MARRI LAXMAN REDDY
INSTITUTE OF TECHNOLOGY AND MANAGEMENT
(AN AUTONOMOUS INSTITUTION)
(Approved by AICTE, New Delhi & Affiliated to JNTUH, Hyderabad)
Accredited by NBA and NAAC with 'A' Grade & Recognized Under Section2(f) & 12(B)of the UGC act,1956

Department of Civil Engineering

STUDENT HANDBOOK

R20 - II B.Tech I & II Semester

Student Name :……

Register No :……

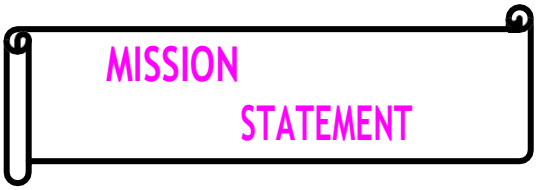
Class :……..

Department :……

Academic Year:……...

VISION STATEMENT OF MLRITM

To establish as an ideal academic institutions in the service of the nation, the world and the humanity by graduating talented engineers to be ethically strong, globally competent by conducting high quality research, developing breakthrough technologies, and disseminating and preserving technical knowledge.



MISSION STATEMENT OF MLRITM

MLR Institute of Technology and Management is committed to providing a positive, professional and conducive learning environment where all students are inspired to achieve their potential and strive for excellence in a global society as dignified professionals with the cooperation of all stakeholders.

GOALS OF MLRITM

Goals of engineering education at undergraduate / graduate level:

- Contemporary and rigorous educational experiences that develop the engineers and managers;
- An atmosphere that facilitates personal commitment to the educational success of students in an environment that values diversity and community;
- Prudent and accountable resource management;
- Undergraduate programs that integrate global awareness, communication skills and team building;
- Leadership and service to meet society's needs;
- Education and research partnerships with colleges, universities, and industries to graduate education and training that prepares students for interdisciplinary engineering research and advanced problem solving abilities;
- Highly successful alumni who contribute to the profession in the global society.

Our Pioneers...

MARRI LAXMAN REDDY – CHAIRMAN

Sri **Marri Laxman Reddy**, the Founder Chairman of MLR Institutions – MLR Institute of Technology, MLR Institute of Pharmacy and Marri Laxman Reddy Institute of Technology and Management.

He is also Founder Chairman of St. Martin's Engineering College and St. Martins Schools at Balanagar, Chintal (HMT) and Malkajgiri who has been in the field of education from last 22 years with the aim spreading quality education among children at the school and college level. He is a veteran Athlete International repute.

MARRI MAMATHA REDDY – TREASURER

Mrs. **Marri Mamatha Reddy**, a person with remarkable abilities and great acumen and a dynamic leader. She is known to be the dynamic mentor of MLR Institute of Technology and Management who is always on the sprit to take the institute to newer levels in every aspect of an "Ideal Institution" and strives hard to make every dream a reality.

The treasurer has a vision of establishing MLR Institute of Technology and Management as a brand. She is striving hard to initiate various industry oriented programs for the benefit of the students and he envisions her student to be present at the top most position in the industry**.**

Dr. K. VENKATESWARA REDDY – PRINCIPAL

Dr.K.Venkateswara Reddy, M.Tech., Ph.D., MISTE, the Principal, Marri Laxman Reddy Institute of Technology& Managemnt, is a young and dynamic Professor of CSE, has 15 years of Teaching, Research and Administrative experience in reputed engineering colleges & industry. In 15 years of experience served various positions from Asst. Professor to Principal. He received "The Great Mind Challenge - 2013, TGMC Mentor Award".

Dr.K.V.Reddy contributed immensely for the growth of institutes by introducing the disciplinary innovative in the life style of under graduate engineering students. He has established Institute-Industry Interaction and Research & Development cells in the institute.

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Dundigal, Quthbullapur Mandal, R.R. Dist.- 500 043.
Ph: 08418 – 204066, 204088, 9866755166

1. GENERAL INFORMATION

ABOUT THE COLLEGE

The college is situated at Dundigal village, which is located at 11km away from Jawaharlal Nehru Technological University Hyderabad, KPHB Colony Hyderabad. The college started functioning during the academic year 2009-2010, after due recognition from AICTE. This college is affiliated to the prestigious JNT University Hyderabad. MLRITM got the Autonomous status in the academic year 2019-20 by the University Grants Commission (UGC). Though started 10 years back, the college is making biggest strides and marching ahead very confidently for excellent outputs in their future endeavors. At present the college is offering 10 UG courses and 4 PG programmes. The total strength of the college is more than 3000.

1.1 BEAUTIFUL CAMPUS:

Set in Sylvan surroundings away from the hustle & bustle of city life yet only 4 km away from Mahindra Satyam Technology Park on Balanagar – Narsapur state highway, the Institute is extremely conducive to academic, co-curricular and extra-curricular activities. It has large and well ventilated buildings with modern equipment in place and "State of the art", sports facilities.

HIGHLIGHTS:

1.2 PERFORMANCE

The college has been AA rated under colleges in AP by Careers360 magazine. Also, the college has been ranked at 126 by the week magazine in the Best colleges Survey-2013.

1.3 FACULTY:

The College is proud to have the best faculty, a blend of experienced and academics with eminent academicians team from IIT's, NIT's and other reputed universities and organizations teaching at the Institute that makes MLRITM as one of the best Autonomous Institute to pursue B.Tech, M.Tech, and MBA courses affiliated to JNTU Hyderabad. The faculty is constantly encouraged to upgrade their skills & qualifications and most of them have enrolled their Ph.D. Most of the faculty members have been empowered with High Impact teaching under Wipro Mission 10X program.

1.4 INFRASTRUCTURE:

The Institute is housed in a RCC Building with a built up area of Three Lakh Sft in 5.2 Acres and have centralized air conditioning Auditorium, Seminar Halls and a Central Library. A good canteen caters hygienic food and a fleet of buses running from all important points to bring the students to the college. Accessibility of HDFC Bank ATM within the Campus is to enable students and faculty to withdraw cash at anytime.

1.5 LABORATORIES:

The Institute has State of the art laboratories with 1000 plus Branded Systems equipped with latest hardware and software with online testing facility catering to the needs of CSE, IT, DS, CS, CSIT. The Institute also has well equipped Electronic Labs, Civil Engineering Labs and Workshops for ECE, Mechanical and Civil Engineering Students.

1.6 CAT Centre:

The Institute is an Authorized IIM Cat Centre, which will conduct tests all through the year as per the IIM schedule.

1.7 COMMUNICATION SKILLS LABORATORY:

The Institute has established Ultramodern Computerized English language laboratory with 60 plus Computer Systems loaded with latest Software to enhance the Soft skills of Students to make the Students Industry ready.

The Library also have the previous University Exam Question papers and previous project reports from all the departments. The library contains recorded lectures of all IIT professors from NPTEL.

1.8 R&D CELL:

The Institute has an R&D Cell under the guidance of Dr.G.Narsinga Rao. The R&D cell undertakes externally funded R&D projects from agencies like AICTE, DST, UGC and other similar state, private and society/trust bodies. It also undertakes research publications and interactions of faculty members with outside world.

1.9 LIBRARY:

The Institute Library has over 26427 books and 120 National and International journals that are required to all branches of Engineering. The Institute has the unique distinction of becoming Member of DELNET that connects more than 700 libraries in Asia Pacific Region. The Library has 20 Computers with 10 MBPS, Internet Facility that makes our knowledge Savvy Students to be technically competent on par with Industry professionals.

1.10 NATIONAL PROGRAMME ON TECHNOLOGY ENHANCED LEARNING (NPTEL):

The main objective of NPTEL program is to enhance the quality of engineering education in the country by developing curriculum based video and web courses. This is being carried out by seven IITs and IISc Bangalore as a collaborative project. In the first phase of the project, supplementary content for 129 web courses in engineering / science and humanities have been developed. Each course contains materials that can be covered in depth in 60 or more lecture hours. In addition, 110 courses have been developed in video format, with each course comprising of approximately 60 or more one-hour lectures. In the next phase other premier institutions are also likely to participate in content creation.

1.11 CO-CURRICULAR ACTIVITIES:

The Institution organizes Local Industrial Visits to Organizations like DOORDARSHAN, BSNL, and to Student Conferences like Valourous, Student Conference at INFOSYS, Gachibowli Campus, and Government Sponsored Summits like INDO SOFT IT Summit at Hitech City Convention Centre to Interface with the Industry for Career Planning and to make them Industry Ready. The Institute focuses on Techno Management Events like Technonium and Zavtra to enhance the Technical Skills and Soft Skills to make them Employable.

1.12 PROFESSIONAL BODIES:

MLRITM have the unique distinction of becoming Institutional Member in professional bodies such as ACCE, MISTE and ACI.

1.13 EXTRA-CURRICULAR ACTIVITIES:

The Institute helps the B.Tech, M.Tech and MBA Students to imbibe Culture, Knowledge and Sportsman Spirit during their Study Period.

The Institution has a Basketball Court, Volley ball Court, Beach Volley ball Court, Cricket Stadium with 400 meter, Excellent track for Athletic Meet and Indoor Stadium for Shuttle Badminton and Gymnasium. MLRITM has been regularly conducting JNTU Zonal Games Football, Cricket, and State level Volleyball Tournaments. The Institute has been awarded as the best organiser for conducting JNTU Zone A Intercollegiate Tournaments by JNTUH. MLRITM is affiliated to Hyderabad Cricket Association (HCA) to play league Cricket Matches. The college has conducted 5K RUN in 2008-09 and south zone Cricket Tournament in 2009-10.The college has been conducting JNTU-H Cricket Tournament I 2010-11.

The Institute also organizes events like Traditional Day, Annual Day, Fashion Shows, Rockshows and other Cultural Events. MLR Institutions has been conducting Traditional Day every year. The purpose of Celebrating traditional day is basically to imbibe a spirit of Oneness, where the First year Students who have joined the Institute shed their Inhibitions, play and dine together with their seniors and recollect the old traditions & glory of the Past.

Apart from that the traditional day is being celebrated with a purpose of removing fear and as a measure of Anti-Ragging activity.

The college has a National Service Scheme (NSS) unit, which conducts a number of programmes viz blood donation camp, tree plantation, community services in the adjoining villages, flood relief, etc.

1.14 IN HOUSE PROJECTS:

The students are taking part in International Project competitions hosted by major MNCs, like IBM, Microsoft and Infosys. The Great Mind Challenge hosted by IBM, Microsoft Imagine Cup and project work as part of foundation programme conducted under the aegis of Infosys are some of the important projects presently being undertaken by the students of MLRITM. Further, the students are encouraged to do In House Projects under the supervision of expect faculty members. In addition, students are encouraged to give innovative ideas and do projects under the aegis of Microsoft academic innovative alliance.

1.15 MEMORANDOM OF UNDERSTANDING:

The Institute has MOUs for student and faculty enhancement programmes with Multi National Companies like

- **IBM -** IBM has established "Center of Excellence" in MLRITM
- **Sun Microsystem Systems -** Student Development Programmes and Certificates
- **Oracle -** Faculty and Student Development Programmes
- **WIPRO: Mission – 10X Programme -** Faculty impact teaching programme
- **CA Labs -** Student and Faculty enablement Programme
- **Infotech -** To enhance the quality of educational experience for student community
- **Mahindra -** Industry Oriented course ware and Technology
- **Institute of Electronic Governance -** Faculty Enablement Programme on "Soft Skills, Technical Skills, Reasoning and Aptitude and Basic Computer Skills".
- **Indo – US Collaboration for Engineering Education -** Faculty Development Programme sponsored by Infosys
- **Microsoft IT Academy -** Student and Faculty enablement programme
- **Microsoft -** Academic Innovative Alliance
- **Infosys -** Foundation Programme for students
- **IIIT, Gachibowli, Hyderabad -** Certification in Information Technology (CIT) for students
- **SAM Technologies -** In house projects in Robotics and Embedded System

1.16 CONTACT INFORMATION:

S. No.	Name	Designation	Contact Number
1	Dr. K. Venkateswara Reddy	Prinicipal	040-29556182
2	Dr. B. Ravi Prasad	Dean - Academics	9849356732
3	Mr.K.Nagabhushan	Controller of Examinations	9985795785
4	Mr. D Pavan Kumar	Admin Officer	9866755144
5	Dr. Srinivas Bachu	HOD (E.C.E)	9912712798
6	Dr. Vinod	HOD (E.E.E)	9951166558
7	Dr. K. Abdul Basith	HOD (C.S.E)	9160400041
8	Dr. Nagalakshmi	HOD (IT)	7036089991
9	Dr.M.Saravanan	HOD (CIVIL)	9160404645
10	Dr. K.Ashok	HOD (H&S)	9160404647
11	Dr.G.Surya Prakash	HOD (MECH)	9490217919
12	Dr. Veeraiah	HOD (MBA)	9160404643
13	Dr S Pratap Singh	Website	9527366149
14	Mr. M.Srinivas Reddy	Library	9849924036
15	Mr. G.B.N Saroj	Transport	9160401744
16	Mr Sumanth	Training and Placement Officer	9849568827
17	Mr D Pavan Kumar	Public Information Officer	9866755144

2. PLACEMENT & HIGHER STUDIES

Marri Laxman Reddy Institute of Technology and Management has a unique distinction of placing their First Batch of B.Tech Students in their prefinal year of Study and MBA Students in Multi National Companies. The Institute has so far interacted with more than 72 Companies and 746 Selections from B.Tech and MBA Programmes have taken Place.

In this direction Apart from the Placements the Institute has arranged Summer Internship Programmes with Companies like Computer Amociates, Mind Tree, M/s Infotech Enterprises Ltd, Mahindra Finance, Max New York Life Insurance, Nokia Ltd, Mahindra Finance, Bajaj Capital Ltd, Reliance Money and Tata AIG for Engineering and MBA Students to develop Mentor Relationships and to get to know about the Work Culture and gain Competencies to make them Industry Ready during their Study period.

The Institute has arranged Campus Recruitment drives Infosys, Mind Tree Ltd, Oracle, ADP, Mahindra Satyam, Infotech Enterprises Ltd, Keane India Ltd (NTT), IBM Technologies Pvt Ltd, Tata Advanced Systems, IBM, Syntel Inc, Tech-Synergy Pvt Ltd, Adithya Software Solutions, HDFC Bank Ltd, Medha Servo drives. NR Radio & Switches Pvt.Ltd. OsiTechnologies Ltd, Genpact, Reliance Money, Nagarjuna Caments Ltd & Oasis Software Informatics, Shoppers Shop, Trident Micro Systems India, SnapDeal.com, India Mart Ltd, Power Tech, Suchir India, Quartz Infra and Engineering Pvt Ltd, Gobrah Technologies Pvt Ltd, Elbit Diagnostics, Eprism Solutions, Geo Meme Strategic Consulting, India Info Line, Water Shed project of Govt of AP, Ocean Ship Maritime etc.

The CSE students visited Infosys Infosys for the SPARK Programme which is an orientation programme on Information Technology Space.

2.1 Industry Grade Skills required for Employment

Behavioral and Communication Skills are recognized as important elements in professional development of an Engineer including English for specific purposes. Employers give considerable value to these diverse set of skills at the time of interviews.

In addition to course curriculum, every student will gain the following skills during the study period:

- Analytical and Problem solving skills
- Subject – specific knowledge
- Research and improved decision making abilities
- Oral communication skills
- Managerial skills
- Understanding of other cultures
- Confidence and competence to work in International environment

As students are the future leaders, the Responsibility, Accountability and exhibiting the leadership skills should start from the first year of engineering. Every student is advised to read / practice from the following books;

- Verbal and Nonverbal by RS Agarwal

- Baron GRE
- Wren and Martin English Grammer Book

2.2 Important criteria of Employment

In addition to the industry grade skills required for employment, the most important criteria for employment is that the student should get a minimum of 60% in academics with no backlogs to make them eligible for campus recruitments. In the recent past, many companies stipulated a cut of 68% for attending the interview / writing the test. Every student should Endeavour to achieve a minimum of 68% with no backlogs to make them suitable for picking up by good companies.

Job Portals:

1. www.freshersworld.com
2. www.monster.com
3. www.naukri.com

2.3 Higher Studies

M.Tech

The Graduate Aptitude Test in Engineering (GATE) is an all-India examination administered and conducted in eight zones across the country by the GATE Committee comprising faculty from Indian Institute of Science, Bangalore and 23 Indian Institutes of Technology on behalf of the National Coordinating Board - GATE, Department of Education, Ministry of Human Resources Development (MHRD), and Government of India.

Objective

To identify meritorious and motivated candidates for admission to Post Graduate Programmes in Engineering, Technology, Architecture and Pharmacy at the National level. To serve as benchmark for normalization of the Undergraduate Engineering Education in the country.

This provides an opportunity for advanced engineering education in India. An M.E or M.Tech degree is a desirable qualification for our young engineers seeking a rewarding professional career. Engineering students, while in the final year of their degree course, spend considerable time in seeking an opening for studies in foreign universities.

The students are advised to pursue M.Tech in IIT's/NIT's/University Colleges.

MBA

Earning a Master's of Business Administration (MBA) degree can provide you with management skills and business expertise that open new career opportunities to you. An MBA program will also launch you into the much higher pay range that upper level managers and executives enjoy. Furthermore, in the high-level positions, an MBA degree will allow you to hold and your work will often be more interesting and rewarding.

The students are advised to pursue M.BA in IIM's/XLRI/Reputed Business Schools.

Higher Studies Abroad

TOEFL is mandatory for seeking admission in any academic course at any level-undergraduate, graduate or post graduate, in USA and Canada. Similarly UK Universities ask for IELTS for seeking admission to graduate and past graduate courses.

GRE The Graduate Record Examination (GRE) is administered by the Educational Testing Services (ETS) for admission into all graduate academic programs (except management) in universities across USA and Canada and some selected universities across the world including India. The exam is a Computer Adaptive Test and is administered at any of the Sylvan testing centers in the country after prior registration.

The GMAT is a Computer Adaptive Test administered online by Educational Testing Services (ETS) through Sylvan testing centers located in all the major cities in India. Those who wish to enroll for courses in Business Management in American universities have to take the GMAT test and submit their scores to the department.

2.4 Various Scholarships Available In India

Bharat Petroleum Scholarship For Higher Studies | Balarama Digest Scholarship | Central Institute of Indian Languages | Fair & Lovely Foundation - Project Saraswati Scholarships | Government Of India Office of the Director General of Civil Aviation Scholarship | Homi Bhabha Centre For Science Education Tata Institute of Fundamental Research Research Scholarships | HSBC Scholarships | Indian Council Of Agricultural Research Award Of National Talent Scholarship In Agriculture | Indian Institute Of Geomagnetism Research Scholars | Invention Awards For School Children | Indian Oil Corporation Ltd (IOCL) - Scholarships | Jawaharlal Nehru Memorial Fund Jawaharlal Nehru Scholarships For Doctoral Studies | Junior Research Scholarships For Cancer Biology Tata Memorial Centre & Tata Memorial Hospital | Jaigopal Garodia Vivekananda Trust Scholarships | Lalit Kala Akademi - Scholarship | Mahindra All India Talent Scholarships For Diploma courses In Polytechnics | National Brain Research Centre Scholarships | NTPC Scholarships | National Institute Of Science Communication And Information Resources(NISCAIR) | National Board For Higher Mathematics(NBHM) | National Thermal Power Corporation Ltd.Scholarships | National Olympiad Programme | National Level Science Talent Search Examination - 2005 | Narotam Sekhsaria Scholarship Programme | National Brain Research Centre Scholarships, Post Doctoral Fellowships | National Aptitude Test | NIIT National IT Aptitude Test | Oil And Natural Gas Corporation Ltd (ONGC) Scholarships To SC/ST Students | Office Of The Director General of Civil Aviation Scholarships Stipend to the SC/ST Candidates | Rashtriya Sanskrit Sansthan - Scholarships | Scholarships To Young Artistes | Saf-Madanjeet Singh Scholarship | Sports Authority Of India - Sports Scholarships | SAF-Madanjeet Singh Scholarship | Spic Macay Scholarships | The Childrens Foundation - Scholarships | The L&T Build-India Scholarship | The Hindu-Hitachi Scholarships | The Paul Foundation Scholarships | Technology Information Forecsting and Assessment Council(TIFAC)

Women Scientist Scholarship Scheme | The Young Talent IT Scholarship The Dr.GB Scholarships Foundation |

2.5 Various International Scholarships Available In India

A * STAR India Youth Scholarship | A.M.M. Arunachalam-Lakshmi Achi Scholarship For Overseas Study | British Chevening Scholarships | Bharat Petroleum - Scholarships for Higher Studies | Cambridge Nehru Scholarships | Commonwealth Scholarship and Fellowship | Czech Government Scholarship | Chevening Technology Enterprise Scholarship Programme | Chinese Government Scholarship | Greek Government Scholarships | Israel Government Scholarship | Iranian Government Scholarship | Offer of Italian Government Scholarship | Japanese Government Scholarships | K.C.Mahindra Scholarships For Post-Graduate Studies Abroad | Lady Meherbai D.Tata Scholarships | Mexican Government Scholarship | Norwegian Government Scholarships | National Overseas Scholarships/Passage Grant for ST Candidates | Portuguese Government Scholarships | Sophia Merit Scholarships Inc | Slovak Government Scholarship | SIA Youth Scholarships | The Rhodes Scholarships India | The Ramakrishna Mission Institute Of Culture Award of Debesh-Kamal Scholarships For Studies Abroad | The Inlaks Foundation - Scholarships |

Website for Higher Studies:

1. www.higherstudyabroad.org
2. www.highereducationinindia.com
3. www.educations.com

3. STUDENT CAREER ORIENTED PROFESSIONAL CERTIFICATION COURSES

As per the career plan for students of MLR Institute of Technology and Management with a view to bridge the gap between Industry and Academia, it has been planned to equip every student with at least three International / National certification by the time he / she completes the course of study. The details of the certification courses are given below:

Branch	Year	Name of the Certification Course
CIVIL Engineering	2nd Year	Certificate in AutoCAD
	3rd Year	Certificate in model bridge
	4th Year	Certificate in STAAD Pro
Computer Science and Engineering / IT / MCA	2nd Year	Certificate Information Technology
	3rd Year	IBM Certified DB2 Database Associate, Infosys Campus Connect
	4th Year	IBM Certified Rational Application Developer
	4th Year	SUN Certified Java Programmer
Electronics and Communication Engineering	2nd Year	Institute of Electronics and Telecommunication Engineering
	3rd Year	Motorola @ CAMPUS
	4th Year	IBM Certified DB2 Database Associate
Mechanical Engineering	2nd Year	Certificate in AutoCAD
	3rd Year	Certificate in HighPerMesh
	4th Year	Certificate in CATIA

3.1 Help Desk

The college has set up a Help Desk for Career Guidance and overseas education. The aim of the Help Desk is to provide a platform for the students to choose the Right Destination. The students can reach the Help Desk in person or through mail at email id helpdesk@mlrinstitutions.ac.in

4. PERFORMANCE MONITORING AND GUIDANCE

4.1 Student Feedback

In case the students find it difficult to cope up / understand a particular subject, they are advised to discuss it with

a. The Concerned Teacher
b. The Class Teacher
c. The Department Head
d. The Principal

Students can use the suggestion boxes for communicating feedback. Students should mention their names so that they can be informed of the progress / more details / clarifications can be obtained.

4.2 Class Teacher

Every class is assigned a Class Teacher (a faculty member). Students can directly discuss their college related or personal problems related to studies with them. The Class Teachers are accessible to the students and they can talk to the Class Teacher or whenever they are free from class / lab work. Class Teacher will meet with the class representative on daily basis to discuss their day-to-day difficulties if any.

4.3 Class Representatives and their roles

Two students from each class are selected as the Class Representatives from the department basing on their academic performance and discipline. Department Head makes the selections.

Responsibilities of the Class Representatives:

- Collection of MIS format from Class Teacher daily.
- Communicating the departmental / college directives & information to the students.
- Collecting the feedback of difficulties faced by the students and communicating Suggestions for improvements.
- Coordinating academic events and co-curricular activities.
- Encourage students to interact for better studies, sharing books and notes.
- Compilation and submission of MIS form to class teacher at the end of the period.

4.4 Performance Counseling

One counselor is assigned to a group of 20students. Students can directly discuss their college related or personal problems related to academics with them. The Counselors are accessible to the students and they can talk to them, whenever they are free from class / lab work. Counselors will interact with the students once in a fortnight and discuss the progress.

Mentors will evaluate the student individually for the following:

- Less marks in internal exams
- Continuous absence (3 days) and shortage of attendance
- Not understanding the subject
- Students from Telugu medium
- Assistance for back log subjects etc.
- Communication with parents
- Provide help to back log students

4.5 Remedial Classes / Tutorial / Revisions

Remedial Classes are conducted for students who are weak and who do not perform well in their internal examinations / class tests or for the students who want extra help. Slots in the time table have been reserved for Tutorial where in the students are helped to solve the question in the class itself.

4.6 Backlog Management

The Mentors maintain a complete record of Examination results of each student and they counsel and guide them in preparing for backlogs. Students are provided with material and important questions are discussed.

4.7 Correspondence with parents

Parents will be informed about the performance of their ward from time to time in the semester. However, parents are requested to be in touch with the Student mentor / Department Head on a regular basis. Further, parents are sent sms on daily bases if their wards do not attend the college.

5. RULES AND REGULATIONS FOR STUDENTS

5.1 Administrative:

1. Students, admitted into this College, are deemed to have agreed to the rules and regulations of the college, as laid down by the College Authorities from time to time, and the rules lay down in this leaflet, issued at the time of admission.
2. Students should inform **any changes in the addresses/Phone No.** of their parents / guardians to the college office.
3. The college shall communicate to the parents \ guardians of the students from time to time regarding the regularity and performance in the examinations of their wards. The case of serious indiscipline on the part of the students (s) may also be communicated to parent (s) \ guardian (s).

