically understand the strengths and weaknesses of disaster management approaches, planning, and programming in different countries, particularly their home country or the countries they work in.

UNIT - I

Introduction: Disaster: Definition, Factors and Significance; Difference Between Hazard and Disaster; Natural and Manmade Disasters: Difference, Nature, Types and Magnitude.

Disaster-Prone Areas in India:

Study of Seismic Zones; Areas Prone to Floods and Droughts, Landslides and Avalanches; Areas Prone to Cyclonic and Coastal Hazards with Special Reference to Tsunami; Post-Disaster Diseases and Epidemics

UNIT - II

Repercussions of Disasters and Hazards:

Economic Damage, Loss of Human and Animal Life, Destruction of Ecosystem. Natural Disasters: Earthquakes, Volcanism, Cyclones, Tsunamis, Floods, Droughts and Famines, Landslides and Avalanches, Man-made disaster: Nuclear Reactor Meltdown, Industrial Accidents, Oil Slicks and Spills, Outbreaks of

Disease and Epidemics, War and Conflicts.

UNIT - III

Disaster Preparedness and Management:

Preparedness: Monitoring of Phenomena Triggering Disaster Hazard; Evaluation of Risk:

Application of Remote Sensing, Data from Meteorological and Other Agencies, Media Reports: Governmental and Community Preparedness.

UNIT - IV

Risk Assessment Disaster Risk:

Concept and Elements, Disaster Risk Reduction, Global and National Disaster Risk Situation.
Techniques of Risk Assessment, Global Cooperation in Risk Assessment and Warning, People's
Participation in Risk Assessment. Strategies for Survival.

UNIT - V

Disaster Mitigation:

Meaning, Concept and Strategies of Disaster Mitigation, Emerging Trends in Mitigation.Structural
Mitigation and Non-Structural Mitigation, Programs of Disaster Mitigation in India.

Suggested Reading

1.   R.Nishith, Singh AK,"Disaster Management in India: Perspectives, issues, and strategies

2.   "' New Royal book

Company..Sahni, Pardeep et al.(Eds.)," Disaster Mitigation Experiences And Reflections",

PrenticeHa ll Of India, New Delhi.

3. GoelS.L., Disaster Administration And Management Text And CaseStudies,,
    Deep&Deep Publication Pvt. Ltd., New Delhi

M.Tech – I-Semester   **L T P C**
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(25BHS01)   SANSKRIT FOR TECHNICAL KNOWLEDGE

Course Objectives: This course will enable students:

•   To get a working knowledge of illustrious Sanskrit, the scientific language in the world

•   Learning of Sanskrit to improve brain functioning

•   Learning of Sanskrit to develop the logic in mathematics, and other subjects, enhancing the memory power

•   The engineering scholars equipped with Sanskrit will be able to explore the huge

•   Knowledge from ancient literature

Course Outcomes (CO): Students will be able to

•   Understanding basic Sanskrit language

•   Ancient Sanskrit literature about science &technology can be understood

•   Being a logical language will help to develop logic in students

UNIT - I

Alphabets in Sanskrit,

UNIT - II

Past/Present/Future Tense, Simple Sentences

UNIT - III

Order, Introduction of roots

UNIT - IV

Technical information about Sanskrit Literature

UNIT - V

Technical concepts of Engineering-Electrical, Mechanical, Architecture, Mathematics

Suggested Reading

1.   "Abhyaspustakam" –Dr.Vishwas, Sanskrit-Bharti Publication, New Delhi

2.   "Teach Yourself Sanskrit" Prathama Deeksha- VempatiKutumbshastri, Rashtriya Sanskrit Sansthanam, New Delhi Publication

3.   "India's Glorious Scientific Tradition" Suresh Soni, Ocean Books (P) Ltd., New Delhi

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY (AUTONOMOUS)

M. Tech - II – Semester   **(STRUCTURAL ENGINEERING)**

(25BST10)   **STRUCTURAL DYNAMICS**   L   T   P   C

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Course Objectives:

This Course Will Enable Students:

1. Determine vibration characteristics of structures like frequency, amplitude, impedance and time period
2. Differentiate the response of single and multi-degree of freedom systems
3. Determine the response of structures for pulse excitation like blast load
4. Differentiate the response of Multi Degree of Freedom systems

Course Outcomes:

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

1. Write equation of motion for single and multi degree of freedom systems
2. Understand the impact of damping on charecterstics of vibrating system
3. Gain Knowledge about arbitary and pulse excitation
4. Understand applications of Numerical methods in dynamics
5. Analyse in various theories of failure and plasticity

UNIT: I   Theory of Vibrations:

Introduction –Elements of A Vibratory System – Degrees of Freedom- Continuous Systems – Lumped Mass Idealization –Oscillatory Motion –Simple Harmonic Motion – Pictorial Representation of S.H.M - Free Vibrations of Single Degree of Freedom (SDOF) Systems – Undamped and Damped –Critical Damping –Logarithmic Decrement –Forced Vibrations of SDOF Systems-Harmonic Excitation –Dynamic Magnification Factor- Bandwidth. Fundamental Objective of Dynamic Analysis-Types of Prescribed Loading- Methods of Discretization-Formulation of The Equations of Motion.

UNIT: II   Single Degree of Freedom System:

Formulation and Solutions of The Equation of Motion - Free Vibration Response –Response To Harmonic, Periodic, Impulsive and General Dynamic Loading – Duhamel Integral

UNIT: III   Multi Degree of Freedom System:

Selection of The Degree of Freedom –Evaluation of Structural Property Matrices-Formulation of The MDOF Equations of Motion –Undamped Free Vibrations- Solution of Eigen Value Problem for Natural Frequencies and Mode Shapes- Analysis of Dynamic Response –Normal Coordinates –Uncoupled Equations of Motion –Orthogonal Properties of Normal Modes-Mode Superposition Procedure.

UNIT: IV   Practical Vibration Analysis:

Stodola Method- Fundamental Mode Analysis –Analysis of Second and Higher Modes –Holzer's Method –Basic Procedure –Transfer Matrix Procedure

UNIT: V   Introduction To Earthquake Analysis:

Introduction –Excitation by Rigid Base Translation – Lumped Mass Approach -SDOF and MDOF System- I.S Code Methods of Analysis. Continuous System: Introduction –Flexural Vibrations of Beams- Elementary Case-Equation of Motion –Analysis of Undamped Free Shapes of Simple Beams With Different End Conditions- Principles of Application To Continuous Beams.

Text Book(s)

1.   Structural Dynamics for Earthquake Engineering,A.K.Chopra,Pearson Pubilications

2   Dynamics of Structures by Clough & Penziem

3   Structural Dynamics by Roy. R. Craig John willy & fours.

Reference Books

1   Structural Dynamics by Mario Paz

2   I.S:1893(Latest)" Code of Practice for Earthquakes Resistant Design of Stuctures"

3   Fundamentals of Vibration, Anderson R.A, Amerind Pulblishing Co.,1972.

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY (AUTONOMOUS)

M. Tech - II – Semester   (STRUCTURAL ENGINEERING)

**(25BST11)   FINITE ELEMENT METHODS IN STRUCTURAL   L   T   P   C
ENGINEERING**

                                                                    3   0   0   3

Course Objectives:

This Course Will Enable Students:

1. To provide an overview and basic fundamentals of Finite Element Analysis.
2. To introduce basic aspects of finite element theory, including domain discretization, interpolation, application of boundary conditions, assembly of global arrays, and solution of the resulting algebraic systems.
3. To explain the underlying concepts behind variational methods and weighted residual methods in FEM.
4. Formulate simple structural problems in to finite elements

Course Outcomes:

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

1. Analyse and build FEA models for various Engineering problems.
2. Able to identify information requirements and sources for analysis , design and evaluation
3. Use professional-level finite element software to solve engineering problems.
4. Interpret results obtained from FEA software solutions, not only in terms of conclusions but also awareness of limitations.

UNIT: I   Introduction   10 hours

Introduction-Concepts of FEM –Steps Involved –Merits &Demerits –Energy Principles –Discretization –Rayleigh –Ritz Method of Functional Approximation.

Elastic Formulations: Stress Equations-Strain Displacement Relationships in Matrix Form-Plane Stress, Plane Strain and Axi-Symmetric Bodies of Revolution With Axi Symmetric Loading

UNIT: II   One Dimensional FEM   10 hours

Stiffness Matrix for Beam and Bar Elements Shape Functions for ID Elements –Static

Condensation of Global Stiffness Matrix-Solution –Initial Strain and Temperature Effects.

UNIT: III   Two Dimensional FEM   10 hours

Different Types of Elements for Plane Stress and Plane Strain Analysis – Displacement Models – Generalized Coordinates-Shape Functions-Convergent and Compatibility Requirements – Geometric Invariance –Natural Coordinate System-Area and Volume Coordinates- Generation of Element Stiffness and Nodal Load Matrices –Static Condensation.

UNIT: IV   Isoparametric Formulation   9 hours

Concept, Different Isoparametric Elements for 2D Analysis- Formulation of 4-Noded and 8-Noded Isoparametric Quadrilateral Elements –Lagrangian Elements- Serendipity Elements. Axi Symmetric Analysis –Bodies of Revolution-Axi Symmetric Modelling – Strain Displacement Relationship-Formulation of Axi Symmetric Elements.

UNIT: V   Three Dimensional FEM   9 hours

Different 3-D Elements, 3D Strain –Displacement Relationship- Formulation of Hexahedral and Isoparametric Solid Element.

Text Book(s)

1.   Finite Elements Methods in Engineering by Tirupati. R. Chandrnpatla and Ashok D. Belegundu – Pearson Education Publications.

2   Finite Element Analysis – Theory & Programming by C.S.Krishna Murthy- Tata Mc.Graw Hill Publishers

3   Finite Elements Methods in Engineering by Tirupati. R. Chandrnpatla, Universities Press India Ltd. Hyderabad.

Reference Books

1   Finite Element Method and Its Application by Desai ,2012, Pearson Pubilications.

2   finite Element Methods by Darrel W.Pepper, Vikas Pubilishers

3   Finite Element Analysis and Procedures in Engineering by H.V.Lakshminaryana, 3rd Edition, Universities Press, Hyderabad.

4   Finite Element Analysis in Engineering Design by S.Rajasekharan, S.Chand

Publications, New Delhi.

5   Finite Element Analysis by S.S. Bhavakatti-New Age International Publishers

6   Finite Element Analysis by P Seshu-PHI Learning Publications.

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY (AUTONOMOUS)

M. Tech - II – Semester   **(STRUCTURAL ENGINEERING)**

(25BST12)   **DESIGN OF REINFORCED CONCRETE**   **L   T   P   C**
                              FOUNDATIONS (PE-III)

                                                                  3   0   0   3

Course Objectives:

This Course Will Enable Students:

1. To explore and examine a site
2. Analyse lateral soil pressures acting on to a wall
3. Determine bearing capacity of a soil using different theories at different conditions
4. Analyse various dynamic forces
5. Design a special foundation for vibrating machinery

Course Outcomes:

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

1. Determine the earthpressures on foundations and retaining structures
2. Analyses shallow and deep foundations
3. Calculate the bearing capacity of soils and foundation settlements
4. Design foundations for different machines
5. Assess the influence of vibrations

UNIT: I   Shallow Foundations-I

General Requirements of Foundations. Types of Shallow Foundations and The Factors Governing The Selection of Type of Shallow Foundation. Bearing Capacity of Shallow Foundations by Terzaghi's Theory and Meyerhof's Theory (Derivation of Expressions and Solution To Problems Based on These Theories). Local Shear and General Shear

Failure and Their Identification

UNIT: II   Shallow Foundations-II

Bearing Capacity of Isolated Footing Subjected To Eccentric and Inclined Loads. Bearing

Capacity of Isolated Footing Resting on Stratified Soils- Button's Theory and Siva Reddy Analysis. Analysis and Structural Design of R.C.C Isolated, Combined and Strap Footings.

UNIT: III   Deep Foundations-I

Pile Foundations-Types of Pile Foundations. Estimation of Bearing Capacity of Pile Foundation by Dynamic and Static Formulae. Bearing Capacity and Settlement Analysis of Pile Groups. Negative Skin Friction, Pile Load Tests. Sheet Pile 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: IV   Deep Foundations-II

Well Foundations-Elements of Well Foundation. Forces Acting on A Well Foundation. Depth and Bearing Capacity of Well Foundation. Design of Individual Components of Well Foundation (Only Forces Acting and Principles of Design). Problems Associated With Well Sinking.

UNIT: V   FOUNDATIONS In PROBLEMATIC SOILS

Foundations in Black Cotton Soils-Basic Foundation Problems Associated With Black Cotton Soils. Lime Column Techniques-Principles and Execution. Under Reamed Piles-Principle of Functioning of Under Reamed Pile-Analysis and Structural Design of Under Reamed Pile. Use of Cohesive Non Swelling (CNS) Layer Below Shallow Foundations.

Text Book(s)

1.   Analysis and Design of Foundations and Retaining Structures-Shamsher Prakash,Gopal Ranjan and Swami Saran.

Reference Books

1   Analysis and Design of Foundations-J.E.Bowles

2   Foundation Design and Construction-Tomlinson

3   Foundation Design-Teng.

4   Geotechnical Engg – C.Venkatramaiah

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY

(AUTONOMOUS)

M. Tech - II – Semester   (STRUCTURAL ENGINEERING)

(25BST13)   EXPERIMENTAL STRESS ANALYSIS (PE-III)   L   T   P   C

                                                                                            3   0   0   3

Course Objectives:

This Course Will Enable Students:

1. To perform NDT test and interpret the results
2. To understand the science behind working of strain gauge
3. Understand the practical applicationsof strain gauge
4. To determine the stress distribution in anacrylic block using the concept of photoelasticity

Course Outcomes:

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

1. To understand the mechanical properties of strain gaugees andapplications
2. To understand the design and performance of strain gauges
3. To understand the methodsof Non destructive testing
4. To understand the methods of photo elasticity and models

UNIT: I   Principles Of Experimental Approach

Merits of Experimental Analysis Introduction, Uses of Experimental Stress Analysis. Advantages of Experimental Stress Analysis, Different Methods –Simplification of Problems.