5.2. Academic:

1. Students should **attend the classes in - time**. Late- comers shall not be permitted to enter the class room and they are likely to **loose the attendance**.
2. Students are expected to be regular to the classes. The students shall not absent themselves for classes without prior approval. **Prior permission** shall be taken from concerned **counselor** and submitted to the **Head of the Department**.
3. In case of **ill-health**, the student should submit the **medical certificate** along with prescription, etc., from a **registered medical doctor**. The student should get the medical certificate within **two days** from the date of reporting to the college after ill health and also produce a **letter from Father/ Mother** regarding ill-health. Permission on medical grounds shall not be granted for one or two days.
4. The students should come to the laboratories with the **prescribed uniform**.
5. If a student **disturbs the class** or makes mischief, he / she will be marked absent and may be **expelled from the class**.
6. Students shall spend their **leisure time** in the library/computer center.
7. Students are expected to put up the **minimum aggregate percentage of attendance (75%)** as laid down by the JNT University. Students, falling short of 75% of attendance shall not be promoted to the next Semester \ Class.
8. Parents \ guardians of the students can contact the college authorities either in person or by post regarding discipline, regularity in attending classes, performance in the examinations, etc., of their wards.

5.3 Dress Code:

1. Students are expected to attend the college **properly dressed**. They should wear the prescribed uniform while attending laboratory classes.
2. Students are expected to **carry the identity cards**, issued by the college, in the campus. They are required to show the identity cards at the library, computer center, office, etc. Students without Identity Cards are not allowed in to the laboratory classes.

5.4 Discipline & Punctuality:

1. No student shall **enter or leave** the class room **without the permission** of the

teacher.

2. **Calling students** out of their class rooms while the lecture is in progress is prohibited.
3. Students are required to help in keeping the rooms, buildings, and premises **clean and tidy**. Writing or sticking up of posters and notices on the walls is strictly prohibited.
4. Smoking, Consumption of alcohol, intoxicating drinks or drugs is **strictly prohibited** in and around the college premises. Those indulging in such activities will be put severely or expelled.
5. Students are expected to behave well with the staff, other students and the general public. Any **misbehavior**, coming to the notice of the college authorities, will be severely dealt with.
6. The conduct of the students should be exemplary not only within the premises of the college but also outside. This will help in maintaining the **image and status** of the college.
7. Students are required to **observe silence** at all times in the college campus. They shall not talk in loud tone or call each other by shouting.
8. Students are **prohibited** from loitering in the verandahs / campus during class hours, and sitting on the steps, stair-cases or parapet walls.
9. Students are **not permitted** to resort to strikes and demonstrations within the campus. Participation in such activity entails their dismissal from the college. Any problem they face may be represented to the Counselor / Head of the Department / Principal.
10. Students are **prohibited carrying Cell Phones** and organizing any meeting or entertainment in the college campus without the permission of the college authorities.
11. The entry of **outsiders without permission** is prohibited. Any student found responsible for bringing outsiders into the campus for settling personal disputes with other students, shall be **expelled** from the college.
12. The college is entitled to take any **disciplinary action**, which is deemed necessary in the case of any indiscipline on the part of the students. The same will be reflected on the **Conduct Certificate** issued at the time of leaving the college.
13. No Student Unions, except **Professional Associations**, are **permitted** in the college.
14. If the students cause any **damage to the college property** knowingly or unknowingly individually or in a group they have to pay **5 times to cost of property** damaged them. All the students are collectively responsible for the proper maintenance college property i.e. building, furniture, lab equipment, garden, playgrounds, etc., recovery, calculated on semester to semester basis, will be collected along with examination fee for the semester.
15. Students should keep their **vehicles** only at the **parking place allotted** for the purpose. Vehicle riding in the campus is strictly prohibited.
16. Sitting on the parapet wall and Riding beyond the **parking limits**, the fine will be imposed to Rs.100.00

17. Breakage or loss of equipment /property as decided by the appropriate authority
18. The Principal/Director may, on the recommendation of the Head of the Department, or otherwise, inflict the **following punishments** in the interests of the student discipline and the Institution: fined, curtailment attendance, denial of promotion to next semester, suspension, expulsion or such other action as deemed necessary for the maintenance of discipline in the campus.

5.5. Lab Classes:

All students must attend lab classes without fail. Those absent shall follow this procedure laid down in the prescribed format explaining valid reasons and obtain permission to attend the future classes.

5.6 Fee:

1. All students admitted into this college, will be required to pay the prescribed tuition fee and other specified fees. Failure of the same will result in the cancellation of admission. No portion of fees will be refunded under any circumstances. If any student wishes to change the college or discontinue the course at any point for any reason, he \ she shall not be permitted to do so unless he \ she pays balance amount of four years fees which he \ she would have to pay, if he \she continued till the completion of the course. His \ Her original certificates including I.e., etc., will be issued only after all the dues as stated above, are cleared by the students. All senior students must pay the college fee every year on or before the 15th of July irrespective of the reopening of the college. If they fail the fine will be imposed as per norms of the management.
2. Miscellaneous fee paid for expenditure related to training programs i.e., technical or soft skills etc., is not refundable.
3. Other than the above, if any fees are levied by the University the student has to be pay the same.

5.7. Transport:

All students who are availing the college bus facility must carry the bus-pass and must produce when demanded, failing which they will not allowed to travel in the bus. All students must travel in the allotted bus and routes. They should not change but occupy only their allotted seats throughout. Unauthorized students caught in the bus for not having the bus pass, should pay even if they traveled for one day also. First and second year are not allowed to bring two-wheelers.

5.8. Library Rules

1. Library Books will be issued for 15 days time and renewal depends upon the demand of the book.
2. Silence should be strictly maintained in the library.
3. Students are responsible for the library borrower card issued to them. Loss of the library card should be reported in writing to the circulation section immediately. Duplicate library borrower card will be issued on payment of Rs.150/- after a week time from the date of application for duplicate cards.

4. The Library borrower card is not transferable.
5. **Library books must be returned on or before the due date. Any student failed to do so, 1st week –Rs.1/-per day/per book, 2nd week – Rs.2/-per day/per book and 3rd week –Rs.3/-per day/per book penalty will be imposed From 4th week- Rs.5/-per day/per book penalty will be imposed.**
6. Students shall not make any sort of conversation in any part of the library, causing inconvenience to others.
7. Students shall not bring their belongings inside the library and should keep them outside the library.
8. Students leaving from the library should be checked at the exit.
9. Tearing of pages/stealing of books will invite suspension from using of the library facilities and further disciplinary action will be taken against such students, as per college norms.
10. The borrower shall replace the **New book within 7 days, otherwise, he/she has to pay 3 times of the book cost, along with fine**. In case of lose of book.

5.9. General:

1. All the students admitted in this college have to give an **undertaking** to abide by the **rules and regulations** of this college in prescribed format given by the college.
2. All the students **should attend** the college after vacations (Dasara / Sankranthi / Christmas / Semester term / summer) on the **re-opening day** without fail.
3. Students must **deposit all the relevant original certificates and documents** at the time of the admission Office and they will not be returned until completion of the course.
4. Admission of any student can be cancelled by the Management at any point during the course for reasons which are not in consonance with the rules and regulations and which are detrin the reputation of the college.
5. All the Students are here by informed that **college authorities will not take any responsibility** for **loss or theft of your valuable items and money** kept in your bags or some where else. Hence I request all the students are not to keep your valuables in class room or anywhere without your presence.
6. **Fee For Issue Of Duplicates**

a) Duplicate Hall ticket	Rs. 100.00
b) Duplicate Identity Card	Rs. 100.00
c) Duplicate College Bus Pass	Rs. 50.00
d) Duplicate Study Certificate for same purpose	Rs. 50.00
e) Xerox copies of OD's	Rs. 50.00

All Breakage etc., penalties will be displayed on the Notice Board, and must be paid by the student and no student will be allowed to write examination or internal test or laboratory test, if penalties are not paid by the due date specified in the notice or circular.

5.10. Ragging

Ragging in any form inside or outside the college campus is banned/Prohibited vide Ragging Act 26 of AP. legislative Assembly 1997. Those who indulge in this

uncivilized activity are liable for severe disciplinary actions besides being liable for prosecution.

SALIENT FEATURES

Ragging means doing an act which causes or is likely to cause insult 'or annoyance or fear or apprehension or threat or intimidation or outrage of modesty or injury to a student.

S. No.	Nature of Ragging	Punishment
1	Teasing, Embarrassing and Humiliating	Imprisonment Upto 6 Month or Fine Upto Rs 1000/- or Both.
2	Assaulting or using criminal Force or criminal intimidation	Imprisonment Upto 1 Year or Fine Upto Rs 2000/- or Both.
3	Wrongfully restraining or Confining or causing hurt	Imprisonment Upto 2 Years or Fine Upto Rs 5000/- or Both.
4	Causing grievous hurt kidnapping Or raping or committing unnatural offence	Imprisonment Upto 5 Years or Fine Upto Rs 10000/- or Both
5	Causing death or abating Suicide	Imprisonment Upto 10 Years or fine Upto Rs. 50000/- or Both

Note:

1. A student convicted of any of the above offences, will be, dismissed from the college
2. A student imprisoned for more than six months for any of the above offences 'will not be admitted in any other College.
3. A student against whom there is prima facie evidence of ragging in any form will be suspended from the college immediately.

Prohibition of Ragging

1. Ragging is prohibited as per act 26 of AP. Legislative assembly, 1997.
2. Ragging entails heavy fines and/or imprisonment.
3. Ragging invokes suspension and dismissal from the college.
4. Outsiders are prohibited from entering the college premises without permission.
5. All students must carry their identity cards and show them when Demanded.
6. The principal and staff will visit and inspect the rooms at any time.
7. Suspended students are debarred from entering the campus except when required to attend enquiry and to submit an explanation .

6. DEPARTMENT SAILENT FEATURES

6.1 General Information:

The department of civil engineering was established in the academic year 2009-2010 with an intake of 60 students and in the year 2017 it has increased to 120. The Department is offering one M.Tech programme in Structural Engineering with the student intake of 24. The department has received NBA accreditation for 3 years in the year 2019. The department has well qualified and experienced faculty and has potential for doing consultancy works like water quality testing, designing of building plans, soil testing and concrete testing etc. to the farmers and industries. The department has in forefront in arranging export lectures faculty drawn from reputed institutions like Jawaharlal Nehru Technological University Hyderabad (JNTUH), Andhra Pradesh State Remote Sensing Application Centre (APSRAC), Osmania University (OU) etc. The department is well known for it's technical excellence and modern infrastructure facilities such as latest version of software and highly sophisticated instruments

6.2 Vision

The Civil Engineering department strives to impart quality education by extracting the innovative skills of students and to face the challenges in latest technological advancements and to serve the society

6.3 Mission

Civil engineers know that they cannot rest on their laurels. Current trends pose questions about the future of their profession. These questions address the role that the Civil Engineers have to play and could play in society, towards the integrity of the world's infrastructure. Hence the mission of the Department of Civil Engineering is

- M-I Provide quality education and to motivate students towards professionalism.
- M-II Address the advanced technologies in research and industrial issues.

6.4 Programme Educational Objectives

The Programme Educational Objectives (PEOs) that are formulated for the civil engineering programme are listed below:

PEO-I solving civil engineering problems in different circumstances

PEO-II Pursue higher education and research for professional development.

PEO-III Inculcate qualities of leadership for technology innovation and entrepreneurship

6.5 Programme Outcomes

1. **Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
2. **Problem analysis:** Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
3. **Design/development of solutions**: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
4. **Conduct investigations of complex problems**: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
5. **Modern tool usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
6. **The engineer and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
7. **Environment and sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
8. **Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
9. **Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
10. **Communication:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
11. **Project management and finance:** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
12. **Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Programme Specific Outcomes

PSO1-UNDERSTANDING:

Graduates will have ability to describe, analyse and solve problems using mathematical, scientific, and engineering knowledge.

PSO2-ANALYTICAL SKILLS

Graduates will have an ability to plan, execute, maintain, manage, and rehabilitate civil engineering systems and processes.

PSO3-EXECUTIVE SKILLS

Graduates will have an ability to interact and work effectively in multi disciplinary teams.

6.6 Highlights

- Focus on industry oriented teaching to bridge the gap between industry demands and course curriculum.
- Department Started the student hapters and professional bodies memberships with ICE(Institute of civil Engineering) Association of consulting Civil Engineers (ACCE) and Indian Association of Structural Engineers (IASE),
- The department has the faculty from NITs, and Professors who have done their PhD from other universities, among all two are pursuing their Ph.D.
- Department has got strong research oriented team and focuses on publishing research based papers in international journals/Conferences.
- Department stresses on academic growth of student/faculty by conducting conferences/workshops/seminars in collaboration with IIT Delhi.

6.7 Laboratories

Department of civil engineering is fully equipped with modern laboratories to cater the needs of civil engineering programme. The Department contain the following laboratories

1. Surveying Laboratory
2. Strength of Material Laboratory
3. Engineering Geology Laboratory
4. Fluid Mechanics and Hydraulic Machinery Laboratory
5. Computer Aided Drawing and Design Laboratory
6. Geotechnical Engineering Laboratory
7. Concrete Technology Laboratory
8. Advanced Concrete Technology Laboratory (M.Tech Structures)
9. Structural Design Laboratory
10. R&D Laboratory

Rules for Laboratory:

a. Equipment in the lab for the use of student community. Students must use the equipment with care. Any damage caused is punishable.
b. Students should carry their observation book along with the record book with completed exercises/ calculations while attending the lab.
c. Students are supposed to occupy the experiment setup allotted to them and maintain discipline in the lab.
d. Labs can be used in free time / lunch hours by the students with prior permission from the lab in-charge.
e. **30 marks are awarded for continuous evaluation in the laboratory. Lab records need to be submitted on or before date of submission**

6.8 CONSULTANCY SERVICES

The Department has potential to take up the consultancy in the following areas

- Water quality monitoring
- Concrete technology
- Surveying
- Strength of material
- Geo technology

7. ACADEMIC REGULATIONS OF R20 FOR B.TECH. (REGULAR)

(Effective for the students admitted into I year from the Academic Year 2020-21 onwards)

7.1. Award of B. Tech. Degree

The LES students after securing admission shall pursue a course of study for not less than three academic years and not more than six academic years.

i) The student shall register for 123 credits and secure 123 credits with CGPA ≥ 5 from II year to IV year B.Tech. Programme (LES) for the award of B.Tech degree.

ii) The students, who fail to fulfill the requirement for the award of the degree in six academic years from the year of admission, shall forfeit their seat in B.Tech.

iii) The attendance requirements of B.Tech. (Regular) shall be applicable to B.Tech. (LES).

7.1.1 A student who registers for all the specified subjects / courses as listed in the course structure and secures the required number of 160 credits (with CGPA > 5.0), within 8 academic years from the date of commencement of the first academic year, shall be declared to have **"QUALIFIED"** for the award of B.Tech. Degree in the chosen branch of Engineering selected at the time of admission**.**

7.1.2 A student who qualifies for the award of the degree as listed in item 12.1 shall be placed in the following classes**.**

7.1.3 A student with final CGPA (at the end of the under graduate Programme) > 7.50, and fulfilling the following conditions - shall be placed in "**FIRST CLASS WITH DISTINCTION"**. However, he / she

(i) Should have passed all the subjects/courses within four academic years or 8 sequential semesters (i.e., whatever the back log subjects have to clear in or before IV-II Regular examinations) from the date of commencement of first year first semester.

(ii) Should have secured a CGPA > 7.50, at the end of each of the 8 sequential semesters, starting from I year I semester on wards.

(iii) Should not have been detained or prevented from writing the semester end examinations in any semester due to shortage of attendance or any other reason.

A student not fulfilling any of the above conditions with final CGPA > 7.5 shall be placed in **"FIRST CLASS".**

7.1.4 Students with final CGPA (at the end of the under graduate Programme) > 6.50 but < 7.50 shall be placed in **"FIRST CLASS"**.

7.1.5 Students with final CGPA (at the end of the under graduate Programme) > 5.50 but < 6.50, shall be placed in **"SECOND CLASS"**.

7.1.6 All other students who qualify for the award of the degree (as per item 12.1), with final CGPA (at the end of the under graduate Programme) > 5.00 but < 5.50, shall be placed in **"PASS CLASS".**

7.1.7 A student with final CGPA (at the end of the under graduate Programme) < 5.00 will not be eligible for the award of the degree.

7.1.8 Students fulfilling the conditions listed under item 12.3 alone will be eligible for award of **"GOLD MEDAL".**

7.2. Credits

	I Year		Semester	
	Periods / Week	Credits	Periods / Week	Credits
Theory	03+1/03	06	04	04
	02	04	--	--
Practical	03	04	03	02
Drawing	02+03	06	03 06	02 04
Mini Project	--	--	--	02
Comprehensive Viva Voce	--	--	--	02
Seminar	--	--	6	02
Project	--	--	15	10

7.3 Distribution and Weightage of Marks

7.3.1 The performance of a student in every subject / course (including practical"s and Project Stage – I &II) will be evaluated for 100 marks each, with 30 marks allotted for CIE (Continuous Internal Evaluation) and 70 marks for SEE (Semester End-Examination).
For all Theory Courses as mentioned above, the distribution shall be 30 marks for CIE, and 70 marks for the SEE.

7.3.2 For Theory Subjects:

Continuous Internal Evaluation (CIE):

1. During the Semester, there will be two mid-terms examinations for 30 marks each. Each mid-term examination consists of one subjective paper for 25 marks and assignment/ Technical Presentation/ Micro Projects for 5 marks for each subject.
2. Question paper contains two Parts (Part-A and Part-B.) The distribution of marks for PART- A and PART-B will be 10 marks & 15 marks respectively for UG Programmes.
3. Pattern of the question paper is as follows:

PART–A:

Consists of Ten ***Short answer Questions*** each carrying one mark. The I-Mid-term examination shall be conducted for the 50 % of the syllabus and II-Mid-term examination shall be conducted for remaining 50 % of the syllabus.

PART-B:

Consists of Three questions (out of which students have to answer three questions) carrying five marks each. Each question there will be an "either" "or" choice (that means there will be two questions from each unit and the student should answer any one question). The questions may consist of sub questions also.

• The first mid-term examination shall be conducted for the first 50% of the syllabus, and the second mid-term examination shall be conducted for the remaining 50% of the syllabus.

• First Assignment should be submitted before the commencement of the first mid-term examinations, and the Second Assignment should be submitted before the commencement of the second mid-term examinations. The assignments shall be specified/given by the concerned subject teacher.

• The total marks secured by the student in each mid-term examination are evaluated for 30 marks, and the average of the two mid - term examinations shall be taken as the final marks secured by each student in Continuous Internal Evaluation.
• If any student is absent for any subject of Mid-term examination, an online test (CBT - Computer Based Test) will be conducted for student by the institute.

Semester End Examination (SEE): The Semester End Examination (SEE) will be conducted for 70 marks consisting of Two parts i).**Part - A** for 20 marks ii). Part - B for 50 marks.
Part - A is compulsory question consisting of ten sub questions. Two sub questions from each unit and carry 2 marks each.

Part - B consist of five questions (numbered from 2 to 6) carrying 10 marks each. Each of these questions is from one unit may contain sub questions. For each question there will be "either" or choice, which means that there will be two questions from each unit and the student, should answer either of the two questions.

7.3.3 For Practical Courses:
Continuous Internal Evaluation (CIE):
There shall be a Continuous Internal Evaluation (CIE) during the Semester for 30 marks with a distribution of 20 marks for day-to-day evaluation and10 marks for internal lab exam. Two internal practical tests (each of 10 marks) shall be conducted by the concerned laboratory teacher and the average of the two tests is considered.

Semester End Examination (SEE):
SEE shall be conducted for 70 marks with an external examiner and the laboratory teacher concerned. The external examiner shall be appointed by the Chief Controller of Examinations of the college. The external examiner should be selected from the outside college among the autonomous / reputed institutions from a panel of three examiners submitted by the concerned BoS chairman of the Department.

7.4 Attendance Requirements:

7.4.1 A student shall be eligible to appear for the semester end examinations, if the student acquires a minimum of 75% of attendance in aggregate of all the subjects / courses (excluding attendance in mandatory courses like Environmental Science, Constitution of India, Intellectual Property Rights, and Gender Sensitization lab) for that semester. Two periods of attendance for each theory subject shall be considered, if the student appears for the mid-term examination of that subject. **This attendance should also be included in the fortnightly upload of attendance to the University. The attendance of Mandatory Non-Credit courses should be uploaded separately to the University.**
7.4.2 Shortage of attendance in aggregate up to 10% (65% and above, and below 75%) in each semester may be condoned by the college academic committee on genuine and valid grounds, based on the students representation with supporting evidence**.**
7.4.3 A stipulated fee shall be payable for condoning of shortage of attendance.

7.4.4 Shortage of attendance below 65% in aggregate shall in **no** case be condoned.

7.4.5 Students whose shortage of attendance is not condoned in any semester are not eligible to take their end examinations of that semester. They get detained and their registration for that semester shall stand cancelled. They will not be promoted to the next semester. They may seek re-registration for all those subjects registered in that semester in which the student is detained, by seeking re-admission into that semester as and when offered; if there are any professional electives and / or open electives, the same may also be re-registered if offered. However, if those electives are not offered in later semesters, then alternate electives may be chosen from the **same** set of elective subjects offered under that category. 12

7.4.6 A student fulfilling the attendance requirement in the present semester shall not be eligible for readmission into the same class**.**

7.5 Minimum Academic Requirements:

The following academic requirements have to be satisfied, in addition to the attendance requirements mentioned in item no.7.4.

7.5.1 A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to each subject/ course, if student secures not less than 35% (24 marks out of 70 marks) in the semester end examination, and a minimum of 40% (40 marks out of 100 marks) in the sum total of the CIE (Continuous Internal Evaluation) and SEE (Semester End Examination) taken together; in terms of letter grades, this implies securing „**C**" grade or above in that subject/course**.**

7.5.2 A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to Industrial Oriented Mini Project / Summer Internship and seminar, if the student secures not less than 40% marks (i.e. 40 out of 100 allotted marks) in each of them. The student is deemed to have failed, if he (i) does not submit a report on Industrial Oriented Mini Project / Summer Internship, or does not make a presentation of the same before the evaluation committee as per schedule, or (ii) does not present the seminar as required in the IV year I Semester, or (iii) secures less than 40% marks in Industrial Oriented Mini Project / Summer Internship and seminar evaluations.

A student may reappear once for each of the above evaluations, when they are scheduled again; if the student fails in such „one reappearance" evaluation also, the student has to reappear for the same in the next subsequent semester, as and when it is scheduled.

7.5.3 Promotion Rules:

S. No.	Promotion Stage	Conditions to be fulfilled
1	First year first semester to first year second semester	Regular course of study of first year first semester.
2	First year second semester to second year first semester	1. Regular course of study of first year second semester. 2. Must have secured 50% credits up to first year second semester from all the relevant regular and supplementary examinations, whether the student takes those examinations or not.
3	Second year first semester to second year second	Regular course of study of second year first semester.

	semester	
4	Second year second semester to third year first semester	1. Regular course of study of second year second semester. 2. Must have secured 60% credits up to second year second semester from all the relevant regular and supplementary examinations, whether the student takes those examinations or not.
5	Third year first semester to third year second semester	Regular course of study of third year first semester.
6	Third year second semester to fourth year first semester	1. Regular course of study of third year second semester. 2. Must have secured 60% credits up to third year second semester from all the relevant regular and supplementary examinations, whether the student takes those examinations or not.
7	Fourth year first semester to fourth year second semester	Regular course of study of fourth year first semester.

8. II YEAR – CIVIL ENGINEERING - COURSE STRUCTURE

II YEAR I SEMESTER

S. No.	Course Code	Course Title	Course Area	Hours Per Week			Credits	Scheme of Examination Maximum Marks		
				L	T	P		Internal (CIE)	External (SEE)	Total
1	2030112	Strength of Materials - I	PC	3	0	0	3	30	70	100
2	2030113	Surveying and Geomatics	PC	3	0	0	3	30	70	100
3	2030004	Probability and Statistics	BS	3	1	0	4	30	70	100
4	2030202	Basic Electrical and Electronics Engineering	ES	3	0	0	3	30	70	100
5	2030502	Data Structures	ES	3	0	0	3	30	70	100
6	2030171	Surveying Laboratory	PC	0	0	3	1.5	30	70	100
7	2030272	Basic Electrical and Electronics Engineering Laboratory	ES	0	0	2	1	30	70	100
8	2030572	Data Structures Laboratory	ES	0	0	2	1	30	70	100
9	2030022	Gender Sensitization	MC	2	0	0	0	-	-	-
Total Credits				**17**	**1**	**7**	**19.5**	**240**	**560**	**800**

II YEAR II SEMESTER

S. No.	Course Code	Course Title	Course Area	Hours Per Week			Credits	Scheme of Examination Maximum Marks		
				L	T	P		Internal (CIE)	External (SEE)	Total
1	2040114	Strength of Materials - II	PC	3	0	0	3	30	70	100
2	2040115	Building Materials, Construction and Planning	PC	3	0	0	3	30	70	100
3	2040116	Fluid Mechanics	PC	3	0	0	3	30	70	100
4	2040117	Structural Analysis - I	PC	3	0	0	3	30	70	100
5	2040118	Engineering Geology	PC	2	0	0	2	30	70	100
6	2040505	Python	ES	2	0	0	2	30	70	100
7	2040172	Strength of Materials Laboratory	PC	0	0	3	1.5	30	70	100
8	2040173	Computer Aided Civil Engineering Drawing Laboratory	PC	0	0	2	1	30	70	100
9	2040575	Python Laboratory	ES	0	0	2	1	30	70	100
Total Credits				**16**	**0**	**7**	**19.5**	**270**	**630**	**900**

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

T – Tutorial L-Theory P- Practical C – Credits

COURSE OUTCOMES
II YEAR I SEM

COURSE TITLE	COURSE CODE	COURSE OUTCOME
Strength of Materials - I 2030112	CE211.1	Evaluate the strength and deformation of members subjected to axial load.
	CE211.2	Draw the shear force and bending moment diagrams for determinate beams
	CE211.3	Analyze different flexural and **shear**stresses in various beam sections
	CE211.4	Assess the slope and deflection of beams by various methods
	CE211.5	Understand and evaluate the stresses on oblique plane and various theories of failures.
Surveying and Geomatics 2030113	CE212.1	Apply the knowledge to calculate angles, distances and levels
	CE212.2	Identify data collection methods and prepare field notes for levels, Interpret survey data and compute areas and volumes
	CE212.3	Understand working principles of survey instruments and apply the knowledge of trigonometric leveling
	CE212.4	Understand and apply the corrective measures on measurement errors and Apply the knowledge on curve alignment by different methods
	CE212.5	Understand & apply the principles and concepts of modern equipment and its methodologies
Probability And Statistics 2030004	CE213.1	Formulate and solve problems involving random variables and apply statistical methods for analysing experimental data
	CE213.2	Apply discrete and continuous probability distributions
	CE213.3	Classify the concepts of data science and its importance.
	CE213.4	Infer the statistical inferential methods based on small and large sampling tests.
	CE213.5	Interpret the association of characteristics through correlation and regression tools.
Basic Electrical And Electronics Engineering	CE214.1	Analyze and solve electrical circuits using network laws and theorems
	CE214.2	understand and analyze basic Electric and Magnetic circuits

	CE214.3	understand the working principles of Electrical Machines
	CE214.4	understand The components of Low Voltage Electrical Installations
	CE214.5	Identify And Characterize Diodes And Various Types Of transistors.
Data Structures 2030502	CE215.1	Understanding the working of different operating systems like DOS, Windows, Linux
	CE215.2	Write, Compile and Debug programs in C language.
	CE215.3	Design programs connecting decision structures, loops.
	CE215.4	Exercise user defined functions to solve real time problems.
	CE215.5	Inscribe C programs using Pointers to access arrays, strings, functions, structures and files
Surveying Laboratory 2030171	CE216.1	Measure the distance, area of the field using the instruments chain, compass, plane table and plot the same.
	CE216.2	concepts of leveling, and perform & plot the cross & longitudinal sectioning.
	CE216.3	Measurement of angles using theodolite, and calculate the distance and elevation of the given point using trigonometric leveling and tacheometric leveling.
	CE216.4	Understand the concepts of EDM, and calculate the distance, area of the field
	CE216.5	Perform the traverse and plot the contour map for the obtained data.
	CE216.6	Locate the position of points using stake out method, perform the curve using modern equipment.
Basic Electrical And Electronics Engineering Laboratory 2030272	CE217.1	analyze and solve electrical circuits using network laws and theorems.
	CE217.2	understand and analyze basic Electric and Magnetic circuits
	CE217.3	study the working principles of Electrical Machines
	CE217.4	study the working principles of Electrical Machines
	CE217.5	introduce components of Low Voltage Electrical Installations
	CE217.6	identify and characterize diodes and various types of transistors.
STRUCTURES LABORATORY	CE218.1	Understand the basic terminologies used and principles of programming in DATA STRUCTURES
	CE218.2	Understand the concepts of Arrays and Strings. Design, develop modular programming skills such as function

	CE218.3	Understand the basic concepts of data structures, pointers, create/update basic data files. Effective utilization of memory using dynamic memory allocations and pointer technology.
	CE218.4	Apply the programming components that effectively solve computing problems in real world
GENDER SENSITIZATION 2030022	CE219.1	Develop students sensibility with regard to issues of gender in contemporary India
	CE219.2	Provide a critical perspective on the socialization of men and women
	CE219.3	Introduce students to information about some key biological aspects of genders
	CE219.4	Expose the students to debates on the politics and economics of work
	CE219.5	Help students reflect critically on gender violence
	CE219.6	Expose students to more egalitarian interactions between men and women

II YEAR II SEM

COURSE TITLE	COURSE CODE	COURSE OUTCOME
STRENGTH OF MATERIALS - II 2040114	CE221.1	Apply the torsion theory for analysis of circular shafts and springs
	CE221.2	Analyze columns and struts
	CE221.3	Understand the concept of direct and bending stresses and Analyze the structures under the conditions of sliding, overturning
	CE221.4	Analyze the stress in Thin and thick cylinders.
	CE221.5	Understand the concept of stresses & shear center for symmetrical and unsymmetrical Sections
BUILDING MATERIALS, CONSTRUCTION AND PLANNING 2030113	CE222.1	General knowledge on stones, bricks and its production and masonry. And other type of modern material for construction
	CE222.2	Understand the process involved in the manufacturing of cement, their test, grades of concrete, tests on concrete, NDT, different admixtures used for concrete
	CE222.3	Identify the different building components, their materials and services
	CE222.4	To know the types of form work and where to be

		utilised, preparation of mortars for finishing work.
	CE222.5	Able to know the bye laws to construct a building
FLUID MECHANICS 2040116	CE223.1	Understand the basic terms used in fluid mechanics and principles of fluid statics.
	CE223.2	Understand the broad principles of fluid kinematics and dynamics
	CE223.3	Apply the bernoulis principle in flow through pipes
	CE223.4	Estimate loss of head through pipes
	CE223.5	Apply the momentum and energy principles in Boundary layer concepts
STRUCTURAL ANALYSIS - I 2040117	CE224.1	Understand determinate and indeterminate structure
	CE224.2	Analyse the statically indeterminate beams and frames and Evaluate bending moment of three hinged arch.
	CE224.3	Analyse the beams and frames using slope and deflection, moment distribution and theorem of three moments method
	CE224.4	Analyse the pin jointed plane frames
	CE224.5	Evaluate the structure under moving loads and draw the SFD
ENGINEERING GEOLOGY 2040118	CE225.1	Understand the role of Geological concepts in Civil Engineering.
	CE225.2	Evaluate different types of minerals and rock compositions.
	CE225.3	Understand different geological structures and its suitability for groundwater and building construction
	CE225.4	Evaluate subsurface information through geophysical investigations
	CE225.5	Apply geological principles in selecting sites for tunnels, dams and reservoirs
PHYTHON 2040172	CE226.1	Understand Python syntax and semantics and be fluent in the use of Python flow control and functions.
	CE226.2	Understand Lists, Dictionaries and Regular expressions in Python.

	CE226.3	Demonstrate proficiency in handling Strings and File Systems.
	CE226.4	Understand exceptions, Multi thread programming in Python.
	CE226.5	Apply theGUI of phyton programming to develop applications
STRENGTH OF MATERIALS LABORATORY 2040172	CE227.1	Evaluate properties of steel, Brick and concrete
	CE227.2	Evaluate deflection, bending strength and young's modulus of cantilever and simply supported beam
	CE227.3	analyze the modulus of rigidity of materials
	CE227.4	Determine hardness value of material
	CE227.5	analyze the impact and shear strength of material
	CE227.6	Evaluate the stiffness and modulus of elasticity of material
COMPUTER AIDED CIVIL ENGINEERING DRAWING LABORATORY 2040173	CE228.1	Understand CAD software and basic functions
	CE228.2	Evaluate plans of Single storied building & multi-storeyed buildings
	CE228.3	Develop different sections at different elevations
	CE228.4	Detailing of building components like doors, windows roof trusses
	CE228.5	Develop section and elevation for single and multi-storeyed buildings using CAD software.
	CE228.6	Understand development concepts in detailing
PYTHON LABORATORY 2040575	CE229.1	Interpret the fundamental Python syntax and semantics and be fluent in the use of Python control flow statements.
	CE229.2	Express proficiency in the handling of strings and functions
	CE229.3	Determine the methods to create and manipulate Python programs by utilizing the data structures like lists, dictionaries, tuples and sets.
	CE229.4	Identify the commonly used operations involving file systems and regular expressions
	CE229.5	Articulate the Object-Oriented Programming concepts such as encapsulation, inheritance and polymorphism as used in Python

CO – PO MAPPING

R20 - REGULATIONS

S.NO	SUBJECT Name	Code	Programme Outcomes												PSO		
			1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
II-I																	
1	Strength of Materials - I	CE211	3	3	1	2.2	1	0	0	0	0	0	0	1	3	3	2
2	Surveying and Geomatics	CE212	3	3	2	3	3	0	0	0	0	0	0	2	3	1	2
3	Probability and Statistics	CE213	3	3	3	2	0	0	0	0	0	0	0	1	3	1	0
4	Basic Electrical and Electronics Engineering	CE214	3	3	2	3	3	3						3	3	3	3
5	Data Structures	CE215	3	3	3	2	0	0	0	0	0	0	0	1	3	1	0
6	Surveying Laboratory	CE216	3	3	3	3	3	0	0	0	3	0	0	3	3	3	3
7	Basic Electrical and Electronics Engineering Laboratory	CE217	3	3	3	2.7	1	0	0	0	0	0	0	0	3	1	0
8	Data Structures Laboratory	CE218	3	3	3	2	0	0	0	0	0	0	0	1	3	1	0
9	Gender Sensitization	CE219						3	1	3					1		
II-II																	
1	Strength of Materials - II	CE221	3	3	1	2.2	1	0	0	0	0	0	0	1	3	3	2
2	Building Materials, Construction and Planning	CE222	3	3	1	1	2	3	2					3	3	1	1
3	Fluid Mechanics	CE 223	3	3	2	3	1	0	0	0	0	0	0	1	3	3	2
4	Structural Analysis - I	CE 224	3	3	2	3	3	0	0	0	0	0	0	3	3	3	1
5	Engineering Geology	CE 225	3	1	1	1.5	0	1	1	0	0	0	0	0	1	1	0
6	Python	CE 226	3	3	3	2	0	0	0	0	0	0	0	1	3	1	0
7	Strength of Materials Laboratory	CE 227	3	3	1	2.2	1	0	0	0	0	0	0	3	3	3	2
8	Computer Aided Civil Engineering Drawing Laboratory	CE 228	3	1	1	3	1	1	0	0	0	0	0	3	1	1	1
9	Python Laboratory	CE 229	3	3	3	2	0	0	0	0	0	0	0	1	3	1	0

2030112 - STRENGTH OF MATERIALS – I

B. Tech. II Year I Sem **L T P C**

Pre-requisites: Engineering Mechanics **3 0 0 3**

Course Objective: The objective of the course is

1. To understand the concepts of stress, strain and strain energy
2. To calculate the shear force and bending moments for various loading conditions
3. To analyze the beams under flexural stresses
4. To analyze the beams under shear stresses
5. To calculate the deflections of beams under different loading conditions
6. To understand principal stresses and strains in structural members and various theories of failures.

Course Outcomes: At the end of the course the student will able to

1. Evaluate the strength and deformation of members subjected to axial load.
2. Draw the shear force and bending moment diagrams for determinate beams.
3. Analyze the bending stresses in various beam sections
4. Evaluate the shear stress distribution across various beam sections
5. Assess the slope and deflection of beams by various methods
6. Understand and evaluate the stresses on oblique plane and various theories of failures.

UNIT - I

Simple stresses and strains: Concept of stress and strain- Strain diagram - Elasticity and plasticity – Hooke's law – Elastic constants – Poisson's ratio – Bars of varying section – composite bars – Temperature stresses.

Strain energy: Resilience – Gradual, sudden, and impact loadings – simple applications.

Learning Outcomes:

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

- Understand the behaviour of axially loded members of different cross section.
- Analyse bars subjected to thermal stresses.
- Evaluate strain energy stored in a body subjected to external load

UNIT - II

Shear force and bending moment: Beam - Types of beams – Concept of shear force and bending moment – S.F and B.M diagrams for determinate beams – Point of contraflexure – Relation between S.F., B.M and rate of loading at a section of a beam.

Learning Outcomes:

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

- Know the various types of beams and external loads.
- Evaluate the variation of Shear Force and Bending Moment along the length of the beam.

UNIT - III

Flexural stresses: Theory of simple bending – Section Modulus - bending stresses

Shear stresses: Formula for shear stress distribution – Shear stress distribution for different sections.

Learning Outcomes:

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

- Understand the concept bending stress and shear stress.
- Evaluate the variation of shear stress and bending stress distribution across the section.

UNIT - IV

Deflection of beams: Slope and deflection – Double integration method - Macaulay's method – Moment area method - Conjugate beam method

Learning Outcomes:

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

- Understand the concept slope, deflection and elastic curve of beams.
- Evaluate the slope and deflection of beams by different methods.

UNIT - V

Principal stresses: Stresses on an oblique section –Analytical and graphical solutions.

Theories of failure: Introduction – Various theories of failure

Learning Outcomes:

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

- Understand the concept of principal stresses
- Evaluate stresses and factor of safety according to various theories of failure.

TEXT BOOKS:

1. Strength of Materials by R. K Rajput, S. Chand & Company Ltd.
2. Mechanics of Materials by Dr. B.C Punmia, Dr. Ashok Kumar Jain and Dr. Arun Kumar Jain, Laxmi Publications Pvt Limited.
3. Strength of Materials by R. Subramanian, Oxford University Press.
4. Strength of Materials by S. Ramamrutham, Dhanpat Rai Publishing Company (p) Ltd.
5. Strength of Materials by R.S.Khurmi, S.Chand and Co

REFERENCES:

1. Mechanics of Materials by R.C. Hibbeler, Prentice Hall publications.
2. Engineering Mechanics of Solids by Egor P. Popov, Prentice Hall publications.
3. Strength of Materials by T.D.Gunneswara Rao and M.Andal, Cambridge University Press.

4. Strength of Materials by R.K. Bansal, Lakshmi Publications Pvt. Ltd.
5. Strength of Materials by B.S.Basavarajaiah and P. Mahadevappa, Universities Press.

Session Planner:

S.No	Unit No.	L.No	Topic Details	Date Planned	Date Conducted	Remarks
1	1	1	Concept of stress and strain			
2	1	2	Strain diagram - Elasticity and plasticity			
3	1	3	Hooke's law – Elastic constants – Poisson's ratio			
4	1	4	Bars of varying section			
5	1	5	composite bars			
6	1	6	Temperature stresses			
7	1	7	Resilience – Gradual			
8	1	8	Resilience – Sudden			
9	1	9	Resilience – Impact loadings			
10	1	10	Simple applications.			
11	1	11	PPT			
12	1	12	Active Learning			
13	1	13	Unit Test 1			
14	2	14	Beam - Types of beams			
15	2	15	Concept of shear force and bending moment			
16	2	16	S.F and B.M diagrams for determinate beams			
17	2	17	S.F and B.M diagrams for determinate beams			
18	2	18	S.F and B.M diagrams for determinate beams			
19	2	19	Point of contraflexure			
20	2	20	Relation between S.F., B.M			
21	2	21	Rate of loading at a section of a beam.			
22	2	22	PPT			
23	2	23	Active Learning			
24	2	24	Unit Test 2			
25	3	25	Theory of simple bending			
26	3	26	Section Modulus for different section			
27	3	27	Section Modulus for different section			
28	3	28	Section Modulus for different section			
29	3	29	Bending stresses			
30	3	30	Formula for shear stress distribution			

31	3	31	Shear stress distribution for different sections.			
32	3	32	Shear stress distribution for different sections.			
33	3	33	Shear stress distribution for different sections.			
34	3	34	PPT			
35	3	35	Active Learning			
36	3	36	Unit Test 3			
37	4	37	Deflection of beams by Slope and deflection			
38	4	38	Slope and deflection			
39	4	39	Double integration method			
40	4	40	Double integration method			
41	4	41	Macaulay's method			
42	4	42	Macaulay's method			
43	4	43	Moment area method			
44	4	44	Moment area method			
45	4	45	Conjugate beam method			
46	4	46	Conjugate beam method			
47	4	47	PPT			
48	4	48	Active Learning			
49	4	49	Unit Test 4			
50	5	50	Stresses on an oblique section			
51	5	51	Stresses on an oblique section			
52	5	52	Analytical solutions			
53	5	53	Analytical solutions			
54	5	54	Graphical solutions			
55	5	55	Graphical solutions			
56	5	56	Theories of failure: Introduction			
57	5	57	Various theories of failure			
58	5	58	Various theories of failure			
59	5	59	PPT			
60	5	60	Active Learning			
61	5	61	Unit Test 4			

Important Questions:

Unit – 1

Part – A

1. Define Longitudinal Strain and Poisson's ratio. (Nov-Dec 2016)
2. A circular bar of diameter 50mm is subjected to a tensile force of 120kN. Find longitudinal strain and lateral strain. Take E = 200GPa and 1/m = 0.3 (Nov-Dec 2016)
3. Define Young's modulus. (Nov-Dec 2011)

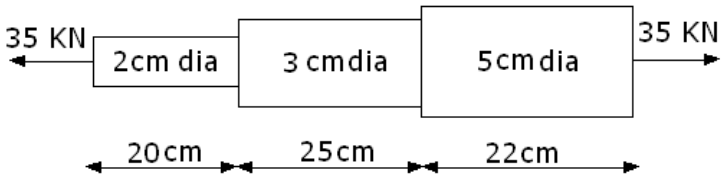
4. Define Hooks Law (Nov-Dec 2011)
5. What is thermal stress (Nov-Dec 2013)
6. What do you mean by strain energy? (Nov-Dec 2013)
7. Define pure shear
8. What to you mean by Poisson's ratio?
9. What is composite bar?
10. What do you mean by ductility?

Part – B

1. (a) State and explain the Hooke's law.
(b) Draw the stress-strain diagram for mild steel and explain salient points.
(c) Write the relations between Modulus of Elasticity and Shear Modulus, Modulus of Elasticity and Bulk Modulus and hence derive the relation among the three elastic constants. (JNTUH Dec 2011)

2. A steel bar of 300mm long and 30 x 30 mm cross section is subjected to a tensile force of 150kN in the direction of length. Determine the change in volume. Take E = 200GPa and 1/m = 0.3 (Nov-Dec 2016)

3. An axial pull of 35000 N is acting on a bar consisting of three lengths as shown in Figure . If theYoung`s modulus = 2.1 x 10^5 N/mm2, determine: Stresses in each section and Total extension of the bar. (R07 nov 2010)



4. A Copper rod circular in cross section uniformly tapers from 40 mm to 20 mm in a length of 11m. Find the magnitude of force which will deform it by 0.8mm. take E = 100GPa.

5. A steel block 200mm x 20mm x 20mm is subjected to a tensile load of 40kN in the direction of its length. Determine the change in volume if E = 205GPa and 1/m = 0.3.

Unit – 2

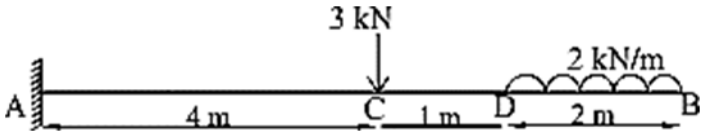
Part – A

1 Define shear force.
2 What do you mean by point of contra-flexure?
3 Write the relation between shear force and bending moment.
4 What do you mean by cantilever beam?
5 Define Bending Moment.
6 Write the relation between load and shear force.
7 What is the value of maximum bending moment for a S.S beam of length L when is subjected to central point load W ?
8 Write application of SFD and BMD.
9 Name the types of beam based on its support condition.

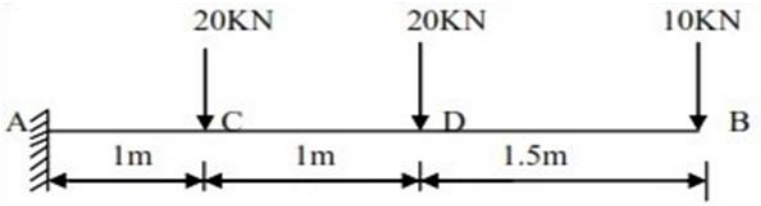
10 What do you mean by shear force diagram?
11 What is the value of maximum bending moment for a S.S beam of length L when is subjected to udl w through out the beam?
12 What do you mean by overhanging beam?
13 Name the different types of loads acting on beam.
14 What do you mean by Bending Moment Diagram?
15 Define beam.
16 Draw SFD for simply supported beam subjected to udl.

Part – B

1 Define Shear force, bending moment, SFD, BMD and Point of Contra-flexure.
2 Write the important points to be considered while drawing SFD and BMD
3 Explain Different types of loads acting on a beam with neat sketches.
4 Explain types of beams based on its support condition with neat sketches.
5 Draw Shear force and bending moment diagrams for the Cantilever beam of length 4m, which carries a U.D.L of 2 kN/m run over a length of 2.5 m from the free end.
6 Draw SFD and BMD for cantilever beam shown in figure.



7 Draw Shear force and bending moment diagrams for the Cantilever beam shown in Figure- 1 indicating values at salient points.



8 Explain the following terms 1.Point of contraflexure 2.Pure Bending 3. Hogging moment and Sagging moment 4.Point of inflection.
9 An overhanging beam ABC of length 7m is simply supported at A & B over a span of 5m and the portion BC overhangs by 2m. Draw the SFD and BMD. Determine the point of contraflexure if it is subjected to UDL of 3kN/m over a span of 3m from B and concentrated load of 8kN at C.
10 Derive the relation between SF, BM and the rate of loading at a section of the beam.

Unit – 3

Part – A

1 What do you mean by pure bending?
2 Define Neutral Axis.
3 Derive section modulus for circular section.

4 What are the assumptions made in theory of simple bending?
5 Define section modulus.
6 Write bending equation.
7 What do you mean by bending stress?
8 Derive section modulus for rectangular section.
9 Define shear stress.
10 Write equation of rectangular section for average and maximum shear stress and also the shear stress at a distance of Y from N-A
11 Differentiate single shear and double shear.
12 Write any two assumptions made in theory of simple bending.
13 What do you mean by moment of resistance?
14 What is the value of maximum bending moment for a S.S beam of length L, whe it is subjected to central point load W?
15 Write the equation for shear stress at a section of a beam.

Part – B

1 Derive section modulus for rectangular and circular section.
2 Derive the Expression for Bending Stress Equation.
3 A rectangular beam 60 mm wide and 150 mm deep is simply supported over a span of 4 metres. If the beam is subjected to a uniformly distributed load of 4.5 kN/m, find the maximum bending stress induced in the beam.
4 A beam of I-section has top flange 125mm x 16mm, bottom flange 150mm x 20mm and web thickness 12mm. The total depth of the beam is 250mm and simply supported over a span of 5m. The beam is subjected to UDL of 50kN/m over its entire span in addition to a concentrated load of 60kN at its midspan. Draw the bending stress distribution across the depth of the beam cross section at a section located 3m from the left support.
5 Derive section modulus for various cross section.
6 Explain Theory of simple bending.
7 What do you mean by bending stress? Write bending equation.
8 A wooden beam 100mm wide and 150mm deep is simply supported over a span of 4m. if shear force at a section of a beam is 4500N, find the shear stress at a distance of 25mm above the N-A.
9 A timber beam of rectangular section is simply supported at the ends and carries the point load at the centre of the beam. The maximum bending stress is 12N/mm2 and shear stress is 1N/mm2. Find the ratio of the span to the depth.

Unit – 4

Part – A

1 Write any two relations between actual beam and conjugate beam.
2 When do you prefer Moment area method?
3 What is the value of maximum bending moment for a S.S beam of length L, whe it is subjected to central point load W?
4 What is the value of maximum bending moment for a S.S beam of length L, whe

it is subjected to uniformly distributed point load w?

5 What is meant by double integration method?

6 Write the boundary conditions for fixed end.

7 What do you mean by deflection of beam?

8 Define the term slope.

9 Write the maximum value of slope and deflection for simply supported beam wi point load at centre.

10 Write the maximum value of slope and deflection for cantilever beam with poi load at free end.

11 State the two theorems in Moment area method .

12 When Mecaulay's method is preferred?

13 Write any four methods of finding slope and deflection at a section in a loaded beam.

14 Define slope and deflection.

15 Write boundary condition for cantilever beam.

16 Write boundary condition for simply supported beam.

Part – B

1 Derive deflection of Simply supported beam carrying a point load at centre.

2 A beam of length 6m is simply supported at its ends and carries two point loads of 48 kN and 40kN at a distance of 1m and 3m respectively from the left support. Find (i) Deflection under each load (ii). The point at which the maximum deflection occur and Maximum deflection.

3 A beam of length 5m and of uniform rectangular section is simply supported at its ends. It carries a U.D.L of 8 kN/m run over the entire length. Calculate the width and depth of the beam, if permissible bending stress is 7 N/mm2 and central deflection is not to exceed 1 cm. Take E = 1 X 104 N/mm2

4 A s.s beam of length 5m carries a point load of 5kN at a distance of 3m from the left end. If E = 2 x 10^5 N/mm2 and I = 108 mm2. Determine the slope at the left support and deflection under the point load using conjugate beam method.

5 Derive deflection of a cantilever with a point load at free end using conjugate beam method.

6 Derive slope and deflection of S.S beam subjected to point load at centre using Moment Area method.

7 A Simply supported beam AB of length 4m is carrying a point load 100kN at Its center C. the value of I for the left half is 1 x 108 mm4 and for the right half portion is 2 x 108 mm4. Find the Slope at the two supports and deflection under the load. Take E = 200 GN/m2.

8 Derive slope equation for S.S beam subjected to point load at centre using Macaley's method.

9 A cantilever beam AB of length 2m is carrying a point load 10kN at B. the I for The right half of the cantilever is 2 x 108 mm4. If E = 2 X 108 kN/m2, Find the Slope and deflection at the free end of the cantilever.

10 A beam 4m long, simply supported at its ends, carries a point load W at its centre. If the slope of the ends of the beam is not to exceed 1 degree find the deflection at the centre of the beam.

11 Derive deflection of S.S beam with an eccentric point load.

Unit – 5

Part – A

1 Define obliquity.

2 Define Mohr's circle.

3 Write three cases involved in Mohr's circle method.

4 Normal stress on a section which is inclined at an angle of 30 deg with normal cross section of the bar is _____ if a rectangular bar of cross sectional area 10000mm^2 subjected to an axial load of 20kN.

5 Write formula for normal stress, tangential stress, resultant stress for a member subjected to direct stresses in two mutually perpendicular direction.

6 Write formula for obliquity and max. tangential stress for a member subjected to direct stresses in two mutually perpendicular direction.