UNIT: II   Strain Measurement Using Strain Gauges

Definition of Strain and Its Relation of Experimental Determinations Properties of Strain-Gauge Systems-Types of Strain Gauges –Mechanical, Acoustic and Optical Strain Gauges. Introduction To Electrical Strain Gauges - Inductance Strain Gauges – LVDT – Resistance Strain Gauges –

Various Types –Gauge Factor – Materials of Adhesion Base.

UNIT: III   Strain Rossettes and Non – Destructive Testing of Concrete

Introduction – The Three Elements Rectangular Rosette – The Delta Rosette Corrections for Transverse Strain Gauge. Ultrasonic Pulse Velocity Method –Application To Concrete. Hammer

Test – Application To Concrete.

UNIT: IV   Theory Of Photoelasticity

Introduction –Temporary Double Refraction – The Stress Optic Law –Effects of Stressed Model in A Polariscope for Various Arrangements – Fringe Sharpening. Brewster's Stress Optic Law.

UNIT: V   Two-Dimensional Photoelasticity

Introduction – Isochromatic Fringe Patterns- Isoclinic Fringe Patterns Passage of Light Through Plane Polariscope and Circular Polariscope Isoclinic Fringe Patterns – Compensation Techniques – Calibration Methods – Separation Methods – Scaling Model To Prototype Stresses – Materials for Photoelasticity- Properties of Photoelastic Materials.

Text Book(s)

1.   Experimental Stress Analysis by J.W.Dally and W.F.Riley, College House Enterprises

2   Experimental Stress Analysis by Dr.Sadhu Singh.Khanna Publishers

3   Abdul Mubeen, "Experimental Stress Analysis", DhanpatRai and Sons, 2001.

Reference Books

1   Experimental Stress Analysis by U.C.Jindal, Pearson Pubilications.

2   Experimental Stress Analysis by L.S.Srinath, MC.Graw Hill Company Publishers.

3   Moire Fringes in Strain Analysis, PS Theocaris, Pergammon Press, 2002.

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY (AUTONOMOUS)

M. Tech - II – Semester   (STRUCTURAL ENGINEERING)

(25BST14)   STABILITY OF STRUCTURES (PE-III)   L T P C

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Course Objectives:

This Course Will Enable Students:

1. Determine stability of columns and frames
2. Determine stability of beams and plates
3. Use stability criteria and concepts for analyzing discrete and continuous systems,
4. To form differential equations for plate buckling

Course Outcomes:

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

1. Apply the torisonal buckling and platesfor buckling concept
2. Apply the inelastic behaviour of materials and analyse the inelastic charecter of column
3. Analyse the frame structures
4. Analyse the plate structures

UNIT: I   Formulations Related To Beam Columns

Concept of Stability, Differential Equation for Beam Columns –Beam Column With Concentrated Loads –Continuous Lateral Load –Couples -Beam Column With Built in Ends –Continuous Beams With Axial Load –Application of Trignometric Series –Determination of Allowable Stresses.

UNIT: II   Elastic Buckling of Bars

Elastic Buckling of Straight Columns –Effect of Shear Stress on Buckling-Eccentrically and Laterally Loaded Columns –Energy Methods –Buckling of A Bar on Elastic Foundation, Buckling of A Bar With Intermediate Compressive Forces and Distributed Axial Loads –Buckling of Bars With Change in Cross Section –Effect of Shear Force on Critical Load – Built Up Columns

UNIT: III   Inelastic Buckling and Torsional Buckling

Buckling of Straight Bars-Double Modulus Theory – Tangent Modulus Theory. Pure Torsion of Thin Walled Bar of Open Cross Section-Non –Uniform Torsion of Thin Walled Bars of Open Cross Section-Torsional Buckling –Buckling Under Torsion and Flexure.

UNIT: IV   Mathematical Treatment of Stability Problems

Buckling Problem Orthogonality Relation –Ritz Method-Timoshenko Method, Galerkin Method

UNIT: V   Lateral Buckling of Simply Supported Beams and Rectangular Plates

Beams of Rectangular Cross Section Subjected for Pure Bending. Derivation of Equation of Rectangular Plate Subjected To Constant Compression in Two Directions and One Direction.

Text Book(s)

1.   Stability of Metalic Structure by Bleich –Mc Graw Hill

2   Theory of Beam Columns Vol I by Chen & Atsuta Mc.Graw Hill

3   Timoshenko, S., and Gere., Theory of Elastic Stability, Mc Graw Hill Book Company, 1973.

Reference Books

1   Elastic Stability of Structures, Smitses, Prentice Hall,1973.

2   Buckling of Bars Plates and Shells, Brush and Almorth., Mc Graw Hill Book Company, 1975

3   Principles of Structural Stability Theory, Chajes, A., Prentice Hall,1974

4   Stability Theory of Structures, Ashwini Kumar, TATA Mc Graw Hill Publishing Company Ltd, New Delhi,1985.

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY (AUTONOMOUS)

M. Tech - II – Semester　　　　(STRUCTURAL ENGINEERING)

(25BST15)　　　　**ADVANCED STEEL DESIGN (PE-IV)**　　　L　T　P　C

　　　　　　　　　　　　　　　　　　　　　　　　　　　　3　0　0　3

Course Objectives:

This Course Will Enable Students:

1. To understand the relation between structural analysis and design provisions
2. Design and analysis of girders under maximum load effects
3. Design and analysis of cold formed steels under stiffened and un stiffened conditions
4. Design and analysis of industry buildings

Course Outcomes:

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

1. Gain knowledge about plastic analysis of steel structures
2. Analyze and design of girders
3. Analyze and design of steel tanks and stacks
4. Analyze and design of industrial buildings
5. Analyze and design of light gauge steel structures

UNIT: I

Design of Self Supporting Steel Stacks/Chimneys – Considerations for Preliminary Design (Industrial Requirements – Thermal Requirement – Mechanical Force Requirement – Wind Load and Dead Load Estimation) – Detailed Estimation of Wind; Dead-And Other Accidental – Loads;

Analysis; Detailed Design Including Provision of Stakes /Spoilers – Design of Super Structure Only.

UNIT: II

Analysis of Multi-Storey Frames Using Approximate Methods and Substitute Frame Method: Cantilever Method & Portal Method

UNIT: III

Design of Gantry Girder – Introduction – Loads Acting on The Gantry Girder – Permissible Stresses

- Types of Gantry Girders and Crane Sails – Crane Data – Maximum Moments and Shears – Design Procedure (Restricted To Electrically Operated Cranes)

UNIT: IV

Theorems of Plastic Analysis, Applications To The Cases of Rectangular Portal Frames. Principles of Optimization in Structural Design – Application To Simple – Rectangular Portal Frame –

Minimum Weight Design.