7 Define principal plane.

8 Name the two methods for determining stresses on oblique section.

9 Define Principal stress.

10 Write any two cases considered in analytical method for determining stresses on oblique section?

11 State maximum strain energy theory.

12 State maximum shear stress theory.

13 State maximum principal stress theory.

14 What do you mean by principal plane and principal stress?

15 Write equation of normal and shear stresses for a member subjected to only shear stresses.

16 Write equation of normal and shear stresses for a member subjected to direct stresse of two mutually perpendicular direction and shear stresses.

Part – B

1 How to draw Mohr's circle when a body is subjected to two mutually perpendicular tensile stresses of unequal Intensities.

2 The tensile stresses at a point across to mutually perpendicular planes are 120 N/mm2 and 60 N/mm2. Determine the Normal, Tangential and Resultant stresses on a plane inclined at 30 degree to the axis of the minor stress, using Mohr's circle method.

3 Explain maximum shear stress theory.

4 Explain maximum strain energy theory.

5 Find the diameter of a circular bar which is subjected to an axial pull of 160kN, If the maximum allowable shear stress on any section is 65N/mm2.

6 A rectangular bar of cross sectional area 10000mm2 is subjected to an axial load of 20kN. Determine the normal and shear stresses on a section which is inclined

at an angle of 30 deg with normal cross section of the bar.

7 Explain any two methods of theories of failure.

8 Draw Mohr's circle for a member subjected to two mutually perpendicular principle stresses accompanied with shear stress.

9 List out the various types of theories of failure and define them

10 An I section beam 350 mm x 200 mm has a web thickness of 12.5mm and a flange thickness of 25mm. It carries a shearing force of 200kN at a section. Draw shear stress distribution across a section.

11 A beam 4m long, simply supported at its ends, carries a point load W at its centre. If the slope of the ends of the beam is not to exceed 1 degree find the deflection at the centre of the beam.

12 Determine (I) slope at the left support (ii) Deflection under the load and (iii) maximum deflection of a simply supported beam of length 5m, which is carrying a point load of 5kN at a distance of 3m from the left end. Take E = 2 X 10^5 N/mm2 and I = 1 x 10^8 N/mm4.

2030113 - SURVEYING AND GEOMATICS

B.Tech. II Year I Sem **L T P C**

Pre-requisites: - **3 0 0 3**

Course Objectives: The objective of the course is

1. To know the principles and methods of surveying
2. To measure horizontal and vertical- distances and angles
3. To recording of observation accurately and Perform calculations based on the observation
4. To Identify source of errors and rectification methods
5. To apply surveying principles to determine areas and volumes and setting out curves
6. To use modern surveying equipment's for accurate results

Course Outcomes: At the end of the course the student will able to

1. Apply the knowledge to calculate angles, distances and levels
2. Identify data collection methods and prepare field notes for levels, Interpret survey data and compute areas and volumes
3. Understand working principles of survey instruments and apply the knowledge of trigonometric leveling
4. Understand and apply the corrective measures on measurement errors
5. Apply the knowledge on curve alignment by different methods
6. Understand & apply the principles and concepts of modern equipment and its methodologies

UNIT - I

Introduction and Basic Concepts: Introduction, Objectives, classification and principles of surveying, Scales, Shrinkage of Map, Conventional symbols and Code of Signals, Surveying accessories, phases of surveying.

Different methods of distance measurement, direct methods of distance measurement using chain/tape, ranging, Tape corrections.

Compass and its types, Bearings, Included angles, Local Attraction, Magnetic Declination and dip

Learning Outcomes:

At the end of the unit, students should able to

- Understand the concepts and classification of surveying, conventional symbols used for mentioning the different objects in the field, list of accessories used for surveying.
- Do the corrections if any during the measurement of distances.
- Measure the bearings in prismatic compass, converting WCB to RB and vice versa, Also to correct the bearings if any local attraction and calculate the included angle of a traverse.

UNIT - II

Leveling- Types of levels and levelling staves, temporary adjustments, methods of levelling, booking and Determination of levels, Effect of Curvature of Earth and Refraction.

Contouring- Characteristics and uses of Contours, methods of contour surveying.

Areas and volumes - Determination of areas for regular and irregular boundary, Determination of volume of earth work for level section, volume of borrow pits, capacity of reservoirs.

Learning Outcomes:

At the end of the unit, students should able to

- Understand reduced level, elevation, fore sight, inter sight, back sight, bench mark, different levels & staves and also to write field book by different methods.
- Draw the contour map using different methods; understand the characteristics and uses of contour lines.
- Calculate the quantity of earth work from contour map using different formula

UNIT - III

Theodolite Surveying: Types of Theodolites, Fundamental Lines, temporary adjustments, measurement of horizontal angle by repetition and reiteration method, measurement of vertical Angle, Trigonometrical levelling when base is accessible and inaccessible.

Tacheometric Surveying: Principles of Tacheometry, stadia and tangential methods of Tacheometry

Learning Outcomes:

At the end of the unit, students should able to

- Understand the components of theodolite, terminologies used in theodolite, temporary adjustments, how to measure the horizontal and vertical angles using theodolite.
- Perform trigonometric leveling under the category of base is accessible and inaccessible to measure the height of the object using angular and linear measurements.
- Perform tachometric leveling to measure the height and distance of the object using angular and stadia hair measurements.

UNIT - IV

Traversing: Methods of traversing, traverse computations and adjustments, Omitted measurements.

Curves: Types of curves and their necessity, elements of simple, compound, reverse, transition and vertical curves.

Learning Outcomes:

At the end of the unit, students should able to

- Perform traverse surveying using chain and compass or by optical means.

- Do corrections if any in the traverse measurements.
- Perform the calculation for road alignment using different methods in the field too.

UNIT - V

Modern Surveying Methods: Principle and types of E.D.M. Instruments, Total station-advantages, Applications and Field Procedure, Errors in Total Station Survey, GPS-Principle and Applications.

Photogrammetry Surveying: Introduction, Basic concepts, perspective geometry of aerial photograph, relief and tilt displacements, terrestrial photogrammetry, flight planning; Stereoscopy, ground control extension for photographic mapping- aerial triangulation, radial triangulation, methods; photographic mapping- mapping using paper prints, mapping using stereo plotting instruments, mosaics, map substitutes.

Learning Outcomes:

At the end of the unit, students should able to

- Know the advanced instruments used for surveying and its principle, application, errors due to various circumstances
- Handle total station, GPS for calculating distance, area
- Application and principles of photogrammetry for doing reconnaissance survey, different types, methods and mapping of photogrammetry.

TEXT BOOKS:

1. Surveying (Vol – 1, 2 & 3), by B. C. Punmia, Ashok Kumar Jain and Arun Kumar Jain – Laxmi Publications (P) ltd., New Delhi.
2. Duggal S K, “Surveying (Vol – 1 & 2)”, Tata McGraw Hill Publishing Co. Ltd. New Delhi.
3. N N Basak, “Surveying and Levelling”, Tata McGraw Hill Publishing Co. Ltd. New Delhi.
4. Chandra A M, “Plane Surveying and Higher Surveying”, New age International Pvt. Ltd., Publishers, New Delhi.

REFERENCES:

1. Arthur R Benton and Philip J Taety, Elements of Plane Surveying, Tata McGraw Hill Publishing Co. Ltd. New Delhi.
2. Arora K R “Surveying (Vol 1, 2 & 3), Standard Book House, Delhi.
3. R. Subramanian, “Surveying and Levelling”, Oxford University Press, New Delhi.

Session Planner:

S. No	Unit No.	L. No	Topic Details	Date Planned	Date Conducted	Remarks
1	1	1	Introduction and Basic Concepts			
2	1	2	Introduction, Objectives			

3	1	3	Classification and principles of surveying			
4	1	4	Scales, Shrinkage of Map, Conventional symbols			
5	1	5	Code of Signals, Surveying accessories, phases of surveying			
6	1	6	Different methods of distance measurement			
7	1	7	Direct methods of distance measurement using chain/tape			
8	1	8	Ranging, Tape corrections			
9	1	9	Compass and its types			
10	1	10	Bearings, Included angles			
11	1	11	Local Attraction			
12	1	12	Magnetic Declination and dip			
13	1	13	PPT			
14	1	14	Active Learning			
15	1	15	Unit Test 1			
16	2	16	Leveling- Types of levels and levelling staves			
17	2	17	Temporary adjustments, methods of levelling			
18	2	18	Booking and Determination of levels			
19	2	19	Effect of Curvature of Earth and Refraction			
20	2	20	Contouring- Characteristics			
21	2	21	Uses of Contours			
22	2	22	Methods of contour surveying			
23	2	23	Determination of areas for regular boundary			
24	2	24	Determination of areas for irregular boundary			
25	2	25	Determination of volume of earth work for level section, volume of borrow pits			
26	2	26	Determination of volume of earth work for capacity of reservoirs.			
27	2	27	PPT			
28	2	28	Active Learning			
29	2	29	Unit Test 2			
30	3	30	Theodolite Surveying: Types of Theodolites			
31	3	31	Fundamental Lines, temporary adjustments			
32	3	32	measurement of horizontal angle by repetition method			
33	3	33	measurement of horizontal angle by reiteration method			
34	3	34	Measurement of vertical Angle			

35	3	35	Trigonometrical levelling when base is accessible			
36	3	36	Trigonometrical levelling when base is inaccessible			
37	3	37	Tacheometric Surveying: Principles of Tacheometry			
38	3	38	Stadia methods of Tacheometry			
39	3	39	Tangential methods of Tacheometry			
40	3	40	PPT			
41	3	41	Active Learning			
42	3	42	Unit Test 3			
43	4	43	Traversing: Methods of traversing			
44	4	44	Traverse computations and adjustments			
45	4	45	Omitted measurements			
46	4	46	Curves: Types of curves			
47	4	47	Necessity and elements of simple curve			
48	4	48	Elements of compound curves			
49	4	49	Elements of reverse curves			
50	4	50	Elements of transition curves			
51	4	51	Elements of vertical curves			
52	4	52	PPT			
53	4	53	Active Learning			
54	4	54	Unit Test 4			
55	5	55	Modern Surveying Methods: Principle and types of E.D.M. Instruments			
56	5	56	Total station- advantages, Applications and Field Procedure			
57	5	57	Errors in Total Station Survey			
58	5	58	GPS- Principle and Applications			
59	5	59	Photogrammetry Surveying: Introduction, Basic concepts			
60	5	60	Perspective geometry of aerial photograph, relief and tilt displacements			
61	5	61	Terrestrial photogrammetry, flight planning; Stereoscopy			
62	5	62	Ground control extension for photographic mapping- aerial triangulation, radial triangulation			
63	5	63	Methods; photographic mapping- mapping using paper prints			
64	5	64	Mapping using stereo plotting instruments, mosaics, map substitutes.			
65	5	65	PPT			
66	5	66	Active Learning			

67	5	67	Unit Test 5			

Important Questions:

Unit 1

Part A

1. Define the term Surveying.
2. Define the terms forward and backward bearing. *March 2017 (2), Dec 2017 (2)*
3. Define Dip and Declination. *March 2017 (5)*
4. Define the terms Meridian and Bearing. *March 2017 (5)*
5. Define the term included angle.
6. Define the term Traverse.
7. Define the term local attraction and how will you determine it in a closed traverse? *Dec 2017 (3)*
8. Define the term Ranging.

Part B

1. What are the different classifications of surveying? Explain them. Dec 2016.
2. List out the tape corrections.
3. List out the principles of surveying.
4. What are the different classification of surveying?
5. Write down the different types of traverse. May 2018
6. What are the objectives of plane and geodetic surveying? March 2017 (2), Dec 2017
7. Difference between prismatic compass and surveyor compass. March 2017 (5)
8. At what stations do you suspect local attraction? Find the correct bearings of lines and also compute the included angles.

Line	F.B	B.B
AB	66^0- 20’	246^0- 20’
BC	139^0- 30’	318^0- 50’
CD	189^0- 40’	11^0- 20’
DA	300^0- 30’	119^0- 30’

9. The following are the observed bearings of the lines of a traverse ABCDE with a compass in a place where local attraction was suspected. Find the corrected fore and back bearing and the true bearing of each line given that the magnetic declination was 1^0E.

Line	FB	BB
AB	$38^0$30’	$219^0$15’
BC	$100^0$45’	$278^0$30’
CD	$25^0$45’	$207^0$15’
DE	$325^0$15’	$145^0$15’

10. A steel tape exactly 30m long at 18°C when supported throughout its length under a pull of 8 kg, A line was measured with a tape under a pull of 12 kg and found to be 1602 m. The mean temperature during the measurement was 26^0 C. Assuming the tape to be supported at every 30m,calculate the length of the line, given that

cross sectional area of the tape is 0.04 sq.cm, the weight of 1 cc = 0.0077 kg, the coefficient of expansion=0.000012 per 1°C,and the modulus of elasticity = 2.1 x 10^3 kg / sq.cm.

Unit – 2

Part - A

1. Define the term Levelling. What are the uses of leveling?
2. Define and distinguish between 'Back sights' and 'Fore sight' in the process of fly Levelling. *Dec 2017*
3. Define the term benchmark and reduced level.
4. Define the term sensitivity of a bubble. State any two factors affecting the same. *May 2018 (3)*
5. Define the terms contour, contour interval and, horizontal equivalent. *Dec 2016 (2), Dec 2017 (2)*
6. What do you mean by datum surface?
7. What is mean by line of collimation and height of collimation?
8. Explain the theory of direct leveling.
1. Write the different types of levels. March 2017
2. List the essential parts of a Level.
3. What are the different type's leveling staffs?
4. List out the various sources of errors in levelling. Dec 2017
5. What are the different kinds of bench marks?
6. List out the methods used to compute the reduced levels. May 2018
7. List out the problems in leveling. May 2018
8. Write the different formulae to calculate the area of the irregular plate.
9. Distinguish between differential levelling and reciprocal levelling.
10. What are the different Characteristics of contour? May 2018
11. What are the uses of contours?
12. Write the formula for curvature correction, refraction correction and combined correction.
13. What are the various methods of levelling? Describe them briefly. March 2017

Part - B

1. Different types of Levelling.
2. The following consecutive readings were taken with a dumpy level and 4m levelling staff on a continuously sloping ground at 30m interval. 0.680, 1.455, 1.855, 2.330, 2.885, 3.380, 1.055, 1.860, 2.265, 3.540, 0.835, 0.945, 1.530 and 2.250m. The R.L of a starting point was 80.750m. *Dec 2016.*
   a) Carry out the reduction of height by the collimation height method
   b) Determine the gradient of the line joining the first and last points.
3. The following staff readings were taken with a level. The instrument have been shifted after the 4th, 7th and 10th readings. The R.L. of the starting point (B.M) is 100.000m. Enter the readings in the form of level book page and reduce the level by the Rise and Fall method and apply the usual check. *Dec 2017.*

   2.650, 3.740, 3.830, **5.270**, 4.640, 0.380, **0.960**, 1.640, 2.840, **3.480**, 4.680 and 5.260.
4. List the characteristics of contour lines and the usage of contour maps.

5. A contour line must close itself but need not be necessarily within the limits of the map.
6. Write down the different methods of contouring.
7. The latitudes and departures of the lines of a closed are given below. Calculate the area of the closed traverse. March 2017 (5)
8. The following offsets were taken from a chain line to a hedge at regular intervals of 5m. 2.72, 3.46, 5.23, 6.80, 4.86, 3.35, 3.00, 2.50 and 1.60m. Determine the area included between the chain line and the hedge by using
   a) Mid ordinate rule
   b) Average ordinate rule
   c) Trapezoidal rule
   d) Simpson's rule.

Unit - 3

Part – A

1. Define Theodolite surveying and what are the uses of a theodolite?
2. What is the principle of tacheometry? March 2017 (2), May 2018 (2)
3. Define the term Trigonometrical levelling.
4. List the essential qualities of a theodolite telescope. The essential parts of the telescope:
5. List the essential parts of a theodolite.
6. What are the temporary adjustments of the theodolite? *Dec 2016 (2)*
7. List out the permanent adjustments of Theodolite.
8. List out the fundamental lines of Theodolite
9. Name the two methods of measuring horizontal angles using a thedolite. When each method is advantageously used?
10. What are the methods used to find the elevations of the points in the case of inaccessible points? Differentiate that?
11. Differentiate between the Vernier theodolite and Micrometer theodolite.
12. Why a type of theodolite is called a transit theodolite?
13. State what errors are eliminated by repetition method. *May 2018 (5)*
14. Describe face left and face right in theodolite. Mar 2017 (2)
15. What is tacheometer? What are the systems of tacheometric measurements? May 2018.
16. What are the advantage of tacheometric surveying over other methods? May 2018

Part - B

1. List out the methods for measuring horizontal angle and explain any two methods in detail.
2. Derive distance equation for staff vertical condition and explain the role of anallactic lens in stadia tacheometry. March 2017 (5)
3. The purpose of analectic lens in the stadia tachometry is that to make the multiplying constant (K) value is 100 and the additive constant (C) value is become 0, to reduce the calculation part.
4. A road at the formation level is 6m wide and has a side slope of 2:1, The road is to have a constant R.L. of 200m. The ground level across the centre line of the road. The following observations were made:

Chainage (m)	0	20	40	60	80	100
Surface along the centre line of road	204.6	203	200.8	201.6	202	200.2

Estimate the volume of earth work.

5. The following consecutive readings were taken with a dumpy level and 4m leveling staff on a continuously sloping ground at 30m intervals: 0.680, 1.455, 1.855, 2.330, 2.885, 3.380, 1.055, 1.860, 2.265, 3.540, 0.835, 0.945, 1.530 and 2.250m. The R.L. of a starting point was 100.000m.

a) Carry out reduction of heights by collimation method

b) Determine the gradient of the line joining the first and last points.

6. The following consecutive readings were taken with a dumpy level along a chain line at a common interval of 15 m. The first reading was at a chainage of 150 m where the R.L. is 100.000 m. The instrument was shifted after the fourth and ninth reading. 3.150, 2.245, 1.125, 0.860, 3.125, 2.760, 1.835, 1.470, 1.965, 1.225, 2.390 and 3.035m. Enter the above readings in a level book and calculate the R.L. of all the points by i) Height of instrument method ii) Rise and fall method.
7. List out the characteristics of contour.
8. The following perpendicular offsets were taken at 10 metres intervals from a survey line to an irregular boundary line. 3.25, 5.60, 4.20, 6.65, 8.75, 6.20, 3.25, 4.20, 5.65m.
9. Calculate the area using average ordinate rule, trapezoidal rule and simpson's rule.
10. List out the methods of contouring and explain any one method in detail.
11. Differentiate between stadia and tangential tacheometry. Dec 2016 (3).

Unit – 4

Part - A

1. Define the term closing error.
2. Define the term Balancing. What are the methods used to balancing the traverse?
3. Define the term Omitted measurements.
4. What is traversing? And list the types of traverse available.
5. What are the methods used to plot the traverse?
6. Explain the Bowditch's rule in balancing the traverse.
7. What is Gale's table? What is its use?
8. What is closed traverse? What are the two checks applicable in this case?
9. Difference between simple and compound curves. March 2017 (2)

Part - B

1. Explain clearly, how a traverse is balanced? *May 2018 (5)*
2. What are the elements of simple circular curve? *March 2017 (4)*
3. List out the methods for setting out simple curve by chain and tape. *Dec 2016 (2), Dec 2018 (5)*

4. A tacheometer was setup at a station C and the following readings were obtained on a staff vertically held. Calculate the horizontal distance CD and R.L of D. Where, K=100, C=0.

Inst. Station	Staff Station	Vertical Angle	Hair Readings (m)	Remarks
C	BM	- 5º20'	1.150, 1.800, 2.450	R.L of B.M
D		+ 8º12'	0.750, 1.500, 2.250	= 750.500m

5. A circular curve has a 200m radius and 650 deflection angles. Calculate i) Length of curve ii) Tangent length iii) Length of the chord iv) Apex distance v) Mid-ordinate.

6. To find the RL of station B, two observations are taken by a theodolite from station A. One to a BM, the other to the station B. Calculate the RL of B and the distances between the BM to B. The records are follows.

Inst. Station	Staff Station	Target	Vertical Angle	Staff Reading	Remarks
A	BM	Lower	- 10º00'	0.655	R.L of B.M
		Upper	- 7º00'	2.655	= 510.500m
A	B	Lower	- 5º00'	1.250	
		Upper	+ 4º00'	3.200	

7. A closed traverse ABCD was made; due to obstructions it was not possible to observe the bearings of line BC and CD. Calculate the missed observations.

Line	Length (m)	Bearing
AB	550	60^0
BC	1200	?
CD	880	?
DA	1050	310^0

8. Tabulate the necessary data to set out a right handed circular curve of radius 600m, to connect two straights intersecting at a chainage of 3605m by Rankines method of deflection angle, the angle of deflection angel being 25^0 and peg interval is 30m.

9. What is omitted measurements? List out the cases of omitted measurements. And explain any one case with neat sketch.

Unit – 5

Part - A

1. What are the principles of electronic theodolite.
2. Describe about total station and state its advantage over other methods of surveying.
3. State four uses and application of GPS.
4. What are the applications of Total station?
5. What are the working principles of EDM instrument?
6. Explain about the electromagnetic wave theory.
7. What are the components of Global Positioning System?
8. Explain about the different types of EDM instruments.
9. Explain about the different types errors in EDM instrument.

Part - B

1. Write down the classification of photographs. Explain them in detail.
2. Describe about total station and state its advantage over other methods of surveying.
3. Explain types of projection in photogrammetry.
4. Describe components and functions of satellite segments.
5. State uses and application of GPS.
6. Explain briefly about Terrestrial photogrammetry
7. Define the terms: Aerial Photograph, Mosaic, Map, Lens
8. Write down the working principle and operation of EDM instrument

2030004 - PROBABILITY AND STATISTICS
(Common to CIVIL, CSE and IT branches)

B.Tech. II Year I Sem **L T P C**

Pre-requisites:- **3 1 0 4**

Course Objectives: To learn

1. The ideas of probability and random variables and various discrete and continuous probability distributions and their properties.
2. The basic ideas of statistics including measures of central tendency, correlation and regression.
3. The statistical methods of studying data samples.
4. The sampling theory and testing of hypothesis and making inferences.

Course Outcomes: At the end of the course the student will able to

1. Formulate and solve problems involving random variables and apply statistical methods for analysing experimental data.
2. Apply discrete and continuous probability distributions.
3. Classify the concepts of data science and its importance.
4. Infer the statistical inferential methods based on small and large sampling tests.
5. Interpret the association of characteristics through correlation and regression tools.

UNIT - I

Probability and Random Variables

Probability: Sample Space, Events, Probability of an Event, Additive Rules, conditional probability, independent events, Product Rule and Bayes' theorem.

Random variables: Discrete and continuous random variables. Expectation, Mean and Variance of random variables. Chebyshev's inequality.

Learning Outcomes:

- Understand the concept of probability
- Explain the notion of random variable, distribution functions and expected value.
- Apply Baye's theorem to real time problems
- Analyse the mean and variance of random variables
- Evaluate the probability of event for more complex outcomes.

UNIT - II

Probability Distributions & Estimation

Probability distribution-Binomial, Poisson approximation to the binomial distribution, uniform,exponential and Normal distribution. Estimation.: Estimating the Mean, Standard Error of a Point Estimate, Prediction Intervals, Tolerance Limits, Estimating the Variance, Estimating a Proportion for single mean, Difference between Two Means, between Two Proportions for Two Samples and Maximum Likelihood Estimation.

Learning Outcomes:

- Understand the concept of Probability distribution.

- Explain the statistical parameters
- Apply Binomial and Poisson distributions for real data
- Analyse the properties of Normal distribution and its applications.
- Evaluate probabilities, theoretical frequencies.

UNIT - III

Sampling theory and Small samples

Population and sample, parameters and statistics; sampling distribution of means (⌐ known)-central limit theorem, t-distribution, sampling distribution of means (⌐ unknown)-sampling distribution of variances-chi-square and F-distributions, point estimation, maximum error of estimation, interval estimation.

Learning Outcomes:

- Understand the concept of sampling and estimation.
- Explain the concept of estimation, interval estimation and confidence intervals
- Apply distribution problems in real world.
- Analyse the types of distributions
- Evaluate the maximum error of estimation, interval estimation

UNIT - IV

Testing of Hypothesis & Stochastic Processes and Markov Chains:

Large sample test for single proportion, difference of proportions, single mean, difference of means; Introduction to Stochastic processes- Markov process. Transition Probability, Transition Probability Matrix, First order and Higher order Markov process, n- step transition probabilities, Markov chain, Steady state condition, Markov analysis.

Learning Outcomes:

- Understand the concept of testing of hypothesis
- Explain the single proportions and difference of proportions.
- Apply the concept of hypothesis testing for large samples.
- Analyse testing hypothesis for small samples to draw the inference.
- Evaluate single mean and difference of means for small samples.

UNIT - V

Curve Fitting For Statistical Data

Curve fitting by the method of least squares- fitting of straight lines, second degree parabolas and more general curves; Correlation and regression – Rank correlation.

Learning Outcomes:

- Understand the concept of curve fitting.
- Explain the Method of least squares.
- Apply the Correlation and regression to real data
- Analyse polynomial curve – fitting, general curve fitting and interpolation
- Evaluate Rank correlation.

TEXT BOOKS:

1. Ronald E. Walpole, Raymond H. Myers, Sharon L. Myers, keying Ye, Probability and statistics for engineers and scientists, 9th Edition, Pearson Publications.
2. Fundamentals of Mathematical Statistics, Khanna Publications, S C Guptas and V.K. Kapoor.

REFERENCES:

1. Miller and Freund's, Probability and Statistics for Engineers, 8th Edition, Pearson Educations
2. S. Ross, A First Course in Probability, 6th Ed., Pearson Education India, 2002.