UNIT: V   **9 hours**

General Methods of Plastic Design: Combining Mechanics Methods, Plastic Moment Redistribution Method; Application To Few Cases of Simple Two Storied Rectangular Portal Frames Including Estimation of Deflection.

Text Book(s)

1.   Plastic Analysis of Structures by B.G.Neal

2   Steel Skeleton V.I and II by Baker

3   Design of Steel Structures by Vazarani and Ratwani

Reference Books

1   Strength of Materials (Vol-II)) by Timoshenko.

2   Analysis of Steel Structure by Manohar.

3   Analysis of Steel Structure by Pinfold

4   Analysis of Steel Structure by Arya & Azmani

5   Analysis of Steel Structure by Relevant IS Codes.

6   Analysis of Steel Structure by Punmia, B.C.

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY (AUTONOMOUS)

M. Tech - II – Semester   (STRUCTURAL ENGINEERING)

(25BST16)   FRACTURE MECHANICS (PE-IV)   L   T   P   C

3   0   0   3

Course Objectives:

This Course Will Enable Students:

1. To design based on linear elastic fracture mechanics
2. To find out the variation of plastic zone over thickness of various elements
3. To know about the plane strain and plane stress in slip planes
4. To understand the fracture process of concrete and different materials

Course Outcomes:

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

1. Acquire basic skills in fracture mechanism of brittle materials
2. Apply fracture mechanics theory to calculate stress areas
3. Calculate the "energy release rate" around crack tips
4. Examine crack growth due to fatigue

UNIT: I   Summary of Basic Problems and Concepts:

Introduction - A Crack in A Structure - The Stress At A Crack Tip - The Griffith Criterion The

Crack Opening Displacement Criterion - Crack Propagation - Closure

UNIT: II   The Elastic Crack – Tip Stress Field :

The Airy Stress Function - Complex Stress Functions - Solution To Crack Problems - The Effect of Finite Size - Special Cases - Elliptical Cracks - Some Useful Expressions

UNIT: III   The Crack Tip Plastic Zone:

The Irwin Plastic Zone Correction - The Dugdale Approach - The Shape of The Plastic Zone - Plane Stress Versus Plane Strain - Plastic Constraint Factor - The Thickness Effect.

UNIT: IV   The Energy Principle:

The Energy Release Rate - The Criterion for Crack Growth - The Crack Resistance (R Curve) - Compliance , The J Integral (Definitions Only)- Plane Strain Fracture Toughness: The Standard Test - Size Requirements - Non-Linearity – Applicability – Plane Stress and Transitional Behaviour:

Introduction - An Engineering Concept of Plane Stress - The R Curve Concept

UNIT: V   The Crack Opening Displacement Criterion:

Fracture Beyond General Yield - The Crack Tip Opening Displacement - The Possible Use of The CTOD Criterion. Determination of Stress Intensity Factors: Introduction - Analytical and Numerical Methods - Finite Element Methods, Experimental Methods (An Ariel Views Only)

Text Book(s)

1. Elementary Engineering Fracture Mechanics - David Broek, Battelle, Columbus Laboratories, Columbus, Ohieo, USA

2. Fracture and Fatigue Control in Structures - John M.Barsom, Stanley T.Rolfe, Ross H.Forney

3. Rock and other Quasi-brittle materials - Surender P Shah , Stuart E Swartz,Wiley 1995.

Reference Books

1. Analysis of Concrete Structures by fracture mechanics, Elfgren L, Routledge,1990

2. Fracture Mechanics- Applications to concrete, Victor C.Li and Z P Bazant , ACI SP118

3. Fracture Mechanics , CT Suri and Zh jin , Elsevier Academic Press,2012

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY (AUTONOMOUS)

M. Tech - II – Semester   (STRUCTURAL ENGINEERING)

**(25BST17)   ADVANCED REINFORCED CONCRETE DESIGN (PE- L   T   P   C
IV)**

                                                                    3   0   0   3

Course Objectives:

This Course Will Enable Students:

1. To design of reinforced concrete beam
2. To design of reinforced concrete slab
3. To analyze and design of multi storey building and Industrial Building
4. To design special structures such as Deep beams,Corbels and Grid Floors

Course Outcomes:

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

1. Design the strength and serviceability of reinforced concrete elements
2. Design special reinforced concrete elements
3. Analyse and design of slabs and grid floor
4. Design the inelastic behaviour of concrete beams

UNIT: I   Deflection of Reinforced Concrete Beams and Slabs:

Deflection of Reinforced Concrete Beams and Slabs:

Introduction -Short-Term Deflection of Beams and Slabs -Deflection Due To -Imposed Loads - Short- Term Deflection of Beams Due To Applied Loads- Calculation of Deflection by IS 456 - Calculation of Deflection by BS 8110 - Deflection Calculation by Eurocode – ACI Simplified Method - Deflection of Continuous Beams by IS 456 - Deflection of Cantilevers - Deflection of

Slabs

UNIT: II Estimation of Crack Width in Reinforced Concrete Members and Design of Deep Beams:

Estimation of Crack Width in Reinforced Concrete Members and Design of Deep Beams:

Introduction - Factors Affecting Crack width in Beams - Mechanism of Flexural Cracking Calculation of Crack Widths - Simple Empirical Method - Estimation of Crack width in -Beams by IS 456 of BS 8110 - Shrinkage and Thermal Cracking.

Deep Beams:

Introduction - Minimum Thickness - Steps of Designing Deep Beams - Design by IS 456 - Design According To British Practice - ACI Procedure for Design of Deep Beams - Checking for Local Failures - Detailing of Deep Beams.

UNIT: III

Shear in Flat Slabs and Flat Plates:

Introduction - Checking for One-Way (Wide Beam) Shear - Two-Way (Punching) Shear Permissible Punching Shear - Shear Due To Unbalanced Moment (Torsional Moments) Calculation of J Values - Strengthening of Column Areas for Moment Transfer by Torsion Which Produces Shear - Shear Reinforcement Design - Effect of Openings in Flat Slabs - Recent Revisions in ACI 318 - Shear in Two – Way Slabs With Beams.

UNIT: IV

Design of Plain Concrete Walls and Shear Walls:

Introduction - Braced and Unbraced Walls - Slenderness of Walls- Eccentricities of Vertical Loads At Right Angles To Wall - Empirical Design Method for Plane Concrete Walls Carrying Axial Load

- Design of Walls for In-Plane Horizontal Forces - Rules for Detailing of Steel in Concrete Walls.
Design of Shear Walls:

Introduction - Classification of Shear Walls - Classification According To Behavior - Loads in Shear Walls - Design of Rectangular and Flanged Shear Walls - Derivation of Formula for Moment of Resistance of Rectangular Shear Walls

UNIT: V

Design of Reinforced Concrete Members for Fire Resistance :

Introduction - ISO 834 Standard Heating Conditions- Grading Or Classification - Effect of High Temperature on Steel and Concrete - Effect of High Temperatures on Different Types of Structural Members - Fire Resistance by Structural Detailing From Tabulated Data - Analystical Determination of The Ultimate Bending Moment Capacity of Reinforced Concrete Beams Under Fire - Other Considerations

Text Book(s)

1. Reinforced Concrete Structural Elements: Behaviour Analysis and Design, P.Purushothaman, Tata Mcgraw Hill.

2   Reinforced Concrete Desigers Hand Bood, C.E. Reynolds and J.C. Steedman, A View Point Publication.

3   Advanced Reinforced Concrete Design , Varghese PC, Prentice Hall of India,2008

Reference Books

1   Limit State Design of Reinforced Concrete Structures by P.Dayaratnam, Oxford & Ibh Publishers.

2   Advanced RCC by N.Krishna Raju, Cbs Publishers & Distributors.

3   Reinforced Cement Concrete Structures – Devdas Menon & Unnikrishna Pillai, Tata Mcgraw Hill

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY
(AUTONOMOUS)

M. Tech - II – Semester   (STRUCTURAL ENGINEERING)

(25BST18)   COMPUTER AIDED DESIGN LABORATORY   L   T   P   C

                                                                                                    0   0   4   2

Course Objectives:

This Course Will Enable Students:

1. To learn the software applications in structural engineering.
2. To learn the analysis of plane, space truss and frames subjected to different types of loadings.
3. To draw the detailing of RCC members and to learn the estimations.
4. To study the design concepts of steel members like truss, beams and columns.

Course Outcomes:

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

1. Understand the software usages for structural members.
2. Able to analyse plane, space frames and dynamic response and natural frequency for beams and frames.
3. Able to design, detailing and estimations of RC members.
4. Able to design the steel members like truss, beams and columns.

List of Experiments:

1. Analysis of Cantilever, Simply Supported Beam, Fixed Beams, Continuous Beams for Different Loading Conditions.
2. Design of R.C.C. Beams, Slabs, Foundations.
3. Design of Steel Tension Members
4. Reinforcement Detailing in Beam Using Graphics.
5. Reinforcement Detailing in Slabs Using Graphics.
6. Reinforcement Detailing in Foundation Using Graphics.

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY
(AUTONOMOUS)

M. Tech - II – Semester   **(STRUCTURAL ENGINEERING)**

(25BST19)   ADVANCED STRUCTURAL DESIGN LAB   L   T   P   C

                                                             0   0   4   2

Course Objectives:

This Course Will Enable Students:

1. To develop MATLAB codes for solution of simultaneous linear equations.
2. To construct codes for 1D Finite Element problems.
3. To identify methods to code for numerical integration techniques & statistical methods.
4. To model finite difference methods.

Course Outcomes:

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

1. Design and Detail all the Structural Components of Frame Buildings.
2. Design and Detail complete Multi-Storey Frame Buildings
3. design the frames using Excel sheets
4. Design the Shells and folded plates using ETABS

List of Experiments:

1. Static and Dynamic analysis of Building structure using software (ETABS / STAADPRO)
2. Design of RCC and Steel structure using software (ETABS / STAADPRO)
3. Analysis of folded plates and shells using software.
4. Preparation of EXCEL sheets for structural design.

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY (AUTONOMOUS)

M. Tech - III – Semester   (STRUCTURAL ENGINEERING)

**(25BST21)   EARTHQUAKE RESISTANT DESIGN of BUILDINGS   L   T   P   C
(PE-V)**

                                                    3   0   0   3

Course Objectives:

This Course Will Enable Students:

1. To understant effects of earthquakes on engineering structures and its measurement
2. To apply dynamics loadson various structures
3. To design buildings for earthquake loads as per IS Codes
4. To understand and implement the concept of ductility in Earthquake Resistant Design

Course Outcomes:

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

1. Illustrate the measurement of earthquakes and their effect on engineering structures
2. Analyse the free and forced vibration response of single degree and multi degree of freedom and continuous systems
3. Apply the basic principles of conceptual design of Earthquake Resistant buildings
4. Learn the various seismic control methods

UNIT: I   Engineering Seismology

Earthquake – Causes of Earthquake – Earthquakes and Seismic Waves – Scale and Intensity of Earthquakes – Seismic Activity – Measurements of Earth Quakes – Seismometer- Strong Motion Accelerograph / Field Observation of Ground Motion – Analysis of Earthquakes Waves – Earth

Quake Motion – Amplification of Characteristics of Surface Layers – Earthquake Motion on The Ground Surface

UNIT: II   Vibration of Structures Under Ground Motion:

Elastic Vibration of Simple Structures – Modelling of Structures and Equations of Motion – Free vibrations of Simple Structures – Steady State Forced Vibrations – Non Steady State Forced

Vibrations – Response Spectrum Representations; Relation Between The Nature of The Ground Motion and Structural Damage.

UNIT: III

Lateral Force Procedure Seismic Base Shear – Seismic Design Co-Efficient - Vertical Distribution of Seismic Forces and Horizontal Shear – Twisting Moment - Over Turning Moment – Vertical Seismic Load and Orthogonal Effects Lateral Deflection – P- Δ Characteristics Effect – Soil Structure Interaction. Seismic – Graphs Study, Earthquake Records for Design – Factors Affecting Accelerogram Characteristics - Artificial Accelerogram – Zoning Map. Dynamic – Analysis Procedure: Model Analysis – Inelastic – Time History Analysis Evaluation of the Results.

UNIT: IV   Earthquake – Resistant Design of Structural Components and Systems:

Introduction – Monolithic Reinforced – Concrete Structures – Precast Concrete Structures – Prestressed Concrete Structures – Steel Structures – Composite – Structures, Masonry Structures – Timber Structures.

UNIT: V

Fundamentals of Seismic Planning: Selection of Materials and Types of Construction Form of Superstructure – Framing Systems and Seismic Units – Devices for Reducing. Earthquake Loads.

Text Book(s)

1.   Design of Earthquake Resistant Structures by Minoru Wakabayashi.

2   Strucutural Dynamics for Earthquake Engineering”, A.K.Chopra,Pearson Pubilications.

3   Dynamics of Structures. R.W.Clough, Mc Graw – Hill, 2nd Edition,

Reference Books

1   Fundamentals of Earthquake Engineering,N.M Newmark and E.Rosenblueth,

2   Earthquake Design Practice for Buildings. David Key,” Thomas Telford,London,1988

3   Earthquake Engg; R.L. Wegel, Prentice Hall 12nd Edition 1989.

4   Design of Multi –Storied Buildings for Earthquake Ground Motions J.A. Blume, N.M. Newmark, L.H. Corning.,’, Portland Cement Association, Chicago,1961

5   I.S.Codes No. 1893,4326,13920.

6   Earthquake Resistant Design by Pankaj Agarwal.

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY (AUTONOMOUS)

M. Tech - III – Semester   (STRUCTURAL ENGINEERING)

(25BST22)   LOW COST HOUSING TECHNIQUES (PE- V)   L   T   P   C

3   0   0   3

Course Objectives:

This Course Will Enable Students:

1. To possess comprehensive knowledge of planning, design, evaluation, construction and financing of housing projects.
2. To focuses on cost effective construction materials and methods.
3. To understand on the principles of sustainable housing policies and programmes.
4. to adopt the suitable techniques in rural and disaster prone areas by using locally available materials.