Session Planner

S. No	Unit No.	L. No	Topic Details	Date Planned	Date Conducted	Remarks
1	1	1	Probability: Sample Space, Events			
2	1	2	Probability of an Event, Additive Rules			
3	1	3	Conditional probability			
4	1	4	Independent events			
5	1	5	Product Rule and Bayes' theorem.			
6	1	6	Random variables: Discrete and continuous random variables.			
7	1	7	Random variables: Discrete and continuous random variables.			
8	1	8	Expectation, Mean and Variance of random variables. Chebyshev's inequality.			
9	1	9	Expectation, Mean and Variance of random variables. Chebyshev's inequality.			
10	1	10	Expectation, Mean and Variance of random variables. Chebyshev's inequality.			
11	1	11	Expectation, Mean and Variance of random variables. Chebyshev's inequality.			
12	1	12	PPT			
13	1	13	Active Learning			
14	1	14	Unit Test 1			
15	2	15	Probability distribution-Binomial			
16	2	16	Poisson approximation to the binomial distribution, uniform			
17	2	17	Exponential and Normal distribution.			
18	2	18	Estimation.: Estimating the Mean			
19	2	19	Standard Error of a Point Estimate			
20	2	20	Prediction Intervals, Tolerance Limits			
21	2	21	Estimating the Variance, Estimating a Proportion for single mean			
22	2	22	Difference between Two Means			

23	2	23	Two Proportions for Two Samples and Maximum Likelihood Estimation.			
24	2	24	Two Proportions for Two Samples and Maximum Likelihood Estimation.			
25	2	25	PPT			
26	2	26	Active Learning			
27	2	27	Unit Test 2			
28	3	28	Population and sample			
29	3	29	Parameters and statistics			
30	3	30	Sampling distribution of means (⌐ known)			
31	3	31	Central limit theorem, t-distribution			
32	3	32	Sampling distribution of means (⌐ unknown)			
33	3	33	Sampling distribution of variances-chi-square			
34	3	34	Sampling distribution of variances F-distributions			
35	3	35	Point estimation			
36	3	36	Maximum error of estimation			
37	3	37	Interval estimation.			
38	3	38	PPT			
39	3	39	Active Learning			
40	3	40	Unit Test 3			
41	4	41	Large sample test for single proportion,			
42	4	42	Difference of proportions			
43	4	43	Single mean, difference of means;			
44	4	44	Introduction to Stochastic processes- Markov process.			
45	4	45	Transition Probability			
46	4	46	Transition Probability Matrix			
47	4	47	First order and Higher order Markov process			
48	4	48	n- step transition probabilities			
49	4	49	Markov chain			
50	4	50	Steady state condition			
51	4	51	Markov analysis.			
52	4	52	PPT			
53	4	53	Active Learning			
54	4	54	Unit Test 4			
55	5	55	Curve fitting by the method of least squares			
56	5	56	Curve fitting by the method of least squares			
57	5	57	Fitting of straight lines			
58	5	58	Fitting of straight lines			
59	5	59	Second degree parabolas			
60	5	60	Second degree parabolas			
61	5	61	Second degree parabolas			

62	5	62	More general curves			
63	5	63	Correlation and regression – Rank correlation.			
64	5	64	Correlation and regression – Rank correlation.			
65	5	65	PPT			
66	5	66	Active Learning			
67	5	67	Unit Test 5			

Important Questions:

Unit – 1

Part - A

1. If the probability density function of a random variable X is f(x) = ¼ in – 2 < x < 2 find P($|x| > 1$)
2. If X is a geometric variate, taking values 1,2,3…..∞, $find\ P(X\ is\ odd)$
3. State the memory less property of the exponential distribution.
4. The mean and variance of binomial distribution are 5 and 4 Find the distribution of *X*.
5. The mean of Binomial distribution is 20 and standard deviation is 4. Find the parameters of the distribution.
6. If the events *A* and *B* are independent then show that $\bar{A}$ and $\bar{B}$are independent.
9. If 3% of the electric bulbs manufactured by a company are defective, Find the probability that in a sample of 100 bulbs exactly 5 bulbs are defective.
10. If a random variable X has the MGF $M_X(t) = \frac{2}{2-t}$. Find the standard deviation of X.
11. Show that the function $f(x) = \begin{cases} e^{-x}, x \geq 0 \\ 0, \quad x < 0 \end{cases}$ is a probability density function of a continuous random variable X.
12. Show that the moment generating function of the uniform distribution $f(x) = \frac{1}{2a}, -a < x < a,$ about origin is $\frac{sinh(at)}{at}$.
13. If the MGF of a uniform distribution for a RV X is $\frac{1}{t}(e^{5t} - e^{4t})$. Find E(X).
14. *A* is known to hit the target in 2 out of 5 shots whereas *B* is known to hit the target in 3 of 4 shots. Find the probability of the target being hit when they both try?
15. If the probability that a communication system has high selectivity is 0.54 and the probability that it will have fidelity is 0.81 and the probability that it will have both is 0.18. Find the probability that a system with high fidelity will have high selectivity.
16. If A and B are events in S suche that $P(A) = 1/3$, $P(B) = 1/4$ and $P(A \cup A) =$

1/2 . Find $P(A \cap \bar{B})$ and $P(A|\bar{B})$.

17. The number of hardware failures of a computer system in a week of operations has the following Pdf, Evaluate the mean of the number of failures in a week.

No.of failures	0	1	2	3	4	5	6
Probability	.18	.28	.25	.18	.06	.04	.01

18. The number of hardware failures of a computer system in a week of operations has the following p.d.f, Calculate the value of K.

No.of failures	0	1	2	3	4	5	6
Probability	K	2 K	2 K	K	3 K	K	4 K

19. Suppose that, on an average , in every three pages of a book there is one typographical error. If the number of typographical errors on a single page of the book is a Poisson random variable. What is the probability if at least one error on a specific page of the book?

20. The probability that a candidate can pass in an examination is 0.6. What is the probability that he will pass in third trial?

Part – B

1.(a) A random variable X has the following probability distribution:X 0 1 2 3 4 5 6 7
P(X) 0 k 2□ 2□ 3□ □^{2} 2□^{2} 7□^{2}+k Identify (i) the value of □ (ii) □(1.5 < □ < 4.5 / □ > 2)

1. (b) Give the MGF of Binomial distribution and hence find its mean and variance.

2. (a) A bolt is manufactured by 3 machines *A, B,* and *C*. *A* turns out twice as many items as *B* and machines *B* and *C* produce equal number of items. 2% of bolts produced by *A* and *B* are defective and 4% of bolts produced by *C* are defective. All bolts are put into 1 stock pile and 1 is chosen from this pile. What is the probability that it is defective?

2.(b) Find the moment generating function of a geometric random variable. Also find its mean..

3. (a) The probability distribution of an infinite discrete distribution is given by P[X = j] = $\frac{1}{2^{\square}}$ (j = 1,2,3…) Find (1)Mean of X, (2)P [X is even],(3) P(X is odd)

3.(b) Find the MGF of Poisson distribution and hence find its mean and variance.

4. (a) An urn contains 10 white and 3 black balls. Another urn contains 3 white and5 black balls. Two balls are drawn at random from the first urn and placed in the second urn and then 1 ball is taken at random from the latter. What is the probability that it is a white ball?

4.(b) Find the MGF of Uniform distribution and hence find its mean and variance.

5.(b) The probability of a man hitting a target is 1.4. If he fires 7 times, what is the probability of his hitting the target at least twice? And how many times must he fire so that the probability of his hitting the target at least once is greater

	than 2/3?
6. (a)	0, □□ □ < −1 A random variable X has cdf □(□) = {□(1 + □), □□ − 1 < □ < 1 . 1, □□ □ ≥ 1 Find the value of a. also P(X>1/4) and □(−0.5 ≤ □ ≤ 0).
6.(b)	State and Prove forget fullness property of exponential distribution . Using this property solve the following problem: The length of the shower on a tropical island during the rainy season has on exponential distribution with parameter 2, time being measured in minutes. What is the probability that a shower will last more than 3 minutes.
7. (a)	In a normal population with mean 15 and standard deviation 3.5, it is found that 647 observations exceed 16.25. What is the total number of observations in the population.
8. (a)	The marks obtained by a number of students for a certain subject is assumed to be normally distributed with mean 65 and standard deviation 5.If 3 students are taken at random from this set Find the probability that exactly 2 of them will have marks over 70?
8.(b)	A bag contains 5 balls and it is not known how many of them are white. Two balls are drawn at random from the bag and they are noted to be white. What is the change that all balls in the bag are white?
9.(a)	Out of 2000 families with 4 children each , Find how many family would you expect to have i) at least 1 boy ii) 2 boys iii) 1 or 2 girls iv) no girls
9.(b)	In an Engineering examination, a student is considered to have failed, secured second class, first class and distinction, according as he scores less than 45%,between 45% and 60% between 60% and 75% and above 75%respectively. In a particular year 10% of the students failed in the examination and 5% of the students get distinction. Find the percentage of students who have got first class and second class. Assume normal distribution of marks.
10.(a)	In a certain city , the daily consumption of electric power in millions of kilowatt hours can be treated as a RV having Gamma distribution with parameters λ = ½ and k =3.If the power plant of this city has a daily capacity of 12 million kilowatt – hours, Find the probability that this power supply will be inadequate on any given day?
10.(b)	Suppose that the life of a industrial lamp in 1,000 of hours is exponentially distributed with mean life of 3,000 hours. Find the probability that (i)The lamp last more than the mean life (ii) The lamp last between 2,000 and 3,000 hours (iii) The lamp last another 1,000 hours given that it has already lasted for 250 hours.
11.(a)	Assume that 50% of all engineering students are good in mathematics. Determine the probabilities that among 18 engineering students (i) exactly 10, (ii) atleast 10 are good in mathematics. The life (in years) of a certain electrical switch has an exponential distribution

Unit – 2

Part - A

1. Define the distribution function of two dimensional random variables (X,Y) . State any two properties.

2. If the joint pdf of (X, Y) is $f(x, y) = \begin{cases} \frac{1}{4}, & 0 < x, y < 2 \\ 0, & otherwise \end{cases}$. Find $P(x + y \leq 1)$.

3. Let X and Y be random variables with joint density function $f(x,y) = \begin{cases} 4xy, & 0 \leq x \leq 1,\ 0 \leq y \leq 1 \\ 0, & otherwise \end{cases}$ formulate the value of E(XY)

4. The joint probability density function of the random variable (X,Y) isgiven by $f(x, y) = Kxye^{-(x^2 + y^2)}, \quad x \geq 0, \quad y \geq 0$ Calculate the value of K.

5. If X has mean 4 and variance 9 while Y has mean -2 and variance 5, they two are independent, Identify Var (2X + Y-5).

6. Assume that the random variable X and Y have the probability density function f(x,y). What is E(E(X/Y)) ?.

7 If X and Y are RVs such that Y = aX + b where a and b are real constants ,show that the correlation coefficient between them has magnitude 1.

8 What do you mean by correlation between two random variables

9 Distinguish between correlation and regression.

10 If X,Y denote the deviation of variance from the arithmetic mean and if $r = 0.5, \sum dx = 120, dy = 8, \sum dy^2 = 90$, Find n, the number of times.

11 The regression equations are x + 6y = 14 and 2x + 3y = 1.Point out the correlation coefficient between X & Y .

12 Give the acute angle between the two lines of regression.

13 The correlation coefficient of two random variables X and Y is - 4 and their variances are 3 and 5. Find the covariance.

14 The two regression lines X+6Y=14, 2X+3Y=1. Find the mean values of X and Y.

15 State Central Limit Theorem.

Part - B

1.(a) Three balls are drawn at random without replacement from a box containing 2 white, 3 red and 4 blue balls. If X denotes the number of white balls drawn and Y denotes the number of red balls drawn, Identify the probability distribution of X and Y.

2.(a) The joint distribution of X and Y is given by $f(x, y) = \frac{x+y}{21}$, $x = 1,2,3$; $y = 1,2$. Find the marginal distributions.

2.(b) If the joint probability distribution function of a two dimensional random variable (X,Y) is given by

3. (a) If the joint pdf of (X, Y) is given by p(x, y)= K(2x+3y), x=0, 1, 2, 3. Find all the

marginal probability distribution. Also find the probability distribution of (X+Y).

6. (a) The two dimensional random variable (X, Y) has the joint probability mass function □(□, □) = $\frac{□+2□}{27}$, □ = 0,1,2; □ = 0,1,2. Find the conditional distribution of Y for X= □. Also find the conditional distribution of Y given X=1.

6.(b) Find □(□ < □/□ < 2□) if the joint pdf of (□, □) is □(□, □) = □$^{-(□+□)}$, 0 ≤ □ < ∞, 0 ≤ □ < ∞.

7. (a) From the following data , Give (i)The two regression equations (ii) The coefficient of correlation between the marks in Mathematics and Statistics (iii) The most likely marks in Statistics when marks in Mathematics are 30

Marks in Maths : 25 28 35 32 31 36 29 38 34 32

Marks in Statistics: 43 46 49 41 36 32 31 30 33 39

7.(b) Two random variables X and Y have the following joint probability density function □(□, □) = {□ + □; 0 ≤ □ ≤ 1, 0 ≤ □ ≤ 1 Formulate the

0, □□*h*□□□□□□.

8.(a) probability density function of the random variable U = XY.

Estimate the correlation coefficient for the following heights of fathers

X, their sons Y

X	65	66	67	67	68	69	70	72
Y	67	68	65	68	72	72	69	71

9.(a) The lifetime of a certain brand of an electric bulb may be considered a RV with mean 1200h and standard deviation 250h. Find the probability,using central limit theorem, that the average life time of 60 bulbs exceeds 1250 h.

10.(a) The equation of two regression lines obtained by in a correlation analysis is as follows: 3x + 12y = 19 , 3y + 9x =46.(i) Calculate the correlation coefficient (ii)Mean value of X &Y.

11.(a) If X and Y independent Random Variables with pdf $e^{□x}, x □ 0$ and $e^{□y}, y □ 0$. Find the density function of $U □ \frac{X}{X □ Y}$ and $V □ X □ Y$. Are they independent.

11.(b) A distribution with unknown mean has variance equal to 1.5. Use centrallimit theorem to find how large a sample should be taken from the distribution in order that the probability will be atleast 0.95 that the sample mean will be within 0.5 of the population mean.

Unit – 3

Part - A

1. Define a random process? When do you say a random process is a random variable?
2. Define strict sense and wide sense stationary process.
3. Define a semi-random telegraph signal process.
4. Define Markov process.
5. Define Binomial process and state its properties. Give an example for its sample function.
6. Define Markov chain and one – step transition probability.
7. Give the four types of a stochastic process.
8. Give an example for a continuous time random process.
9. State the postulates of a Poisson process.
10. State any two properties of Poisson process.
11. Prove that a first order stationary random process has a constant mean.
12. Show that the random process X(t) = A cos ($\omega_o t + \theta$) is not stationaryif A and ω_o are constants and θ is uniformly distributed in (0, π).
13. Give an example of evolutionary random process.
14. Write a detailed note on Sine wave process.
15. When is a Markov chain, called homogeneous?
16. When is a Random process said to be ergodic. Give an example of an ergodic process.
17. If the TPM of a Markov chain is $\begin{pmatrix} 0 & 1 \\ \frac{1}{2} & \frac{1}{2} \end{pmatrix}$, find the steady state distribution of the chain.
18. If the customers arrive at a bank according to poisson process with mean rate 2 oer minute. Find the probability that during a 1-minute interval no customer arrives.
19. A gambler has Rs.2. He bets Rs.1 at a time and wins Rs.1 with probability ½ . He stops playing if he loses Rs. 2 or wins Rs.4. Formulate the transition probability matrix for the Markov chain.
20. Let X(t) be a Poisson process with rate λ. Formulate E(X(t)X(t + τ)), where $\tau > 0$.

Part – B

1.(a) If X(t) = Y cos wt + Z sin wt, where Y and Z are two independent normal randomvariables with E(Y) = 0 = E(Z) , $E(Y^2) = E(Z^2) = \sigma^2$and w is a constant, Examine that {X(t)} is a strict sense Stationary process of order 2.

1. (b) Prove that random telegraph process {$\lambda(\tau)$} is a wide sense stationary process.

2.(b) A radioactive source emits particles at a rate of 5 per minute in accordance with Poisson process. Each particle emitted has a probability 0.6 of being recorded. Estimate the probability that 10 particles are recorded in 4 minute period.

3. (a) A random process X (t) is defined by □(□) = □ □□□□□ + □□□□□□, −∞ < □ < ∞ where A, B are independent RV each of which has thevalue -2 with probability 1/3 and a value 1 with probability 2/3. Examine that X (t) is a wide sense stationary process.

3.(b) Suppose that customers arrive at a bank according to a Poisson process with a mean rate of 3 per minute. Calculate the probability that during a time interval of 2 minutes (i) exactly 4 customers arrive and (ii) more than 4 customers arrive.

4.(b) Explain that the random process □(□) = □ □□□(□□ + □) is wide sense stationary ,if A and w are constants and □ is a uniformly distributed random variable in (0, 2□).

5. (a) A man either drives a car or catches a train to go to office each day. He never goes 2 days in a row by train but if he drives one day, thenthe next day he is just as likely to drive again as he is to travel by train. Now suppose that on the first day of the week, the man tossed a fair die and drove to work if and only if a 6 appeared. Calculate (i) the probability that he takes a train on the thirdday and (ii) the probability that he drives to work in the long run.

6. (a) If the random process { □(□)} takes the value -1 with probability $\frac{1}{3}$ and takes the value +1 with probability $\frac{2}{3}$ find whether { □(□)} is a stationary process or not.

6.(b) A fair die is tossed repeatedly. The maximum of the first ‘n’ outcomes is denoted by □□. Is {□□, □ = 1,2, … } a Markov chain? If so, Find its transition probability matrix, also find □{□2 = 6}□□□ □2.

7. (a) A fisherman catches a fish at a poisson rate of 2 per hour from a large lake with lots of fish. If he starts fishing at 10.00 a.m. What is the probability that he catches one fish by 10.30 a.m and three fishes by noon.

7. (b) A machine goes out of order whenever a component fails. The failure of this part follows a Poisson process with mean rate of 1 per week. Find the probability that 2 weeks have a elapsed since last failure. If there are 5 spare parts of this component in an inventory and that the next supply is not due in 10 weeks, find the probability that the machine will not be out of order in the next 10 weeks.

8. (a) Three boys A,B,C are throwing a ball to each other. A always throw the ball to B and B always throws to C but C is just as likely to thow the ball to B as to A. Identify that the process is Markovian. Find the transition matrix and classify the states.

8.(b) Given a RV Y with characteristic function □(□) = □(□□□□) and a random process defined by □(□) = cos(□□ + □). Judge that X(t) is stationary in wide sense if □(1) = □(2) = 0.

9. (a) An engineer analysing a series of digital signal generated by a testing system observers that only 1 out of 15 highly distorted signals follows a highly distorted signal, with no recognizable signal between , whereas 20 out of 23 recognizable signals follow recognizable signals, with no highly distorted signal between. Given that only highly distorted signals are not recognizable, Identify the limiting probability of the signals generated by the testing system are highly distorted.

10.(b) On the average , a submarine on patrol sights 6 enemy ships per hour. Assuming that the no. of ships sighted in a given length of time is a Poisson variate, Point out the probability of sighting (i) 6 ships in the next half-an-hour, (ii) 4 ships in the next 2 hours (iii) at least 1 ship in the next 15 min and (iv) at least 2 ships in the next 20 minutes.

Unit – 4

Part - A

1. Define autocorrelation function and prove that for a WSS Process{X(t)}, $R_{xx}(-\tau) = R_{xx}(\tau)$
2. Define Cross correlation function and state any two of its properties
3. State any two properties of an auto correlation function.
4. Define the power spectral density and cross power spectral density of a random process
5. Give an example of cross – spectral density.
6. State and prove any one of the properties of cross – spectral density function.
7. Estimate the variance of the stationary process { X (t)} whose auto correlation function is given by $R(\tau) = 2+4e^{-2|\tau|}$
8. Estimate the variance of the stationary process {X(t)}, whose auto correlation function is given by□□□(□) = 16 + $\left(\frac{9}{1+6\tau^2}\right)$.
9. Given that the autocorrelation function for a stationary ergodic process with no periodic components is□□□(□) = 25 + $\left(\frac{4}{1+6\tau^2}\right)$. Estimate the mean and variance of the process {X(t)}.
10. Prove that □□□(□) = □□□(−□).
11. The random process X(t) has an autocorrelation function
12. State any two properties of cross-power density spectrums.

Part – B

1.(a) The power spectral density function of a zero mean WSS process is given by $S(\omega) = \begin{cases} 1, & |\omega| < \omega_0 \\ 0, & otherwise \end{cases}$. Identify R($\tau$) and show that X (t) and X(t+ τ) are uncorrelated.

1.(b) Consider two random processes X(t) = 3 cos(ωt + θ) and Y(t) = 2 cos (ωt + θ - π/2) where θ is a random variable uniformly distributed in (0 , 2 π). Give the proof for $R_{xx}(0)R_{yy}(0) \geq R_{xy}(\tau)$.

2.(a) Identify the power spectral density of a random binary transmission process where auto correlation function is $R(\tau) = 1 - |\tau|; |\tau| \leq 1$.

2.(b) If the power spectral density of a continuous process is $S(\omega) = \frac{\omega^2+9}{\omega^4+5\omega^2+4}$, Give the mean value, mean- square value of the process.

3.(a) The auto correlation function of a random process is given by $R_{XX}(\tau) = AA^{-\alpha-|\tau|}\cos(\omega_0\tau)$ where A >0, α > 0 and ω_0 are realconstants. Find the power spectrum of X(t).

3.(b) The power spectrum of a wide sense stationary process X(t) is given $S_{XX}(\omega) = \frac{1}{(1+\omega^2)^2}$. Calculate the auto correlation function.

4.(a) Determine the autocorrelation function of the random process withpower spectral density given by $S_{XX}(\omega) = \omega_0, |\omega| \leq \omega_0$.

5.(a) Consider the random process X(t) = Ycosωt, t $\geq$ 0, where ω is a constant and Y is a uniform random variable over (0 , 1) . Identify auto correlation function Rxx(t, s) of X(t)and auto covariance Cxx (t , s) of X(t).

Unit – 5

Part – A

1. Define a linear system with random input
2. Define White Noise.
3. Define Band –Limited white noise.
4. Define system weighting function.
5. Define a system when is it called memory less system.
6. Define stable system.
7. Give an example for a linear system.
8. Check whether the system y(t)=ω^3(ω) is a linear or not.
9. Give the properties of a linear system.
10. Give the relation between input and out put of a linear time invariant system.
11. Show that Y(t) = t X(t) is linear.

12. Find the autocorrelation function of the white noise.

13. Prove that the mean of the output process is the convolution of the mean of the input process and the impulse response.

14. If {X (t)}& {Y(t) } in the system Y(t) = $\int_{-\infty}^{\infty} h(\square)\square(\square-\square)\square\square$ are WSS process explain how the auto correlation function related.

15. Define a system when is it called linear system?

16. If the input of a linear filter is a Gaussian random process, comment about the output random process.

17. State any two properties of cross power density spectrum.

18. What is unit impulse response of a system? Why is it so called?

Part – B

1.(a) If the input to a time- invariant, stable linear system is a WSS process, Examine that the output will also be a WSS process.

1. (b) A circuit has an impulse response given by $h(\square) = \{^{1}; 0 \leq \square \leq \square$. Express $\square$ $\square_{\square\square}(\square)$ in terms of $\square_{\square\square}(\square)$.

2. (a) Identify the output power density spectrum and output correlation function for a system $h(\square) = \square^{-\square}$, $\square \geq 0$, for an input power density system $\frac{h0}{2}$, $-\infty < \square < \infty$.

2.(b) Let Y(t)= X(t)+N(t) be a wide sense stationary process where X(t) is the actual signal and N(t)is the aero mean noise process with variance $\square^2$, $\square$ and independent of X(t). Estimate the power spectral density of Y(t).

3. (a) A random process X(t) with $R_{\square\square}(\square) = \square^{-2|\square|}$ is the input to a linear system whoseimpulse response is $h(\square) = 2\square^{-\square}$, $\square > 0$. Identify the cross correlation coefficient $\square_{\square\square}(\square)$ between the input process X(t) and output process Y(t).

3.(b) Show that $S_{yy}(\square) = \square H(\square\square^2 S_{xx}(\square)$ where $S_{xx}(\square)$ and $S_{yy}(\square)$ are the power spectral density functions of the input X(t) , output Y(t) and H(□) is the system transfer function.

4. (a) A system has an impulse response h(t) = $e^{-\square t}$ U(t), Express the p.s.d. of the output Y(t) corresponding to the input X(t).

4.(b) Assume a random process X(t) is given as input to a system with transfer function $\square(\square)$ =1 for $-\square_0 < \square < \square_0$.If the autocorrelation function of the input process is $\frac{\square_0}{2}\square(\square)$, Point out the autocorrelation function of the output process.

5. (a) Let X(t) be a stationary process with mean 0 and autocorrelation function $□^{-2|□|}$. If X(t) isthe input to a linear system and Y(t) is the output process , Calculate (i) E[Y(t)] (ii) $S_{YY}(□)$ and (iii) $R_{YY}(|□|)$, if the system function $□(□)= \frac{1}{□+2□}$.

5.(b) Evaluate the mean square value of the output signal of a linear system with input auto correlation function $R_{XX}(□) = □^{-4|□|}$ and impulse response $h(t)= 2□^{-7□}$, $□ \geq 0$.

6.(a) A wide sense stationary random process {X(t)} with autocorrelation $R_{XX}(□) = □□^{-□|□|}$, where A and a are positive constants, is applied to theinput of alinear transmission input system with impulse response $h(□) = □^{-□□}□(□)$,Where b is a real positive constant. Give the autocorrelation ofthe output Y(t) of the system.

2030202 - BASIC ELECTRICAL AND ELECTRONICS ENGINEERING
(Common for Civil & Mechanical)

B.Tech. II Year I Sem **L T P C**

Pre-requisites:- **3 0 0 3**

Course Objectives: The objective of the course is

1. To introduce the concepts of electrical circuits and its components.
2. To understand magnetic circuits, DC circuits and AC single phase & three phase circuits.
3. To study and understand the different types of DC/AC machines and Transformers.
4. To import the knowledge of various electrical installations.
5. To introduce the concept of power, power factor and its improvement.
6. To introduce the concepts of diodes & transistors, and
7. To impart the knowledge of various configurations, characteristics and applications.

Course Outcomes: At the end of the course the student will able to

1. To analyze and solve electrical circuits using network laws and theorems.
2. To understand and analyze basic Electric and Magnetic circuits
3. To study the working principles of Electrical Machines
4. To introduce components of Low Voltage Electrical Installations
5. To identify and characterize diodes and various types of transistors.

UNIT – I

D.C. CIRCUITS

Electrical circuit elements (R, L and C), voltage and current sources, KVL&KCL, analysis of simple circuits with dc excitation.

A.C. CIRCUITS

Representation of sinusoidal wave forms, peak and rms values, phasor representation, real power, reactive power, apparent power, power factor, Analysis of single-phase ac circuits, Three-phase balanced circuits, voltage and current relations in star and delta connections.

UNIT – II

ELECTRICAL INSTALLATIONS

Components of LT Switch gear: Switch Fuse Unit (SFU), MCB, ELCB, MCCB, Types of Wires and Cables, Earthing. Types of Batteries, Important Characteristics for Batteries. Elementary calculations for energy consumption, power factor improvement and battery backup.

UNIT – III

ELECTRICAL MACHINES

Working principle of Single-phase transformer, equivalent circuit, losses in transformers, efficiency, Three-phase transformer connections. Construction and working principle of DC generators, EMF equation, working principle of DC motors, Torque equations and Speed control of DC motors, Construction and working principle of Three-phase Induction motor, Torques equations and Speed control of Three-phase induction motor. Construction and working principle of synchronous generators.

UNIT – IV

PN JUNCTIONANDZENERDIODE:

Principle of Operation Diode equation, Volt-Ampere characteristics, Temperature dependence, Ideal versus practical, Static and dynamic resistances, Equivalent circuit, Zener diode characteristics and applications.

RECTIFIERS AND FILTERS:

P-N junction as a rectifier - Half Wave Rectifier, Ripple Factor - Full Wave Rectifier, Bridge Rectifier, Harmonic components in Rectifier Circuits, Filters – Inductor Filters, Capacitor Filters, L- section Filters, π- section Filters.

UNIT – V

BIPOLAR JUNCTION TRANSISTOR (BJT):

Construction, Principle of Operation, Amplifying Action, Common Emitter, Common Base and Common Collector configurations, Comparison of CE, CB and CC configurations.

FIELD EFFECT TRANSISTOR (FET):

Construction, Principle of Operation, Comparison of BJT and FET, Biasing FET.

TEXT BOOKS:

1. Basic Electrical and electronics Engineering –M S Sukija TK Nagasarkar Oxford University
2. Basic Electrical and electronics Engineering-D P Kothari. I J Nagarath, McGraw Hill Education

REFERENCES:

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3. Engineering circuit analysis- by William Hayt and Jack E. Kemmerly, McGraw Hill Company, 6th edition.
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6. Network Theory by Sudhakar, Shyam Mohan Palli,TMH.
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Session Planner:

S. No	Unit No.	L. No	Topic Details	Date Planned	Date Conducted	Remarks
1	1	1	Electrical circuit elements (R, L and C)			
2	1	2	voltage and current sources			
3	1	3	KVL analysis of simple circuits with dc excitation.			
4	1	4	KCL analysis of simple circuits with dc excitation.			
5	1	5	Representation of sinusoidal wave forms			
6	1	6	Peak and rms values, phasor representation			
7	1	7	Real power, reactive power, apparent power, power factor			
8	1	8	Analysis of single-phase ac circuits,			
9	1	9	Three-phase balanced circuits			
10	1	10	Voltage and current relations in star connections.			
11	1	11	Voltage and current relations in delta connections.			
12	1	12	PPT			
13	1	13	Active Learning			
14	1	14	Unit Test 1			
15	2	15	Components of LT Switch gear:			
16	2	16	Switch Fuse Unit (SFU), MCB, ELCB, MCCB			
17	2	17	Types of Wires and Cables, Earthing.			
18	2	18	Types of Batteries, Important Characteristics for Batteries.			
19	2	19	Elementary calculations for energy consumption			
20	2	20	Power factor improvement			
21	2	21	Battery backup.			
22	2	22	PPT			
23	2	23	Active Learning			

24	2	24	Unit Test 2			
25	3	25	Working principle of Single-phase transformer			
26	3	26	Equivalent circuit			
27	3	27	Losses in transformers, efficiency			
28	3	28	Three-phase transformer connections			
29	3	29	Construction and working principle of DC generators			
30	3	30	EMF equation, working principle of DC motors			
31	3	31	Torque equations and Speed control of DC motors			
32	3	32	Construction and working principle of Three-phase Induction motor			
33	3	33	Torques equations and Speed control of Three-phase induction motor			
34	3	34	Construction and working principle of synchronous generators.			
35	3	35	PPT			
36	3	36	Active Learning			
37	3	37	Unit Test 3			
38	4	38	Principle of Operation Diode equation			
39	4	39	Volt-Ampere characteristics, Temperature dependence			
40	4	40	Ideal versus practical, Static and dynamic resistances			
41	4	41	Equivalent circuit			
42	4	42	Zener diode characteristics and applications.			
43	4	43	P-N junction as a rectifier			
44	4	44	Half Wave Rectifier			
45	4	45	Ripple Factor - Full Wave Rectifier			
46	4	46	Bridge Rectifier			
47	4	47	Harmonic components in Rectifier Circuits			
48	4	48	Filters – Inductor Filters			
49	4	49	Capacitor Filters			
50	4	50	L- section Filters			
51	4	51	π- section Filters			
52	4	52	PPT			
53	4	53	Active Learning			
54	4	54	Unit Test 4			
55	5	55	BJT - Construction, Principle of Operation			
56	5	56	Amplifying Action, Common Emitter			

57	5	57	Common Base and Common Collector configurations			
58	5	58	Comparison of CE, CB and CC configurations.			
59	5	59	FET - Construction, Principle of Operation			
60	5	60	Comparison of BJT and FET			
61	5	61	Biasing FET.			
62	5	62	PPT			
63	5	63	Active Learning			
64	5	64	Unit Test 5			

Important Questions:

Unit – 1

Part – A

1 Define Ohm‘s law

2 Mention the limitations of Ohm‘s Law

3 Define Kirchhoff‘s voltage law and Kirchhoff‘s Current law.

4 Write short notes on resistor, capacitor, and inductor with relevant expression

5 Derive the star-delta conversion equations?

6 What is mean by instrument? Write Different types of instruments

7 Define a)Air friction damping b)Fluid friction damping c)Eddy current damping

8 Write Short notes on different types of torques

9 Define a) Voltage b) Current c) Power

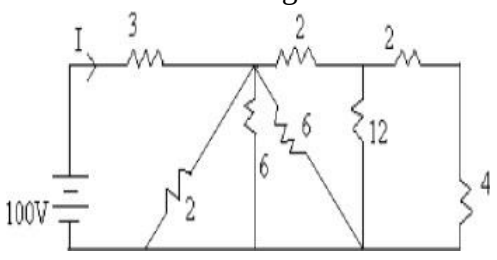
10 Give an Examples of Series and Parallel Resistor Networks

Part - B

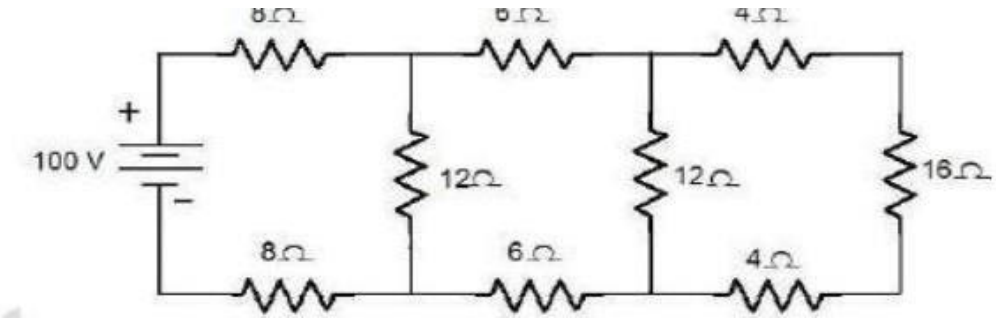
1 A voltage of 200 V is applied to a tapped resistor of 500Ω. Find the resistance between the tapping pointsconnected to a load, needing 0.1A at 25 V. Also calculate the Total power consumed

2 If 3 capacitors of values 2mF, 4mF, 5mF are connected in parallel. Calculate the effective capacitance

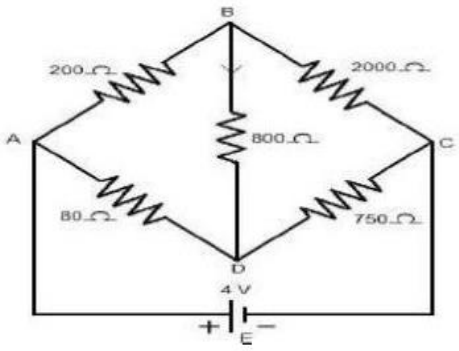
3 Determine the current I in the circuit shown in figure. All resistances are in ohms.



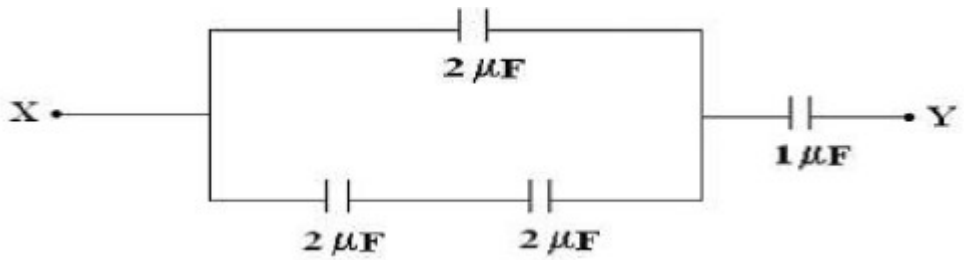
4 Calculate a) the equivalent resistances across the terminals of the supply, b) total current supplied by thesource and c) power delivered to 16 ohm resistor in the circuit shown in the figure shown below.



5 Determine the current through 800 ohm resistor in the network shown in figure



6 Find the equivalent capacitance of the combination shown figure below across X and Y.

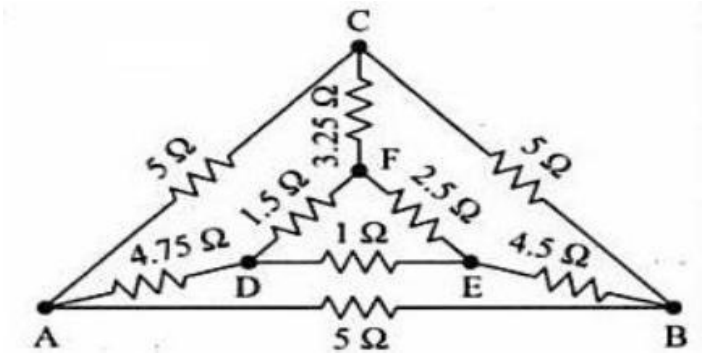


7 Describe the working principle of permanent magnet moving coil instrument

8 Describe the working principle of moving iron attraction type instrument

9 Discuss about series and parallel networks of resistor, inductor and capacitor.

10 Find the resistance between the A and B by using star delta conversion



Unit – 2

Part - A

1 What are the basic parts of a dc generator?

2 Discuss about back emf in DC motor?.

3 Describe the different types of Generators .

4 Discuss about any two types of DC generators

5 What are the applications of DC motors?

6 Describe about Commutator principle of operation.

7 Differentiate between self-excited and separately excited DC machines.

8 Calculate the e.m.f by 4 pole wave wound generator having 65 slotswith 12 conductors per slot when driven at 1200 rpm the flux per pole is 0.02 wb.

9 A dynamo has a rated armature current at 250 amps what is the current per path of the armature if the armature winding is lap orwave wound? The machine has 12 poles.

10 Draw the characteristics for DC shunt generator.

Part - B

1 Describe the principle of operation of DC generator.
2 Derive the equation for induced EMF of a DC machine
3 Give the classification of DC generator and explain
4 Derive the torque equation of DC motor
5 Explain construction of dc machine with neat diagram?
6 A 6 pole lap wound dc generator has 600 conductors on its armature flux per pole is 0.02 wb. Calculate
   i) The speed at which the generator must be run to generate 300v.
   ii) What would be the speed if the generated were wave wound?
7 An 8-pole, lap wound armature rotated at 350 rpm is required to generate 260v. The use full flux per pole is
   0.05 wb if the armature has 120 slots, calculate the number of conductors per slot.
8 A 440v Dc shunt generator has Ra=0.25 ohms and Rsh= 220 ohms while delivering a load current of 50 amps, it has a terminal voltage of 440v determined the generated e.m.f and power developed?
9 A Dc series generator has armature resistance of 0.5 ohms and series field resistance of 0.03 ohms it drives a load of 50 amps. if it has 6 turns/coil and total 540 coils on the armature and is driven at 1500 rpm calculate the terminal voltage at the load. Assume 4-poles, lap type winding, flux pole as 2 mwb and total brush drop as 2V.
10 Explain three point starter for D.C. Shunt motor.

Unit – 3

Part – A

1 Mention the difference between core and shell type transformers.

2 Does transformer draw any current when secondary is open? Why?

3 Define voltage regulation of a transformer

4 Derive the EMF equation of a transformer..

5 Obtain the condition for maximum efficiency of a transformer

6 Describe the construction of a core type transformer.

7 Discuss about the torque slip characteristics of an Induction motor

8 Differentiate between squirrel cage induction motors and slip ring induction motors

9 Describe the principle of alternator

10 Why does the rotor in an induction motor rotate?

Part – B

1 Describe the construction and operation of single phase transformer.

2 Describe the method to perform OC and SC test on a transformer

3 A transformer supplied a load of 32A at 415V. If the primary voltage is 3320V, find the following: (a) Secondary volt ampere (b) Primary current(c) Primary volt ampere. Neglect losses and magnetizing current

4 A transformer with 40 turns on the high voltage winding is used to step down the voltage from 240V to 120V.Find the number of turns in the low voltage winding. Open circuit and short circuit tests on a 5 KVA, 220/400V, 50 Hz, single phase transformer gave the following results:
OC Test: 220V, 2A, 100W (lv side) SC Test: 40V, 11.4A, 200W (hv side) Obtain the equivalent circuit

5 A 440/110 v transformer has a primary resistance of 0.03 ohms and secondary resistance of 0.02 ohms if ironlosses at normal input is 150 watts determine the secondary current at which maximum efficiency will occur and the value of this maximum efficiency at a unity power factor load.

6 Describe the working principle and construction of a 3 phase induction motor

7 A 6-pole, 50Hz squirrel cage induction motor runs on load at a shaft speed of 970 rpm. Calculate
i) Percentage slip
ii) The frequency of the induced current in the rotor.

8 The emf in the stator of an 8 pole induction motor has a frequency of 50 Hz and that in the rotor is 1.5Hz. Atwhat speed the motor is running and what is the slip?

9 Discuss about synchronous impedance method to find regulation of an alternator

10 Describe the principle and construction of salient pole and non salient pole alternator

Unit – 4

Part – A

1 Explain avalanche breakdown?

2 Differentiate intrinsic and extrinsic semiconductors?

3 Sketch the Energy bands in n-type and p-type semiconductor
4 Define static and dynamic resistance?
5 Discuss importance of Active region?
6 Express importance of Cut in voltage?
7 Design a circuit for transistor as a switch?
8 Define saturation region?
9 Derive relationship among α, β?
10 Explain majority and minority carriers in a semiconductor?
11 Name two applications of a Crystal diode

Part - B

1 Explain the theory of PN junction in semiconductors and explain how it acts as diode?
2 Explain different biasing conditions of the PN junction crystal diode
3 Discuss V-I characteristics of a silicon PN junction crystal diode and Analyze the significance of the knee voltage?
4 Analyze the effect of temperature on the volt – ampere characteristics of a diode.
5 Zenar diode works in reverse biased condition. How the Zener diode and its breakdown mechanism work as regulator?
6 Describe the Diode current equation.
7 What is the importance of a filter in voltage rectification process
8 Define rectifier? Describe all parameters for Half wave rectifier?
9 Describe all parameters for Centre tapped full wave rectifier?
10 Define rectifier? Describe all parameters for bridge rectifier?
11 Discuss the difference between Half waves; centre tapped full wave and bridge rectifiers.
12 Explain the operation of SCR and its V_I characteristics?
13 Explain the term α and β current gains and their relationship for N-P-N transistor?
14 Explain the operation of NPN and PNP transistor?
15 Illustrate with a diagram, how the BJT transistor acts as an amplifier?

Unit – 5

Part – A

1 Explain the function of deflection plates?
2 Explain is the purpose of accelerating anode?
3 Explain the function of vertical plates in CRT?
4 Explain the function of horizontal plates?
5 Discuss the use of Fluorescence?
6 Explain the Principle of dual beam oscilloscope?
7 Explain the principle of sampling oscilloscope?

8 Mention the two modes of operation in dual trace oscilloscope

9 List the Disadvantages of storage cathode ray tube?

10 Define Electric Field?

Part - B

1 Give the construction of a Cathode Ray tube using electrostatic focusing and deflection systems and describe the functions of various constituents.

2 Give the construction of a Cathode Ray tube using magnetic focusing and deflection systems and describe the functions of various constituents.

3 Write the principle of CRT? Explain the different types of CROs?

4 Explain the Block diagram of CRO with neat sketch?

5 Discuss critically functional block diagram of CRT?

6 Explain the applications of CRO?

7 Explain the electron gun construction and working?

8 How the magnetic deflection system works in CRT?

9 Explain the Electrostatic deflection system in CRT?

10 Differentiate Electrostatic and magnetic deflection systems?

11 Describe the voltage, current and frequency measurements using CROs.

2030502 - DATA STRUCTURES

B.Tech. II Year I Sem **L T P C**
Pre-requisites: Programming for Problem Solving **3 0 0 3**

Course Objectives: The objective of the course is

1. Exploring basic data structures such as linked list, stacks and queues.
2. Describes searching and sorting techniques.
3. Introduces trees and graphs.

Course Outcomes: At the end of the course the student will able to

1. Ability to select the data structures that efficiently model the information in a problem.
2. Ability to assess efficiency trade-offs among different data structure implementations or combinations.
3. Implement and know the application of algorithms for searching and sorting.
4. Design programs using a variety of data structures- lists, stacks, queues, trees and graphs.

UNIT - I

Introduction to Data Structures, Linear list – singly linked list, Doubly linked list, Circular linked list - operations and its applications

UNIT-II

Stacks- Introduction, Operations, array and linked representations of stacks, stack applications (Infix to postfix conversion and postfix evaluation), Queues-Introduction, operations, array and linked representations of queues and its applications.

UNIT - III

Searching: Linear Search and Binary Search and its applications.
Sorting: Bubble sort, Selection sort, Insertion sort, Merge sort, Quick sort and its applications.

UNIT-IV

Trees - Introduction, Types of trees, Binary tree, recursive and non- recursive Traversals of Binary Tree, Binary search tree- Operations and its applications.

UNIT - V

Graphs: Introduction, Types of graphs, Representation of graphs, Graph Traversal Methods, comparison between trees and graphs and its applications.

TEXT BOOKS:

1. Fundamentals of data structures in C, E.Horowitz, S.Sahni and Susan Anderson Freed, 2nd Edition, Universities Press.

2. Data structures using C, A.S.Tanenbaum, Y. Langsam, and M.J. Augenstein, PHI/pearson Education.

REFERENCES:

1. Data structures: A Pseudocode Approach with C, R.F.Gilberg And B.A.Forouzan, 2nd Edition, Cengage Learning.
2. Introduction to data structures in C, Ashok Kamthane, 1st Edition, Pearson.

Session Planner:

S. No	Unit No.	L. No	Topic Details	Date Planned	Date Conducted	Remarks
1	1	1	Introduction to Data Structures			
2	1	2	Linear list – singly linked list			
3	1	3	Linear list – singly linked list			
4	1	4	Linear list – Doubly linked list			
5	1	5	Linear list – Doubly linked list			
6	1	6	Circular linked list - operations			
7	1	7	Circular linked list - operations			
8	1	8	Circular linked list - applications			
9	1	9	Circular linked list - applications			
10	1	10	PPT			
11	1	11	Active Learning			
12	1	12	Unit Test 1			
13	2	13	Stacks- Introduction			
14	2	14	Operations			
15	2	15	Array and linked representations of stacks			
16	2	16	Stack applications (Infix to postfix conversion and postfix evaluation)			
17	2	17	Stack applications (Infix to postfix conversion and postfix evaluation)			
18	2	18	Stack applications (Infix to postfix conversion and postfix evaluation)			
19	2	19	Stack applications (Infix to postfix conversion and postfix evaluation)			
20	2	20	Queues-Introduction, operations			
21	2	21	Array and linked representations of queues and its applications.			
22	2	22	PPT			
23	2	23	Active Learning			
24	2	24	Unit Test 2			
25	3	25	Introduction on Searching and Sorting			

26	3	26	Linear Search			
27	3	27	Binary Search			
28	3	28	Linear Search and Binary Search Applications			
29	3	29	Sorting: Bubble sort			
30	3	30	Selection sort			
31	3	31	Insertion sort			
32	3	32	Merge sort			
33	3	33	Quick sort and its applications.			
34	3	34	PPT			
35	3	35	Active Learning			
36	3	36	Unit Test 3			
37	4	37	Trees - Introduction			
38	4	38	Types of trees			
39	4	39	Binary tree			
40	4	40	Recursive Traversals of Binary Tree			
41	4	41	Recursive Traversals of Binary Tree			
42	4	42	Non- recursive Traversals of Binary Tree			
43	4	43	Non- recursive Traversals of Binary Tree			
44	4	44	Binary search tree - Operations			
45	4	45	Binary search tree - Operations			
46	4	46	Binary search tree - Applications.			
47	4	47	Binary search tree - Applications.			
48	4	48	PPT			
49	4	49	Active Learning			
50	4	50	Unit Test 4			
51	5	51	Graphs: Introduction			
52	5	52	Types of graphs			
53	5	53	Representation of graphs			
54	5	54	Representation of graphs			
55	5	55	Graph Traversal Methods			
56	5	56	Graph Traversal Methods			
57	5	57	Comparison between trees and graphs			
58	5	58	Comparison between trees and graphs			
59	5	59	Comparison between trees and graphs - Applications.			
60	5	60	PPT			
61	5	61	Active Learning			
62	5	62	Unit Test 5			

2030022 - GENDER SENSITIZATION

B.Tech. II Year I Sem **L T P C**
Pre-requisites:- **2 0 0 0**

Course Objectives: The objective of the course is

1. To develop students' sensibility with regard to issues of gender in contemporary India.
2. To provide a critical perspective on the socialization of men and women.
3. To introduce students to information about some key biological aspects of genders.
4. To expose the students to debates on the politics and economics of work.
5. To help students reflect critically on gender violence.
6. To expose students to more egalitarian interactions between men and women.

Course Outcomes: At the end of the course the student will able to

1. Students will have developed a better understanding of important issues related to gender in contemporary India.
2. Students will be sensitized to basic dimensions of the biological, sociological, psychological and legal aspects of gender. This will be achieved through discussion of materials derived from research, facts, everyday life, literature and film.
3. Students will attain a finer grasp of how gender discrimination works in our society and how to counter it.
4. Students will acquire insight into the gendered division of labour and its relation to politics and economics.
5. Men and women students and professionals will be better equipped to work and live together as equals.

UNIT – I
UNDERST AND INGGENDER
Gender: Why Should We Study It? (*Towards a World of Equals:* Unit -1)
Socialization: Making Women, Making Men (*Towards a World of Equals:* Unit -2)
Introduction. Preparing for Womanhood. Growing up Male. First lessons in Caste. Different Masculinities.

UNIT - II
GENDERANDBIOLOGY
Missing Women: Sex Selection and Its Consequences (*Towards a World of Equals:* Unit - 4)
Declining Sex Ratio. Demographic Consequences.
Gender Spectrum: Beyond the Binary (*Towards a World of Equals:* Unit -10)
Two or Many? Struggles with Discrimination.

UNIT - III

GENDER AND LABOUR

Housework: the Invisible Labour (*Towards a World of Equals:* Unit -3) "My Mother doesn't Work." "Share the Load."

Women's Work: Its Politics and Economics (*Towards a World of Equals:* Unit -7) Fact and Fiction. Unrecognized and Unaccounted work. Additional Reading: Wages and Conditions of Work.

UNIT - IV

ISSUES OF VIOLENCE

Sexual Harassment: Say No! (*Towards a World of Equals:* Unit -6) Sexual Harassment, not Eve-teasing- Coping with Everyday Harassment- Further Reading: "Chupulu".

Domestic Violence: Speaking Out (*Towards a World of Equals:* Unit -8) Is Home a Safe Place? -When Women Unite [Film]. Rebuilding Lives. Additional Reading: New Forums for Justice.
Thinking about Sexual Violence (*Towards a World of Equals:* Unit -11) Blaming the Victim-"I Fought for my Life…." - Additional Reading: The Caste Face of Violence.

UNIT – V

GENDER: CO – EXISTENCE

Just Relationships: Being Together as Equals (*Towards a World of Equals:* Unit -12) Mary Kom and Onler. Love and Acid just do not Mix. Love Letters. Mothers and Fathers. Additional Reading: Rosa Parks-The Brave Heart.

TEXT BOOKS:

1. "*Towards a World of Equals: A Bilingual Textbook on Gender*" written by A. Suneetha, Uma Bhrugubanda, Duggirala Vasanta, Rama Melkote, Vasudha Nagaraj, Asma Rasheed, Gogu Shyamala, Deepa Sreenivas and Susie Tharu and published by **Telugu Akademi, Hyderabad**,Telangana State in the year **2015**.