Course Outcomes:

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

1. Development of construction technology and innovative techniques as tools to address demand mass construction
2. Knowledge of eco friendly material with their application
3. Learn the use of locally available material according to their availability and maintenance

UNIT: I

Housing Scenario

Introduction - Status of Urban Housing - Status of Rural Housing

Housing Finance:

Introducing - Existing Finance System in India - Government Role As Facilitator - Status At Rural Housing Finance - Impedimently in Housing Finance and Related Issues

Land Use and Physical Planning for Housing

Introduction - Planning of Urban Land - Urban Land Ceiling and Regulation Act - Efficiency of

Building Bye Lass - Residential Densities

Housing The Urban Poor

Introduction - Living Conditions in Slums - Approaches and Strategies for Housing Urban Poor

UNIT: II

Development and Adoption of Low Cost Housing Technology

Introduction - Adoption of Innovative Cost Effective Construction Techniques - Adoption of Precast Elements in Partial Prefatroices - Adopting of Total Prefactcation of Mass Housing in India- General Remarks on Pre Cast Rooting/Flooring Systems -Economical Wall System - Single Brick Thick Loading Bearing Wall - 19cm Thick Load Bearing Masonery Walls - Half Brick Thick Load Bearing Wall - Flyash Grypsym Thick for Masonry - Stone Block Masonery - Adoption of Precast R.C. Plank and Join System for Roof/Floor in The Building

UNIT: III

Alternative Building Materials for Low Cost Housing

Introduction - Substitute for Scarce Materials – Ferrocement - Gypsum Boards - Timber Substitutions - Industrial Wastes - Agricultural Wastes - Fitire Starateru; for ,P,Topm of Alternative Building Maintenance

Low Cost Infrastructure Services:

Introduce - Present Status - Technological Options - Low Cost Sanitation - Domestic Wall - Water Supply, Energy

UNIT: IV

Rural Housing:

Introduction Traditional Practice of Rural Housing Continuous - Mud Housing Technology

Mud Roofs - Characteristics of Mud - Fire Treatment for Thatch Roof - Soil Stabilization - Rural Housing Programs

UNIT: V

Housing in Disaster Prone Areas:

Introduction – Earthquake - Damages To Houses - Traditional Prone Areas - Type of Damages

and

Railways of Non-Engineered Buildings - Repair and Restore Action of Earthquake Damaged Non- Engineered Buildings Recommendations for Future Constructions. Requirement's of Structural Safety of Thin Precast Roofing Units Against Earthquake Forces, Status of R&D in Earthquake

Strengthening Measures - Floods, Cyclone, Future Safety

Text Book(s)

1.	Building Materials for Low –Income Houses – International Council for Building Research Studies and Documentation.

2	Hand Book of Low Cost Housing by A.K.Lal – Newage International Publishers.

3	Modern Trends in Housing in Developing Countries – A.G. Madhava Rao, D.S. Ramachandra Murthy & G.Annamalai.

Reference Books

1	Properties of Concrete – Neville A.M. Pitman Publishing Limited, London.

2	Light Weight Concrete, Academic Kiado, Rudhai.G – Publishing Home of Hungarian Academy of Sciences 1963.

3	Low Cost Housing – G.C. Mathur.

SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLOGY (AUTONOMOUS)

M. Tech - III – Semester   (STRUCTURAL ENGINEERING)

(25BST23)   BUILDING CONSTRUCTION MANAGEMENT (PE- V) L T P C

                                                      3 0 0 3

Course Objectives:

This Course Will Enable Students:

1. To create construction project cost estimates.
2. Analyze construction documents for planning and management of construction processes.
3. Understand the legal implications of contract, common, and regulatory law to manage a construction project.
4. Understand different methods of project delivery and the roles and responsibilities of all constituencies involved in the design and construction process.

Course Outcomes:

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

1. Plan, coordinate and control of a project from beginning to completion.
2. Adopting the most effect method for meeting the requirement in order to produce a functionally and financially viable project.
3. Implement different methods of project delivery
4. Follow the legal provisions implied

UNIT: I

Introduction – Types Constructions Public and Private Contract Management – Scrutinizing Tenders and Acceptance of Tenders, Contracted, Changes and Terminating of Contract – Subcontracts Construction Organizations – Organizational Chart-Decentralization Payrolls and Records – Organization Chart of A Construction Company.

UNIT: II

Construction Practices – Times Management – Bar Chart, CPM, PERT – Progress Report

UNIT: III

Resources Management and Inventor- Basic Concepts Equipment Management, Material Management Inventory Control.

UNIT: IV

Accounts Management – Basic Concepts, Accounting System and Book Keeping, Depreciation, Balance Sheet, Profit and Loss Account, Internal Auditing. Quality Control by Statistical Methods, Sampling Plan and Control Charts, Safety Requirements.

UNIT: V

Cost and Financial Management – Cost Volume Relationship, Cost Control System, Budget Concept of Valuation, Cost of Equity Capital Management Cash. Labor and Industrial; Laws – Payment of Wages Act. Contract Labor, Workmen's Compensation, Insurance, Industrial Disputes Act.

Text Book(s)

1. Construction Project Management by Jha ,Pearson Pubilications,New Delhi.

2 Construction Technology by Subir K.Sarkar and Subhajit Saraswati – Oxford Higher Education- Univ.Press, Delhi.

Reference Books

1 Project Planning and Control With PERT and CPM by Dr.B.C.Punmia, K.K.Khandelwal, Lakshmi Publications New Delhi.

2 Optimal Design of Water Distribution Networks P.R.Bhave, Narosa Publishing House 2003.

3 Total Project Management, The Indian Context- by : P.K.JOY- Mac Millan Publishers India Limited.

SRI VENKATESWARA COLLEGE OF ENGINEERING &TECHNOLOGY
(AUTONOMOUS)
(STRUCTURAL ENGINEERING)

M.Tech – II-Semester

AUDIT COURSE-II

L	T	P	C
2	0	0	0

(25BMB03)   **PEDAGOGY STUDIES**

Course Objectives: This course will enable students:

•   Review existing evidence on there viewpoint making undertaken by the DfID, other agencies and researchers.

•   Identify critical evidence gaps to guide the development.

Course Outcomes (CO): Students will be able to

Students will be able to understand:

•   What pedagogical practices are being used by teachers in informal and formal classrooms in developing countries?

•   What is the evidence on the effectiveness of these pedagogical practices, in what conditions, and with what population of learners?

•   How can teacher education (curriculum and practicum) and the school curriculum and guidance materials best support effective pedagogy?

UNIT - I

Introduction and Methodology: Aims and rationale, Policy background, Conceptual framework and terminology, Theories of learning, Curriculum, Teacher education. Conceptual Framework, Research questions. Overview of methodology and searching.

UNIT - II

Thematic overview: Pedagogical practices are being used by teachers in formal and informal classrooms in developing countries, Curriculum, and Teacher education.

UNIT - III

Evidence on the effectiveness of pedagogical practices, Methodology for the in-depth stage: quality assessment of included studies. How can teacher education (curriculum and practicum) and the school curriculum and guidance materials best support effective pedagogy? Theory of change. Strength and nature of the body of evidence for effective pedagogical practices. Pedagogic theory and pedagogical approaches. Teachers' attitudes and beliefs and Pedagogic strategies.

UNIT - IV

Professional development: alignment with classroom practices and follow-up support, Peer support, Support from the head teacher and the community.Curriculum and assessment, Barriers to learning: limited resources and large class

sizes

UNIT - V

Research gaps and future directions: Research design, Contexts, Pedagogy, Teacher education, Curriculum and assessment, Dissemination and research impact.

Suggested Reading

1.   AckersJ,HardmanF(2001)ClassroominteractioninKenyanprimaryschools,Compare, 31 (2): 245-261.

2.   AgrawalM(2004)Curricularreforminschools:Theimportanceofevaluation,Journalof

3.   Curriculum Studies, 36 (3): 361-379.

4.   Akyeampong K (2003) Teacher training in Ghana - does it count? Multi-site teacher education research project (MUSTER) country report 1. London: DFID.

5.   Akyeampong K, LussierK, Pryor J, Westbrook J (2013)Improving teaching and learning of basic maths and reading in Africa: Does teacher preparation count?International Journal of Educational Development, 33 (3): 272–282.

6.   Alexander, RJ(2001). Culture and pedagogy: International comparisons in primary education. Oxford and Boston: Blackwell.
    Chavan M (2003)ReadIndia: A mass scale, rapid, 'learning to read'campaign.

7.   www.pratham.org/images/resource%20working%20paper%202.pdf.

SRI VENKATESWARA COLLEGE OF ENGINEERING &TECHNOLOGY (AUTONOMOUS)
(STRUCTURAL ENGINEERING)

M.Tech – II-Semester

L T P C
2 0 0 0

(25BHS03)   **STRESS MANAGEMENT BY YOGA**

Course Objectives: This course will enable students:

•   To achieve overall health of body and mind

•   To overcome stress

Course Outcomes (CO): Student will be able to

•   Develop healthy mind in a healthy body thus improving social health also

•   Improve efficiency

UNIT - I

Definitions of Eight parts of yoga.(Ashtanga)

UNIT - II

Yam and Niyam.

UNIT - III

Do`s and Don't sin life.

i) Ahinsa,satya,astheya,bramhacharya and aparigrahaii)

Shaucha,santosh,tapa,swadhyay,ishwarpranidhan

UNIT - IV

Asan and Pranayam

UNIT - V

i) Various yoga poses and their benefits for mind &body ii) Regularization of breathing techniques

and its effects-Types of pranayam

Suggested Reading

1.'Yogic Asanas for Group Training-Part I": Janardan SwamiYogabhyasiMandal, Nagpur

2."Rajayoga or conquering the Internal Nature" by Swami Vivekananda, Advaita Ashrama

(Publication Department), Kolkata

SRI VENKATESWARA COLLEGE OF ENGINEERING &TECHNOLOGY (AUTONOMOUS)
(STRUCTURAL ENGINEERING)

M.Tech – II-Semester

L	T	P	C
2	0	0	0

(25BHS05)   PERSONALITY DEVELOPMENT THROUGHLIFE ENLIGHTENMENT SKILLS

Course Objectives: This course will enable students:

• To learn to achieve the highest goal happily

• To become a person with stable mind, pleasing personality and determination

• To awaken wisdom in students

Course Outcomes (CO): Students will be able to

• Shrimad-Bhagwad-Geetawillhelpthestudentindevelopinghispersonalityand achieve the highest goal in life

• The person who has studied Geetawilllead the nation and mankind to peace and prosperity

• Study of Neetishatakam will help in developing a versatile personality of students

UNIT - I

Neetisatakam- Holistic development of personality Verses-19,20,21,22(wisdom)

Verses-29,31,32(pride &heroism)

Verses-26,28,63,65(virtue)

UNIT - II

Neetisatakam- Holistic development of personality Verses-52,53,59(don'ts)

Verses-71,73,75,78(do's)

UNIT - III

Approach to day to day work and duties.

ShrimadBhagwadGeeta: Chapter2-Verses41,47,48, Chapter3-Verses13,21,27,35,Chapter6-Verses5,13,17,23,35, Chapter18-Verses45,46,48.

UNIT - IV

Statements of basic knowledge.

Shrimad Bhagwad Geeta: Chapter2-Verses 56,62,68 Chapter12 -Verses13,14,15,16,17,18

Personality of Role Model. Shrimad Bhagwad Geeta:

UNIT - V

Chapter2-Verses 17,Chapter3-Verses36,37,42, Chapter4-Verses18,38,39

Chapter18– Verses37,38,63

Suggested Reading

1.   "SrimadBhagavadGita"bySwamiSwarupanandaAdvaitaAshram(PublicationDepartment), Kolkata

2.   Bhartrihari's Three Satakam (Niti-sringar-vairagya) by P.Gopinath, Rashtriya Sanskrit Sansthanam, New Delhi.

SRI VENKATESWARA COLLEGE OF ENGINEERING &TECHNOLOGY (AUTONOMOUS)
(STRUCTURAL ENGINEERING)

M.Tech – III-Semester

L	T	P	C
3	0	0	3

(25BMB02)   COST MANAGEMENT OF ENGINEERING PROJECTS

Course Objectives:

• To explain cost concepts and objectives of costing system and cost management process

• To provide knowledge and explain Cost behaviour in relation to Volume and Profit and pricing decisions.

• To know the concepts of target costing, life cycle costing and activity based cost management in a project or business.

• To discuss on budget and budgetary control , type of budgets in a business to control costs

• To provide knowledge on project, types of projects, stages of project execution, types of project contracts and project cost control.

Course Outcomes (CO): Student will be able to

• Know the cost management process and types of costs

• Learn and apply different costing methods under different project contracts

• To understand relationship of Cost-Volume and Profit and pricing decisions.

• Prepare budgets and measurement of divisional performance.

• Acquires knowledge on various types of project contracts, stages to execute projects and controlling project cost..

UNIT - I

Introduction and Overview of the Strategic Cost Management Process - Cost concepts in decision-making; Relevant cost, Differential cost, Incremental cost and Opportunity cost. Objectives of a Costing System; Inventory valuation; Creation of a Database for operational control; Provision of data for Decision-Making.