REFERENCES:

1. Menon, Nivedita. Seeing like a Feminist. New Delhi: Zubaan-Penguin Books, 2012
2. Abdulali Sohaila. "I Fought For My Life…and Won."Available online at: http://www.thealternative.in/lifestyle/i-fought-for-my-lifeand-won-sohaila-abdulal/

Session Planner:

S.No	Unit No.	L.No	Topic Details	Date Planned	Date Conducted	Remarks
1	1	1	Gender: Why Should We Study It?			

2	1	2	Towards a World of Equals			
3	1	3	Socialization: Making Women			
4	1	4	Socialization: Making Men			
5	1	5	Introduction. Preparing for Womanhood			
6	1	6	Growing up Male			
7	1	7	First lessons in Caste			
8	1	8	Different Masculinities			
9	1	9	Different Masculinities.			
10	1	10	PPT			
11	1	11	Active Learning			
12	1	12	Unit Test 1			
13	2	13	Missing Women			
14	2	14	Sex Selection and Its Consequences			
15	2	15	Towards a World of Equals			
16	2	16	Declining Sex Ratio.			
17	2	17	Demographic Consequences			
18	2	18	Gender Spectrum: Beyond the Binary (Towards a World of Equals)			
19	2	19	Two or Many?			
20	2	20	Struggles with Discrimination.			
21	2	22	PPT			
22	2	23	Active Learning			
23	2	24	Unit Test 2			
24	3	25	Gender and Labour			
25	3	26	Housework: the Invisible Labour			
26	3	27	My Mother doesn't Work			
27	3	28	Share the Load			
28	3	29	Women's Work			
29	3	30	Its Politics and Economics			
30	3	31	Fact and Fiction			
31	3	32	Unrecognized and Unaccounted work			
32	3	33	Additional Reading: Wages and Conditions of Work			
33	3	34	PPT			
34	3	35	Active Learning			
35	3	36	Unit Test 3			
36	4	37	Sexual Harassment: Say No!			
37	4	38	Sexual Harassment, not Eve-teasing			
38	4	39	Coping with Everyday Harassment			
39	4	40	Further Reading: "Chupulu".			
40	4	41	Domestic Violence: Speaking Out			
41	4	42	Is Home a Safe Place? -When Women Unite			

42	4	43	Rebuilding Lives.			
43	4	44	Additional Reading: New Forums for Justice.			
44	4	45	Thinking about Sexual Violence			
45	4	46	Blaming the Victim-"I Fought for my Life…."			
46	4	47	Additional Reading: The Caste Face of Violence.			
47	4	48	PPT			
48	4	49	Active Learning			
49	4	50	Unit Test 4			
50	5	51	Just Relationships			
51	5	52	Being Together as Equals			
52	5	53	Mary Kom and Onler			
53	5	54	Love and Acid just do not Mix			
54	5	55	Love Letters			
55	5	56	Mothers and Fathers			
56	5	57	Additional Reading: Rosa Park			
57	5	58	The Brave Heart			
58	5	59	PPT			
59	5	60	Active Learning			
60	5	61	Unit Test 5			

2030171 - SURVEYING LABORATORY

B.Tech. II Year I Sem **L T P C**
Pre-requisites: Surveying and Geomatics **0 0 31.5**

Course Objectives: The objective of the course is

1. To know the principles and methods of surveying using different equipments & methods
2. To determination of distance, area using chain, compass and plane table surveying
3. To Recording the observation accurately and Perform calculations based on the observation
4. To Identify of source of errors and rectification methods
5. To apply surveying principles to determine areas and volumes and setting out curves
6. To understand the concept of advanced techniques and operation of modern equipment and perform various experiments by using that.

Course Outcomes: At the end of the course the student will able to

1. Measure the distance, area of the field using the instruments chain, compass, plane table and plot the same.
2. Know the concepts of leveling, and perform & plot the cross & longitudinal sectioning.
3. Measurement of angles using theodolite, and calculate the distance and elevation of the given point using trigonometric leveling and tacheometric leveling.
4. Understand the concepts of EDM, and calculate the distance, area of the field
5. Perform the traverse and plot the contour map for the obtained data.
6. Locate the position of points using stake out method, perform the curve using modern equipment.

List of Experiments:

1. Surveying of an area by chain and compass survey (closed traverse) & plotting
2. Determine of distance between two inaccessible points with compass
3. Radiation method, intersection methods by plane table survey.
4. Leveling – Longitudinal and cross-section and plotting
5. Measurement of Horizontal and vertical angle by Theodolite
6. Trigonometric leveling using Theodolite
7. Height and distances using principles of tachometric surveying
8. Determination of height, remote elevation, distance between inaccessible points using total station
9. Determination of Area using total station and drawing map
10. Traversing using total station for drawing contour map
11. Stake out using total station

12. Setting out Curve using total station.

2030272 - BASIC ELECTRICAL AND ELECTRONICS ENGINEERING LABORATORY
(Common for Civil and Mechanical)

B.Tech. II Year I Sem **L T P C**

Pre-requisites: Basic Electrical and Electronics Engineering **0 0 2 1**

Course Objectives: The objective of the course is

1. To introduce the concepts of electrical circuits and its components
2. To understand magnetic circuits, DC circuits and AC single phase & three phase circuits
3. To study and understand the different types of DC/AC machines and Transformers.
4. To import the knowledge of various electrical installations.
5. To introduce the concept of power, power factor and its improvement.
6. To introduce the concepts of diodes & transistors, and
7. To impart the knowledge of various configurations, characteristics and applications.

Course Outcomes: At the end of the course the student will able to

1. To analyze and solve electrical circuits using network laws and theorems.
2. To understand and analyze basic Electric and Magnetic circuits
3. To study the working principles of Electrical Machines
4. To introduce components of Low Voltage Electrical Installations
5. To identify and characterize diodes and various types of transistors.

List of experiments/demonstrations:

PART A: ELECTRICAL

1. Verification of KVL and KCL
2. i) Measurement of Voltage, Current and Real Power in primary and Secondary Circuits of a Single-Phase Transformer
   ii) Verification of Relationship between Voltages and Currents (Star-Delta, Delta-Delta, Delta- star, Star-Star) in a Three Phase Transformer
3. Measurement of Active and Reactive Power in a balanced Three-phase circuit
4. Performance Characteristics of a Separately Excited DC Shunt Motor
5. Performance Characteristics of a Three-phase Induction Motor
6. No-Load Characteristics of a Three-phase Alternator

PART B: ELECTRONICS

1. Study and operation of

(i) Multi-meters (ii) Function Generator (iii) Regulated Power Supplies (iv) CRO.

2. PN Junction diode characteristics.
3. Zener diode characteristics and Zener as voltage Regulator.

4. Input & Output characteristics of Transistor in CB / CE configuration.
5. Full Wave Rectifier with & without filters.
6. Input and Output characteristics of FET in CS configuration.

2030572 - DATA STRUCTURES LABORATORY

B.Tech. II Year I Sem **L T P C**

Pre-requisites: Programming for Problem Solving **0 0 2 1**

Course Objectives: The objective of the course is

1. To covers various concepts of C programming language
2. To introduces searching and sorting algorithms
3. To provides an understanding of data structures such as stacks and queues.

Course Outcomes: At the end of the course the student will able to

1. Ability to develop C programs for computing and real life applications using basic elements like control statements, arrays, functions, pointers and strings, and data structures like stacks, queues and linked lists.
2. Ability to Implement searching and sorting algorithms

List of Experiments

1. Write a program that uses functions to perform the following operations on singly linked list.: i) Creation ii) Insertion iii) Deletion iv) Traversal
2. Write a program that uses functions to perform the following operations on doubly linked list.: i) Creation ii) Insertion iii) Deletion
3. Write a program that uses functions to perform the following operations on circular linked list: i) Creation ii) Insertion iii) Deletion
4. Write a program that implement stack operations using i) Arrays ii) Pointers
5. Write a c program to implement infix to postfix conversion using stack.
6. Write a c program to implement postfix evaluation.
7. Write a program that implement Queue operations using i) Arrays ii) Pointers
8. Write a program that implements the following sorting methods to sort a given list of integers in ascending order i) Bubble sort ii) Selection sort iii) Insertion sort
9. Write a program that implements the following sorting methods to sort a given list of integers in ascending order i) Merge sort ii) Quick sort
10. Write a program that use both recursive and non-recursive functions to perform the following searching operations for a Key value in a given list of integers: i) Linear search ii) Binary search
11. Write a program to implement the tree traversal methods using both recursive and non-recursive.
12. Write a program to implement the graph traversal methods.

TEXT BOOKS:

1. Fundamentals of data structures in C, E.Horowitz, S.Sahni and Susan Anderson Freed, 2nd Edition, Universities Press.

2. Data structures using C, A.S.Tanenbaum, Y. Langsam, and M.J. Augenstein, PHI/pearson education.

REFERENCES:

1. Data structures: A Pseudocode Approach with C, R.F.Gilberg And B.A.Forouzan, 2nd Edition, Cengage Learning.
2. Introduction to data structures in C, Ashok Kamthane, 1st Edition, Pearson.

2040114 - STRENGTH OF MATERIALS - II

B.Tech. II Year II Sem	**L**	**T**	**P**	**C**
Pre-requisites: Strength of Materials - I	**3**	**0**	**0**	**3**

Course Objectives: The objective of the course is

1. To understand the concepts of torsion and deflection of springs
2. To understand the behavior of columns and struts for various loading conditions
3. To calculate the direct and bending stresses of members subjected to various loads
4. To analyze the members for stability under sliding and overturning
5. To evaluate the hoop and radial stresses for thick and thin cylinders
6. To evaluate the stresses due to unsymmetrical bending and location of shear center

Course Outcomes: At the end of the course the student will able to

1. Apply the torsion theory for analysis of circular shafts and springs
2. Analyze columns and struts
3. Understand the concept of direct and bending stresses.
4. Analyze the structures under the conditions of sliding, overturning
5. Analyze the stress in Thin and thick cylinders.
6. Understand the concept of stresses & shear center for symmetrical and unsymmetrical Sections

UNIT - I

Torsion of circular shafts: Theory of pure torsion – Derivation of Torsion equation - – Polar section modulus – Power transmitted by shafts – Combined bending and torsion – Design of shafts according to theories of failure

Springs: Types of springs – deflection of close and open coil helical springs under axial pull and axial couple – springs in series and parallel

Learning Outcomes:

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

- Understand the behaviour of shafts subjected to torsion
- Design shafts for pure torsion and Combined action of bending with torsion.
- Analyze and design open and closed coil helical springs.

UNIT – II

Columns and struts: Types of columns – Crushing load – Euler's theory – Equivalent length of a column – slenderness ratio – core of a section - Long columns subjected to

eccentric loading – Secant formula – Empirical formulae – Rankine Gordon formula- Straight line formula – Prof. Perry's formula.

Beam columns: Laterally loaded struts subjected to uniformly distributed and concentrated loads

Learning Outcomes:

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

- Understand the types of column
- Analyze short and long columns subjected to axial load by various theories
- Analyze columns subjected to both axial load and lateral load

UNIT – III

Direct and bending stresses: Stresses under the combined action of direct loading and bending moment – determination of stresses in the case of retaining walls, chimneys and dams – conditions for stability – Overturning and sliding – stresses due to direct loading and bending moment about both axis.

Learning Outcomes:

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

- Understand the behaviour of structures subjected to direct and bending stresses
- Evaluate the failure load for retaining walls, dams and chimneys.

UNIT – IV

Thin cylinders: Thin seamless cylindrical shells – hoop, longitudinal and volumetric stress and strains – changes in diameter and volume of thin cylinders – Thin spherical shells.

Thick cylinders: Lame's theory for thick cylinders – distribution of hoop and radial stresses across thickness – design of thick cylinders – compound cylinders.

Learning Outcomes:

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

- Analyse and design thin and thick cylinders.
- Sketch the stress distribution across the section of thick cylinder

UNIT – V

Unsymmetrical bending: Centroidal principal axes of section – Moments of inertia referred to any set of rectangular axes – Principal axes - Stresses in beams subjected to unsymmetrical bending

Shear centre: Shear centre for symmetrical and unsymmetrical (channel, I, T and L) sections

Learning Outcomes:

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

- Evaluate bending stresses in members subjected to unsymmetrical bending
- Locate shear centre for a section.

TEXT BOOKS:

1. Strength of Materials by R. S. Khurmi, S. Chand Publications
2. Mechanics of Materials by Dr. B.C Punmia, Dr.Ashok Kumar Jain and Dr.Arun KumarJain
3. Strength of Materials by R. Subramanian, Oxford University Press
4. Strength of Materials by R.K. Bansal, Lakshmi Publications House Pvt. Ltd.
5. Strength of Materials by R. K Rajput, S. Chand & Company Ltd.

REFERENCES:

1. Strength of materials by S.S. Rattan, Tata McGrawhill publications
2. Strength of materials by S.S. Bhavikatti
3. Strength of Materials by T.D.Gunneswara Rao and M.Andal, Cambridge Publishers
4. Strength of Materials (Part 1) by S. Timoshenko
5. Strength of Materials by B.S.Basavarajaiah and P. Mahadevappa, 3rdEdition, Universities Press

Session Planner:

S.No	Unit No.	L.No	Topic Details	Date Planned	Date Conducted	Remarks
1	1	1	TORSION OF CIRCULAR SHAFTS			
2	1	2	Theory of pure torsion and Derivation of Torsion equation			
3	1	3	Problems			
4	1	4	Power transmitted by shafts			
5	1	5	Polar section modulus			
6	1	6	Combined bending and torsion			
7	1	7	Design of shafts according to theories of failure.			
8	1	8	SPRINGS-Introduction and types of springs			
9	1	9	Close coiled helical springs under axial pull and axial couple			
10	1	10	Open coiled helical springs under axial pull and axial couple			
11	1	11	Springs in series and parallel			

12	1	12	PPT for UNIT - 1			
13	1	13	ACTIVE LEARNING			
14	1	14	UNIT TEST - 1			
15	2	15	COLUMNS AND STRUTS-Intro, Types of column			
16	2	16	Axially loaded compression members and Crushing load			
17	2	17	Euler's theorem for long columns, assumptions			
18	2	18	Derivation of Euler's critical load formulae for various end conditions			
19	2	19	Secant formula, Empirical formulae, Rankine Gordon formula, Straight line formula and Prof. Perry's formula.			
20	2	20	BEAM COLUMNS Laterally loaded struts subjected to udl			
21	2	22	Laterally loaded struts subjected to concentrated			
22	2	23	loads.			
23	2	24	PPT for UNIT - 2			
24	2	25	ACTIVE LEARNING			
25	2	26	UNIT TEST - 2			
26	3	27	DIRECT AND BENDING STRESSES			
27	3	28	Stresses under the combined action of direct loading and bending moment			
28	3	29	Core of a section			
29	3	30	Determination of stresses in the case of retaining walls			
30	3	31	Determination of stresses in the case of chimneys			
31	3	32	Determination of stresses in the case of dams			
32	3	33	Conditions for stability and overturning, sliding			
33	3	34	Stresses due to direct loading and bending moment about both axis.			
34	3	35	Stresses due to direct loading and bending moment about both axis.			
35	3	36	PPT for UNIT - 3			
36	3	37	ACTIVE LEARNING			
37	3	38	UNIT TEST - 3			
38	4	39	THIN CYLINDERS			
39	4	40	Thin seamless cylindrical shells			

40	4	41	Derivation of formula for longitudinal and circumferential stresses			
41	4	42	hoop, longitudinal and Volumetric strains			
42	4	43	Changes in diameter and volume of thin cylinders, Thin spherical shells.			
43	4	44	THICK CYLINDERS, Introduction			
44	4	45	Lame's theory for thick cylinders			
45	4	46	Derivation of Lame's formulae			
46	4	47	distribution of hoop and radial stresses across thickness			
47	4	48	design of thick cylinders			
48	4	49	Compound cylinders			
49	4	50	Necessary difference of radii for shrinkage			
50	4	51	PPT for UNIT - 4			
51	4	52	ACTIVE LEARNING			
52	4	53	UNIT TEST - 4			
53	5	54	UNSYMMETRICAL BENDING, Introduction			
54	5	55	Centroidal principal axes of section			
55	5	56	Moments of inertia referred to any set of			
56	5	57	rectangular axes			
57	5	58	Stresses in beams subjected to unsymmetrical bending			
58	5	59	Principal axes-Resolution of bending moment into two rectangular axes through the centroid			
59	5	60	SHEAR CENTRE, Introduction			
60	5	61	Shear centre for symmetrical sections			
61	5	62	PPT for UNIT - 5			
62	5	63	ACTIVE LEARNING			
63	5	64	UNIT TEST - 5			

Important Questions:

Unit – 1

Part – A

1. Define Torsion.
2. What are the assumptions made in Torsion equation?
3. Why hollow circular shafts are preferred when compared to solid circular shafts?
4. Write torsional equation.

5. Write down the expression for power transmitted by a shaft.
6. Write down the expression for maximum torque transmitted by hollow shaft.
7. Write down the equation for maximum shear stress of a solid circular section in diameter 'D' when subjected to torque 'T' in a solid shaft.
8. Define torsional rigidity.
9. What is composite shaft?
10. What is a spring?
11. State any two functions of springs.
12. Classify the helical springs.
13. What are the various types of springs?
14. What is spring index (C)?
15. What is solid length?

Part – B

1. Derive Torsion equation for a solid circular shaft.
2. Explain types of springs with neat sketches.
3. Derive an expression for maximum shear stress induced in wire, and derive deflection and stiffness of closed coiled helical spring.
4. A Hollow shaft is to transmit 300kW power at 80 r.p.m. if the shear stress is not to exceed 60 N/mm2 and the internal diameter is 0.6 of the external diameter, Find the external and internal diameters assuming that the maximum torque is 1.4 times the mean.
5. A hollow shaft of external diameter 120mm transmits 300kW power at 200 r.p.m. determine the maximum internal diameter if the maximum stress in the shaft is not to exceed 60 N/mm2.
6. Calculate the maximum intensity of shear stress induced and the angle of twist produced in degrees in solid shaft of 100mm diameter, 12m long, transmitting 150kW at 200r.p.m.take G= 82 kN/mm2.
7. Find the maximum shear stress induced in a solid circular shaft of diameter 15cm when the shaft transmits 150kW power at 180 r.p.m.
8. Determine the diameter of a solid shaft which will transmit 300kW at 250 r.p.m. the maximum shear stress should not exceed 30 N/mm2 and twist should not be more than 1 degree in a shaft length 2m. take G = 1 x 10^5 N/mm2.
9. A hollow shaft of diameter ratio 3/8 (Internal dia to Outer dia)is to transmit 375 kW power at 100 r.p.m. the maximum torque being 20 % greater than the mean. The shear stress is not to exceed 60 N/mm2 and twist in a length of 4m not to exceed 2 degree. Calculate its external and internal diameters which would satisfy both the above conditions. Assume C = 0.85 X 10^5 N/mm2.
10. A solid circular shaft transmits 75kW power at 200 r.p.m. calculate the shaft diameter if the twist in the shaft is not to exceed 1 degree in 2 m length of shaft and shear stress is limited to 50 N/mm2. Take C = 1 X 10^5 N/mm2.
11. The maximum allowable shear stress in a hollow shaft of external diameter equal to twice the internal diameter is 80 N/mm2 . Determine the diameter of the shaft if it is subjected to a torque of 4 X 10^6 N-mm and a bending moment of 3 X 10^6 N-mm.

12. A closely coiled helical spring made of 10mm diameter steel wire has 15 coils of 100mm mean diameter. The spring is subjected to an axial load of 100N. Calculate (i) Maximum shear stress induced, (ii) The deflection and (iii) Stiffness of the spring. Take C = 8.16 X 10^4 N/mm2.
13. A closely coiled helical spring made of 10 cm mean diameter is made up of 1 cm diameter rod and has 20 turns. The springs carries an axial load of 200 N. Determine the shearing stress. Take C = 8.4 X 10^4 N/mm2. Determine the deflection when carrying this load. Also calculate the stiffness of the spring and the frequency of free vibration for a mass hanging from it.
14. The stiffness of a closely coiled helical spring is 1.5 N/mm of compression under a maximum load of 60 N. the maximum shearing stress produced in the wire of the spring is 125 N/mm2 . the solid length of the spring (when the coils are touching) is given as 5 cm. Find (i) Diameter of wire (ii) Mean diameter of coils and (iii) Number of coils required. Take C = 4.5 X 10^4 N/mm2.
15. A Steel close coiled helical spring is subjected to an axial couple of 60 kN-mm. The mean coil diameter of the spring is 75 mm and the diameter of the spring wire is 8 mm. If the number of coils of the spring is 15, Find the bending stress induced in the wire and the increase in the number of turns.

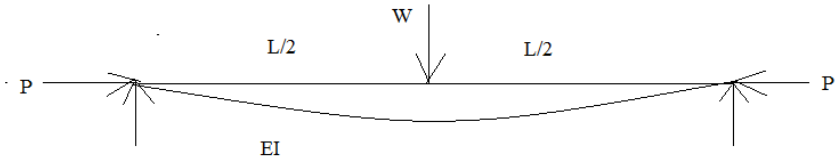
Unit – 2
Part – A

1. Define columns
2. Define struts.
3. Mention the stresses which are responsible for column failure.
4. State the assumptions made in the Euler's column theory.
5. What are the important end conditions of columns?
6. Write the expression for crippling load when the both ends of the column are hinged.
7. Write the expression for buckling load (or) Crippling load when both ends of the column are fixed?
8. Write the expression for crippling load when column with one end fixed and other end hinged.
9. Write the expression for buckling load for the column with one fixed and other end free.
10. Explain equivalent length (or) Effective length.
11. Write the Equivalent length (L) of the column in which both ends hinged and write the crippling load.
12. Write the relation between Equivalent length and actual length for all end conditions of column.
13. Define core (or) Kernel of a section.
14. Derive the expression for core of a rectangular section.
15. Derive the expression for core of a solid circular section of diameter D.
16. A steel column is of length 8m and diameter 600 mm with both ends hinged. Determine the crippling load by Euler's formula. Take E=2.1x105 N/mm2.
17. Define Slenderness ratio.

18. State the Limitations of Euler's formula.
19. Write the Rankine's formula for eccentric column
20. Write the Rankine's formula for columns.

Part - B

1. State Euler's assumptions in column theory.
2. Derive the expression for Euler's crippling load for column with both ends hinged.
3. Find an expression for crippling load for a long column when one end of the column is fixed and other end is hinged.
4. Discuss about different type of columns.
5. An axially loaded column 6m high and having both ends fixed is made up of a wide flanged R.S.J having following properties. Section: 300 mm × 200 mm, Area: 7000 mm^2, I_{xx}: $12400\times10^4 mm^4$, I_{yy}: 1760×10^4 mm^4 and E: $2\times10^5 N/mm^2$. Determine the working load of the column using Euler's formula. Take factor of safety as 4.
6. A solid round bar of diameter 60mm and length 2.5m is used as strut. One end of the strut is fixed and the other end is hinged. Calculate the safe compressive load for this strut using Euler's formula. Assume $E=200GN/m^2$ and factor of safety is 3.
7. A bar of length 4m when used as a simply supported beam and subjected to a UDL of 30kN/m over the entire span, deflects 15mm at its centre. Determine the crippling load when it is used as a column with following conditions
   i) Both the ends are pin jointed
   ii) One end is fixed and other end is hinged
   iii) Both the ends are fixed.
8. A hollow cylindrical cast iron column is 4 m long and fixed at the ends. Design the column to carry an axial load of 250 kN. Use Rankine's formula and adopt a factor of safety of 5. The internal diameter may be taken as 0.8 times the external diameter. Take fc = 550 N/mm2 and Rankine's constant is 1/1600.
9. Design a hollow circular steel strut of length 5 m, both ends fixed, is subjected to an axial load of 600 kN. Assume the ratio of internal diameter to the external diameter is 0.8 and factor of safety is 2. Use Rankine's formula. The Rankine's constants are 320 MPa and 1/7500.
10. Find the Maximum bending moment in a strut subjected point load W at mid point and axial thrust P shown in Figure1.



11. A steel hinged-hinged square tubular beam column of size, 60 mm × 60 mm × 5 mm, is 3.6 m long. It is required to carry an axial load of 150 kN in addition to a transverse uniformly distributed load 10 kN/m length over its entire span. Determine the maximum stresses.

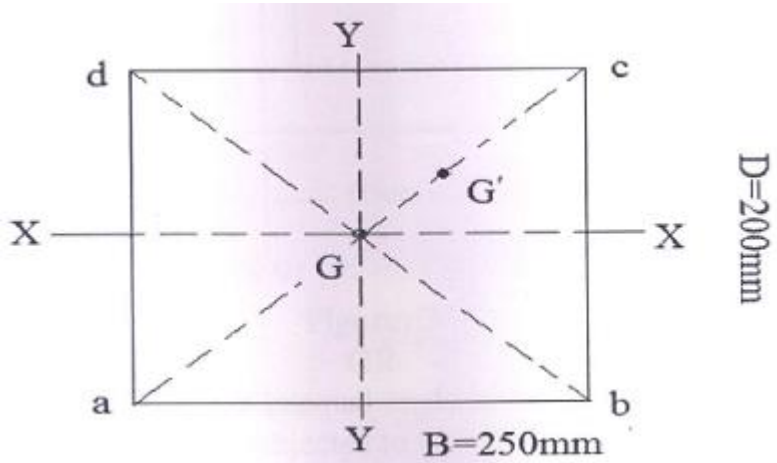
Unit – 3

Part – A

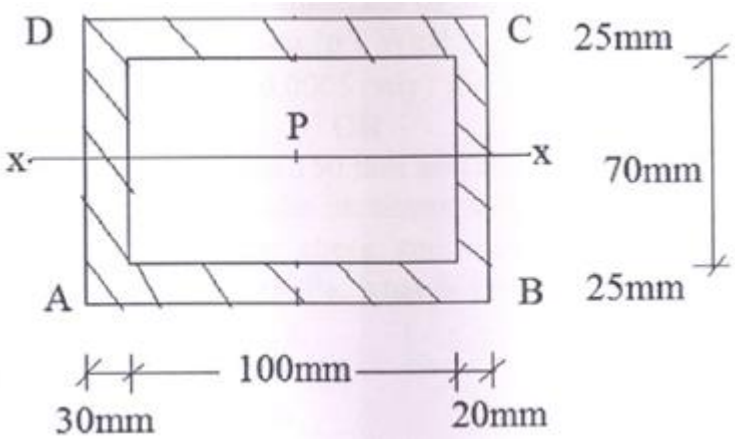
1. What do you mean by core of a column section?
1. State the condition for no tension in the section?
2. What is the kernel of a section? What is its importance?
3. What is the difference between beam and beam column?
4. What are the conditions for stability of a dam?
5. Define "Core" of a section-and obtain the core of a circular section of diameter 300 mm.
6. What is the limit of eccentricity for a rectangular section?
7. What is the limit of eccentricity for a hollow rectangular section?
8. What is the limit of eccentricity for a circular section?
9. What is the limit of eccentricity for a hollow circular section?
10. State the condition in which a dam will be subjected to direct stress only.
11. State the condition in which a dam will be subjected to tensile stress.
12. How will we calculate the weight of the dam per unit length?
13. What is the condition to avoid tension in the masonry of the dam at its base?
14. What is the condition to prevent overturning of the dam?
15. What is the conditions to prevent the sliding of dam?
16. What is the conditions to prevent crushing of masonry at the base of the dam?
17. What is active earth pressure?
18. What is passive earth pressure?
19. State the assumptions made in Rankine's theory for active earth pressure.
20. State the assumptions made in Coulomb's Wedge Theory for Active Earth Pressure.