UNIT - II

Cost Behavior and Profit Planning: Marginal Costing- Distinction between Marginal Costing and Absorption Costing; Break-even Analysis, Cost-Volume-Profit Analysis. Various decision-making problems; Pareto Analysis Just-in-time approach, Theory of constraints.; Divisional performance management: - Measurement of Divisional profitability - pricing decisions - transfer pricing.

UNIT - III

Target costing- Life Cycle Costing - Activity-Based Cost management:- Activity based costing-Value-Chain Analysis- Bench Marking; Balanced Score Card.

UNIT - IV

Budgetary Control; Flexible Budgets; Performance budgets; Zero-based budgets. Measurement of Divisional profitability pricing decisions including transfer pricing.

UNIT - V

Project: meaning, Different types, why to manage, cost overruns centres, various stages of project execution: conception to commissioning. Project execution as conglomeration of technical and non-technical activities. Detailed Engineering activities. Pre project execution main clearances and documents Project team: Role of each member. Importance Project site: Data required with significance. Project contracts. Types and contents. Project execution Project cost control. Bar charts and Network diagram. Project commissioning: mechanical and process.

Textbooks:

1.   Robert S Kaplan Anthony A. Alkinson, Management & Cost Accounting

2.   Ashish K. Bhattacharya, Principles & Practices of Cost Accounting A. H. Wheeler publisher

Reference Books:

1.   Cost Accounting A Managerial Emphasis, Prentice Hall of India, New Delhi

2.   Charles T. Horngren and George Foster, Advanced Management Accounting

3.   N.D. Vohra, Quantitative Techniques in Management, Tata McGraw Hill Book Co. Ltd

Online Learning Resources:

https://nptel.ac.in/courses/105/104/105104161/

https://nptel.ac.in/courses/112/102/112102106/

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M.Tech – III-Semester

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3	0	0	3

(25BCM27) **INDUSTRIAL SAFETY**

Course Objectives:

•   To know about Industrial safety programs and toxicology, Industrial laws , regulations and source models

•   To understand about fire and explosion, preventive methods, relief and its sizing methods

•   To analyse industrial hazards and its risk assessment.

Course Outcomes (CO): Student will be able to

•   To list out important legislations related to health, Safety and Environment.

•   To list out requirements mentioned in factories act for the prevention of accidents.

•   To understand the health and welfare provisions given in factories act.

UNIT - I

Industrial safety: Accident, causes, types, results and control, mechanical and electrical hazards, types, causes and preventive steps/procedure, describe salient points of factories act 1948 for health and safety, wash rooms, drinking water layouts, light, cleanliness, fire, guarding, pressure vessels, etc, Safety color codes. Fire prevention and firefighting, equipment and methods.

UNIT - II

Fundamentals of maintenance engineering: Definition and aim of maintenance engineering, Primary and secondary functions and responsibility of the maintenance department, Types of maintenance, Types and applications of tools used for maintenance, Maintenance cost & its relation with replacement economy, Service

life of equipment.

UNIT - III

Wear and Corrosion and their prevention: Wear- types, causes, effects, wear reduction methods, lubricants- types and applications, Lubrication methods, general sketch, working and applications, i. Screw down grease cup, ii. Pressure grease gun, iii. Splash lubrication, iv. Gravity lubrication, v. Wick feed lubrication vi. Side feed lubrication, vii. Ring lubrication, Definition, principle and factors affecting the corrosion. Types of corrosion, corrosion prevention methods.

UNIT - IV

Fault tracing: Fault tracing-concept and importance, decision tree concept, need and applications, sequence of fault finding activities, show as decision tree, draw decision tree for problems in machine tools, hydraulic, pneumatic, automotive, thermal and electrical equipment's like, I. Any one machine tool, ii. Pump iii. Air compressor, iv. Internal combustion engine, v. Boiler, vi. Electrical motors, Types of faults in machine tools

and their general causes.

UNIT - V

Periodic and preventive maintenance: Periodic inspection-concept and need, degreasing, cleaning and repairing schemes, overhauling of mechanical components, overhauling of electrical motor, common troubles and remedies of electric motor, repair complexities and its use, definition, need, steps and advantages of preventive maintenance. Steps/procedure for periodic and preventive maintenance of: I. Machine tools, ii. Pumps, iii. Air compressors, iv. Diesel generating (DG) sets, Program and schedule of preventive maintenance of mechanical

and electrical equipment, advantages of preventive maintenance. Repair cycle concept and importance

Textbooks:

1.   Maintenance Engineering Handbook, Higgins & Morrow, Da Information Services.

2.   Maintenance Engineering, H. P. Garg, S. Chand and Company.

Reference Books:

1.   Pump-hydraulic Compressors, Audels, Mcgrew Hill Publication.

2.   Foundation Engineering Handbook, Winterkorn, Hans, Chapman & Hall London.

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M.Tech.   **(STRUCTURAL ENGINEERING)**

M.Tech – III-Semester

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(25BMB04)   **BUSINESS ANALYTICS**

Course Objectives:

•   The main objective of this course is to give the student a comprehensive understanding of business analytics methods.

Course Outcomes (CO): Student will be able to

•   Students will demonstrate knowledge of data analytics.

•   Students will demonstrate the ability of think critically in making decisions based on data and deep analytics.

•   Students will demonstrate the ability to use technical skills in predicative and prescriptive modeling to support business decision-making.

•   Students will demonstrate the ability to translate data into clear, actionable insights.

UNIT - I

Business Analysis: Overview of Business Analysis, Overview of Requirements, Role of the Business Analyst. Stakeholders: the project team, management, and the front line, Handling Stakeholder Conflicts.

UNIT - II

Life Cycles: Systems Development Life Cycles, Project Life Cycles, Product Life Cycles, Requirement Life Cycles.

UNIT - III

Forming Requirements: Overview of Requirements, Attributes of Good Requirements, Types of Requirements, Requirement Sources, Gathering Requirements from Stakeholders, Common Requirements Documents. Transforming Requirements: Stakeholder Needs Analysis, Decomposition Analysis, Additive/Subtractive Analysis, Gap Analysis, Notations (UML & BPMN), Flowcharts, Swim Lane Flowcharts, Entity-Relationship Diagrams, State-Transition Diagrams, Data Flow Diagrams, Use Case Modeling, Business Process Modeling

UNIT - IV

Finalizing Requirements: Presenting Requirements, Socializing Requirements and Gaining Acceptance, Prioritizing Requirements. Managing Requirements Assets: Change Control, Requirements Tools

UNIT - V

Recent Trands in: Embedded and colleborative business intelligence, Visual data recovery, Data Storytelling and Data Journalism.

Textbooks:

1.   Business Analysis by James Cadle et al.

2.   Project Management: The Managerial Process by Erik Larson and, Clifford Gray

Reference Books:

1.   Business analytics Principles, Concepts, and Applications by Marc J. Schniederjans, Dara G. Schniederjans, Christopher M. Starkey, Pearson FT Press.

2.   Business Analytics by James Evans, persons Education.