Part - B

1. A Cast iron column of section 200x250mm is subjected to a vertical load of 300kN acting at a point 40mm away (Along the diagonal) from the center. Determine the resulting stress at the corners a, b, c and d of the section.



2. The cross section of a short column is shown in fig. Load of 160kN is applied at P, 75mm from edge AD. Section is symmetrical about x-x axis. Determine the stresses at corners A, B, C and D.



3. A column is rectangular in cross-section of 300mm×400mm in dimensions. The column carries an eccentric point load of 360 KN on one diagonal at a distance of quarter diagonal length from a corner. Determine the stresses at all four corners. Draw the stress distribution diagrams for any two adjacent sides.
4. A tapering chimney of hollow circular section is 30 m high. Its external diameter at the base is 2.4 m and at the top is 1.6 m. It is subjected to the wind pressure of 2.2 k N/m2 of the projected area. If the weight of the chimney is 4000 k N and the internal diameter at the base is 0.8 m, determine the maximum and minimum stress intensities at the base.
5. A concrete dam 12 m high, 4 m wide at the top and 8 m wide at the base has its water-face vertical and retains water to a depth of 10 m. Find the maximum and minimum stress intensities at the base. Assume the unit weight of concrete is 24 kN/m3.
6. A masonry retaining wall, 9 m high, is trapezoidal in section, 2 m wide at the top and 5 m at the base, with inclined outside surface. It retains earth at a surcharge angle of 20^0. The angle of repose is 30^0. Assume the unit weight of masonry as 20 kN/m^3 and unit weight of earth is 18 kN/m^3. Determine the maximum and minimum stresses at the base of the retaining wall.
7. A masonry dam of trapezoidal section of 10m high. It has top width of 1m and bottom width 7m. The face exposed to water has a slope of 1 horizontal to 10 vertical. Determine the maximum and minimum stresses on the base, when the water level coincides with top of the dam. Take unit weight of masonry as 19.62 kN/m2.
8. Discuss about the determination of stresses in the chimneys.

Unit – 4
Part – A

1. When will you call a cylinder as thin cylinder?
2. In a cylinder will the radial stress vary over thickness of wall?
3. What is the ratio of circumferential stress to longitudinal stress of a thin cylinder?
4. What is the maximum principal stress in a thin cylinder?
5. What is the maximum shear stress in a thin cylinder?
6. Write the expression for hoop stress in thin cylinder due to internal presser P.

7. What is the circumferential stress in a thin spherical shell subjected to internal pressure P?
8. Write is the volumetric strain in a thin spherical shell subjected to internal presser P?
9. Write the circumferential strain in thin spherical shell.
10. Different between thin cylinder and thick cylinder.
11. Distinguish between cylindrical shell and spherical shell.
12. Write the equation for the change in diameter and length of a thin cylinder shell, when subjected to an internal pressure.
13. What is the effect of riveting a thin cylindrical shell?
14. What do you understand by term wire winding of thin cylinder?
15. Define principal stresses and principal plane.
16. What is the radius of Mohr‟s circle?
17. Give the expression for maximum shear stress in a two dimensional stress system.
18. What are the planes along which the greatest shear stresses occur?
19. Write the expression for a normal stress on an inclined plane in a block which is subjected to two mutually perpendicular normal stresses and shear stresses?
20. What is the value of maximum shear stress when the principal stresses are σ1 compression and σ2 tension?

Part – B

1. A Cylindrical vessel is 2 m diameter and 5 m long is closed at ends by rigid plates. It is subjected to an internal pressure of 4 N/m^2. If the maximum principal stress is not to exceed 210 N/mm^2, find the thickness of the shell. Assume E=2 $\times 10^5$ N/mm2 and poisson's ratio 0.3. Find the changes in diameter, length and volume of the shell.
2. Find the change in the diameter, change in length and change in volume of a steel cylindrical shell of thickness 10 mm, 250 m diameter and 4 m long carrying a fluid at a pressure of 5 N/mm^2.
3. A cylindrical shell is 3.0m long, 0.75m internal diameter and 12.5 mm thickness. Determine the change in diameter of the shell if it is subjected to an internal pressure of 1.5 N/mm^2. Also calculate the maximum shear stress induced in the shell. Given that E=200GPa and poisson's ratio=0.25.
4. Explain about Lame's theory for thick cylinder and derive the Lame's formulae.
5. Develop the expressions for computations of hoop stress.
6. A compound cylinder is made by shrinking a cylinder of 200 mm external diameter and 160mm internal diameter over another cylinder of 160 mm external diameter and 120 mm internal diameter. The radial pressure at the junction after shrinking on is 8 N/mm^2. Estimate the final stresses setup across the section when the compound cylinder is subjected to an internal fluid pressure of 60N/mm^2.
7. A steel compound cylinder is made by shrinking a cylinder of external diameter 300 mm and internal diameter 200 mm over another cylinder of external diameter 200 mm and internal diameter 150 mm. The radial pressure at the junction after shrinkage is 10 N/mm^2. Find the final stresses if the cylinder is subjected to on internal fluid pressure of 60 N/mm^2.

8. A non- ferrous metal tube having a bore of 32mm and a wall thickness of 1.6 mm has plugged ends. The effective length of the tube between the plugs is 500 mm and the internal fluid pressure of 2 N/mm^2 is applied .An axial pull of 2000N is also applied externally to the plugs. Determine when the forces are acting (a) the change in the internal diameter of the tube (b) change in the length. E= 104500 N/mm^2 and poisson's ratio =0.35.

Unit – 5

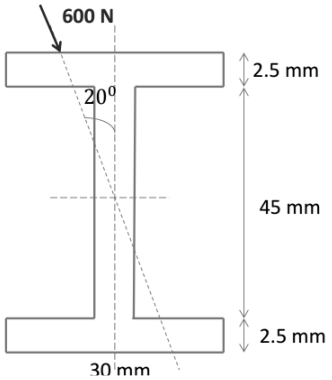
Part – A

1. Define Unsymmetrical bending
2. State the two reasons for unsymmetrical bending.
3. Define shear centre.
4. Write the shear centre equation for channel section.
5. A channel Section has flanges 12 cm x 2 cm and web 16 cm x 1 cm. Determine the shear centre of the channel.
6. Write the shear centre equation for unsymmetrical I section.
7. State the assumptions made in Winkler's Bach Theory.
8. State the parallel Axes and Principal Moment of inertia.
9. Define stress concentration.
10. Define stress – concentration factor.
11. Define fatigue stress concentration factor.
12. Define shear flow.
13. Explain the position of shear centre in various sections.
14. State the principles involved in locating the shear centre.
15. Define the term Fatigue.
16. State the types of fatigue stress.
17. State the reasons for stress- concentration.
18. Define creep.

Part – B

1. Find the principal moment of inertia of angle section 60 mm × 40 mm × 6 mm.

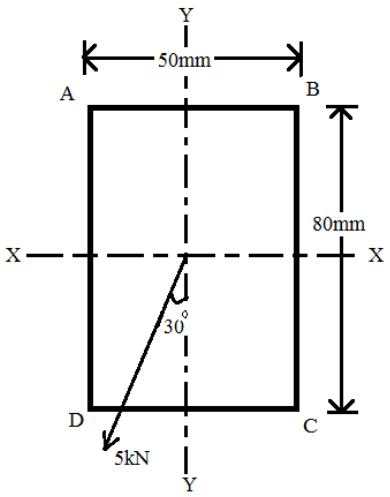
2. A Cantilever of I-section, 2.4 m long is subjected to a load of 600 N at the free end as shown in Figure. Determine the resulting bending stress at corners A and B, on the fixed section of the cantilever.



3. A simply supported beam of span 3.6 m has an unequal angle section, 125mm×75mm×10mm, is placed with the long leg vertically downward.

Determine the central concentrated load that can be placed on the beam in order the maximum stress due to bending is not to exceed 150 N/mm^2? Also determine the maximum deflection.

4. Determine the principal moments of inertia for an un-equal angle section 200mm×150mm×10mm.
5. A rectangular-section beam 80 mm × 50 mm is arranged as a cantilever 1.3 m long and loaded at its free end with a load of 5 kN inclined at an angle of 30^0 to the vertical as shown in Figure. Determine the position and magnitude of the greatest tensile stress in the section. Take E = 210 GN/m^2.



6. Explain about shear center for symmetrical and unsymmetrical sections.
7. Discuss about deflection of a beam under unsymmetrical bending.

2040115 - BUILDING MATERIALS, CONSTRUCTION AND PLANNING

B.Tech II Year II Sem **L T P C**

Prerequisites:- **3 0 0 3**

Course Objectives: The objective of the course is

1. To learn various construction materials for constructing a building.
2. To know the process involved to manufacture of cement, tests on cement, grades of concrete, tests on concrete, NDT, admixtures used for concrete
3. To understand different building components
4. To understand Plumbing services using different materials
5. To know the types of form work, utilisation, preparation of mortars for finishing work.
6. To learn Bye laws to construct a building

Course Outcomes: At the end of the course the student will able to

1. General knowledge on stones, bricks and its production and masonry. And other type of modern material for construction
2. Understand the process involved in the manufacturing of cement, their test, grades of concrete, tests on concrete, NDT, different admixtures used for concrete
3. Identify the different building components, and their materials.
4. To do the plumbing services using materials
5. To know the types of form work and where to be utilised, preparation of mortars for finishing work.
6. Able to know the bye laws to construct a building

UNIT I

Stones and Bricks, Tiles: Building stones – classifications and quarrying – properties – structural requirements – dressing. Stone masonry – types; Bricks – Composition of Brick earth – manufacture and structural requirements, Fly ash, Ceramics. Brick masonry – types – bonds.

Timber and Other modern materials: Wood - structure – types and properties – seasoning – defects; alternate materials for Timber – GI / fibre – reinforced glass bricks, steel & aluminum, Plastics. Geomembranes and Geotextiles for earth reinforcement

UNIT - II

Cement, Concrete & Admixtures: Cements – Grade of cements - Ingredients of cement – manufacture – Chemical composition – Hydration - field & lab tests.

Admixtures – mineral & chemical admixtures – uses.

UNIT - III

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

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

UNIT – IV

Structural Systems: Load Bearing Structure - Framed Structure - Load transfer mechanism.

Form work: Types: Requirements – Standards – Scaffolding – Design; Shoring, Underpinning.

Mortars: Lime and Cement Mortars - Preparation of mortar

Finishers: Plastering, Pointing, Painting, Claddings – Types – Tiles – ACP.

UNIT – V

Building Planning: Principles of Building Planning, Classification of buildings and Building by laws.

TEXT BOOKS:

1. Building Materials and Construction – Arora & Bindra, Dhanpat Roy Publications.
2. Building Construction by B. C. Punmia, Ashok Kumar Jain and Arun Kumar Jain - Laxmi Publications (P) ltd., New Delhi.

REFERENCES:

1. Building Materials and Construction by G C Sahu, Joygopal Jena McGraw hill Pvt Ltd 2015.
2. Building Materials by Duggal, New Age International.
3. Building Materials by P. C. Varghese, PHI.
4. Building Construction by PC Varghese PHI.
5. Construction Technology – Vol – I & II by R. Chubby, Longman UK.
6. Alternate Building Materials and Technology, Jagadish, Venkatarama Reddy and others; New Age Publications.

Session Planner:

S.No	Unit No.	L.No	Topic Details	Date Planned	Date Conducted	Remarks
1	1	1	Building stones – classifications and quarrying			
2	1	2	Properties of stones – structural requirements			
3	1	3	Stone dressing. Stone masonry – types			
4	1	4	Bricks – Composition of Brick earth –			
5	1	5	Manufacture and structural requirements, Flyash, Ceramics.			

6	1	6	Brick masonry – types – bonds.			
7	1	7	Timber and Other modern materials: Wood - structure – types and properties			
8	1	8	Timber seasoning – defects; alternate materials for Timber			
9	1	9	GI fibre reinforced glass bricks, steel & aluminum, Plastics.			
10	1	10	Geomembranes and Geotextiles for earth reinforcement			
11	1	11	PPT			
12	1	12	Active Learning			
13	1	13	Unit Test - 1			
14	1	14	Cements – Grade of cements			
15	2	15	Ingredients of cement – manufacture			
16	2	16	Chemical composition – Hydration			
17	2	17	Field & lab tests.			
18	2	18	Admixtures – Mineral & uses			
19	2	19	Chemical admixtures & uses			
20	2	20	PPT			
21	2	21	Active Learning			
22	2	22	Unit Test - 2			
23	3	23	Lintels, Arches, walls			
24	3	24	Vaults – stair cases			
25	3	25	Types of floor			
26	3	26	Types of roofs – flat, curved, trussed			
27	3	27	Foundations – types			
28	3	28	Damp Proof Course			
29	3	29	Joinery, doors, windows – materials – types.			
30	3	30	Water Distribution, Sanitary – Lines & Fittings;			
31	3	31	Ventilations: Functional requirements systems of ventilations.			
32	3	32	Air-conditioning - Essentials and Types;			
33	3	33	Acoustics – characteristic – absorption			
34	3	34	Acoustic design; Fire protection – Fire Hazards			

35	3	35	Classification of fire resistant materials and constructions			
36	3	36	PPT			
37	3	37	Active Learning			
38	3	38	Unit Test - 3			
39	4	39	Load Bearing Structure - Load transfer mechanism.			
40	4	40	Framed Structure - Load transfer mechanism.			
41	4	41	Form work: Types			
42	4	42	Requirements – Standards			
43	4	43	Scaffolding – Design;			
44	4	44	Shoring, Underpinning			
45	4	45	Lime and Cement Mortars			
46	4	46	Preparation of mortar			
47	4	47	Plastering, Pointing,			
48	4	48	Painting, Claddings – Types			
49	4	49	Tiles – ACP			
50	4	50	PPT			
51	4	51	Active Learning			
52	4	52	Unit Test - 4			
53	5	53	Principles of Building Planning,			
54	5	54	Principles of Building Planning,			
55	5	55	Classification of buildings			
56	5	56	Classification of buildings			
57	5	57	Classification of Building by laws.			
58	5	58	PPT			
59	5	59	Active Learning			
60	5	60	Unit Test - 5			

Important Questions:

Unit – 1

1. Define Seasoning of timber. List out the defects in timber?
2. Write down the characteristic properties of good stone?
3. Describe properties and uses of mild steel?
4. Describe the geological classification of rocks. Give example of each type?
5. What do you understand by the term decay OF timber? What are common causes of decay of timber
6. Explain about three coat lime plaster?
7. Explain various types of composite masonry?
8. What do you understand by the term seasoning of timber? Explain the objects of Seasoning in detail
9. Describe various reasons of the decay of stones?

10. Explain in detail the process of manufacturing glass?

Unit – 2

1. List out the ingredients of cement?
2. List out the various grades of cement in India?
3. What do you mean by setting time of cement?
4. Describe various types of paints, and their suitability or use?
5. Describe in brief any type of manufacture of cement with the help of flow diagram?
6. Write short notes on, (a) Lean-to-roof (b) Couoked roof (c) Coupled-close roof (d) Collar roof

Unit – 3

1. Define arch .what are the components of an arch?
2. Explain about the types of roofs?
3. What are the advantages of damp proof coursing?
4. Explain in detail various systems of mechanical ventilation.
5. Explain acid - proofing of floors?
6. What do you understand by (a) Ventilation (b) Air conditioning. Explain the necessity of each of them?
7. What are air entraining agents? How these air entraining agents help inimprovig performance of cement?

Unit – 4

1. Write down the general requirements of mortars?
2. Differentiate between brick masonry and stone masonry?
3. Explain about the types of bonds in brick work?
4. Explain (a) Flying (or) horizontal shores(b) Dead (or) vertical shores.
5. Explain about Internal and external stair ways?
6. Explain various practical points to be considered while planning a building?
7. What are requirements of a good form work? Describe the steps that should be taken to effect economy in the expenditure on formwork?
8. Explain the requirements for lighting and ventilation in kitchens and living rooms of a residential building?

Unit – 5

1. Define building planning. State its significance?
2. Write briefly the factors affecting building planning?
3. Write any four basic principles of building planning?
4. Describe about Site plans and building plans.
5. Explain the requirements for the following elements of a residential house. What is occupancy of building?
6. Explain how the buildings are classified according to occupancy of building?
7. Write short note on the following: (a) Wooden stairs (b) R.C.C.Stairs. (c) Spiral stairs

2040116 - FLUID MECHANICS

B.Tech. II Year II Sem.	L	T	P	C
Prerequisites:-	3	0	0	3

Course Objectives: The objective of the course is

1. To introduce the concepts of fluid mechanics useful in Civil Engineering applications
2. To provide a first level exposure to the students to fluid statics, kinematics and dynamics.
3. To learn about the application of mass, energy and momentum conservation laws for fluid flows
4. To train and analyse engineering problems involving fluids with a mechanistic perspective is essential for the civil engineering students
5. To obtain the velocity and pressure variations in various types of simple flows
6. To prepare a student to build a good fundamental background useful in the application intensive courses covering hydraulics, hydraulic machinery and hydrology

Course Outcomes: At the end of the course the student will able to

1. Understand the broad principles of fluid statics, kinematics and dynamics
2. Understand definitions of the basic terms used in fluid mechanics and characteristics of fluids and its flow
3. Understand classifications of fluid flow
4. Measure flow in pipes
5. Determine loss of head through pipes
6. apply the continuity, momentum and energy principles

UNIT - I

Properties of Fluid

Basic concepts: Density, Specific weight, Specific volume, Specific gravity, Kinematic and dynamic viscosity - variation of viscosity with temperature - Newton law of viscosity - vapour pressure - boiling point - surface tension and capillarity

Fluid Statics

Fluid Pressure at a point, variation of pressure in a fluid, Pascal's law, measurement of pressure - simple and differential manometers - Hydrostatic pressure and force: horizontal, vertical and inclined surfaces - Buoyancy

Learning Outcomes:

At the end of the unit, student should able to,

- Understand the properties of fluids
- Measure the pressure of fluid

UNIT - II

Fluid Kinematics

Classification of fluid flow: steady and unsteady flow; uniform and non-uniform flow; laminar and turbulent flow; rotational and irrotational flow; compressible and incompressible flow; ideal and real fluid flow; one, two- and three-dimensional flows - Stream line - path line - streak line and stream tube - stream function, velocity potential function - One, two- and three-dimensional continuity equations in Cartesian coordinates.

Fluid Dynamics

Euler's and Bernoulli's equation - Impulse-momentum equation and its applications – Bernoulli's equation to real fluid flows.

Learning Outcomes:

At the end of the unit, student should able to,

- Understand the concepts of fluid kinematics
- Understand the concepts of fluid dynamics

UNIT - III

Flow Measurement in Pipes

Practical applications of Bernoulli's equation: venturimeter, orifice meter and pitot tube - Momentum principle - Forces exerted by fluid flow on pipe bend

Flow Over Notches & Weirs

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

Learning Outcomes:

At the end of the unit, student should able to,

- Measure the flow in pipes through venture and orifice meter
- Measure the flow in pipes through notches and weir

UNIT - IV

Flow through Pipes

Reynolds experiment - Loss of head through pipes – Darcy-Weisbach equation - minor losses - total energy line - hydraulic grade line - pipes in series - equivalent pipes - pipes in parallel – syphon - power transmission through pipes - water hammer in pipes and control measures.

Learning Outcomes:

At the end of the unit, student should able to,

- Able to measure the minor and major losses in pipes
- Analyse the pipe networks using different methods

UNIT - V

Boundary Layer Concepts

Boundary layer: Definition, laminar and turbulent boundary layers - boundary layer thickness - displacement thickness - momentum thickness and energy thickness - Laminar sub-layer, smooth and rough boundaries - Boundary layer separation and Control - Definition of Drag and Lift and types drag - magnus effect.

Learning Outcomes:

At the end of the unit, student should able to,

- Understand the laminar and turbulent flow
- Understand the concepts of boundary layer

TEXT BOOKS:

1. Fluid Mechanics by Modi and Seth, Standard Book House.
2. Fluid Mechanics and Hydraulic machines by Manish Kumar Goyal, PHI learning Private Limited, 2015.
3. Fluid Mechanics by R.C. Hibbeler, Pearson India Education Services Pvt. Ltd.

REFERENCES:

1. Theory and Applications of Fluid Mechanics, K. Subramanya, Tata McGraw Hill
2. Introduction to Fluid Mechanics and Fluid Machines by SK Som, Gautam Biswas, Suman Chakraborthy, Mc Graw Hill Education (India) Private Limited
3. Fluid Mechanics and Machinery, C.S.P. Ojha, R. Berndtsson and P. N. Chadramouli, Oxford University Press, 2010
4. Fluid mechanics & Hydraulic Machines, Domkundwar & Domkundwar Dhanpat Rai &Co
5. Fluid Mechanics and Hydraulic Machines, R. K. Bansal, Laxmi Publication Pvt Ltd.

Session Planner:

S.No	Unit No.	L.No	Topic Details	Date Planned	Date Conducted	Remarks
1	1	1	Basic concepts: Density, Specific weight, Specific volume, Specific gravity			
2	1	2	Kinematic and dynamic viscosity - variation of viscosity with temperature			
3	1	3	Kinematic and dynamic viscosity - variation of viscosity with temperature			
4	1	4	Kinematic and dynamic viscosity - variation of viscosity with temperature			
5	1	5	Newton law of viscosity			
6	1	6	Vapour pressure, Boiling point			
7	1	7	Surface tension and capillarity			
8	1	8	Fluid Pressure at a point			
9	1	9	Variation of pressure in a fluid			
10	1	10	Pascal's law, measurement of pressure			
11	1	11	Simple and differential manometers			
12	1	12	Hydrostatic pressure and force			
13	1	13	Horizontal, vertical and inclined surfaces - Buoyancy			
14	1	14	Horizontal, vertical and inclined surfaces - Buoyancy			
15	1	15	PPT			
16	1	16	Active Learning			

17	1	17	Unit Test - 1			
18	2	18	Classification of fluid flow: steady and unsteady flow; uniform and non-uniform flow			
19	2	19	Classification of fluid flow: laminar and turbulent flow; rotational and irrotational flow; compressible and incompressible flow;			
20	2	20	Classification of fluid flow: Ideal and real fluid flow, One, two dimensional flows			
21	2	21	Three-dimensional flows - Stream line - path line			
22	2	22	Streak line and stream tube - stream function			
23	2	23	Velocity potential function - One, two- and three-dimensional continuity equations in Cartesian coordinates.			
24	2	24	One, two dimensional continuity equations in Cartesian coordinates.			
25	2	25	Three-dimensional continuity equations in Cartesian coordinates.			
26	2	26	Euler's and Bernoulli's equation			
27	2	27	Impulse-momentum equation			
28	2	28	Impulse-momentum equations applications			
29	2	29	Bernoulli's equation to real fluid flows.			
30	2	30	PPT			
31	2	31	Active Learning			
32	2	32	Unit Test - 2			
33	3	33	Practical applications of Bernoulli's equation:			
34	3	34	Venturimeter			
35	3	35	Orifice meter			
36	3	36	Pitot tube			
37	3	37	Momentum principle			
38	3	38	Forces exerted by fluid flow on pipe bend			
39	3	39	Flow through rectangular notches and weirs			
40	3	40	Flow through triangular notches and weirs			
41	3	41	Flow through trapezoidal notches and weirs			
42	3	42	Velocity of approach - Broad crested weir			

43	3	43	Velocity of approach - Broad crested weir			
44	3	44	PPT			
45	3	45	Active Learning			
46	3	46	Unit Test - 3			
47	4	47	Reynolds experiment - Loss of head through pipes			
48	4	48	Darcy-Weisbach equation			
49	4	49	Minor losses - total energy line			
50	4	50	Hydraulic grade line - pipes in series			
51	4	51	Equivalent pipes - pipes in parallel			
52	4	52	Syphon - power transmission through pipes			
53	4	53	Water hammer in pipes and control measures.			
54	4	54	PPT			
55	4	55	Active Learning			
56	4	56	Unit Test - 4			
57	5	57	Boundary layer: Definition, laminar and turbulent boundary layers			
58	5	58	Boundary layer thickness			
59	5	59	Displacement thickness			
60	5	60	Momentum thickness and energy thickness			
61	5	61	Laminar sub-layer			
62	5	62	Smooth and rough boundaries			
63	5	63	Boundary layer separation and Control			
64	5	64	Definition of Drag and Lift			
65	5	65	Types drag - magnus effect.			
66	5	66	PPT			
67	5	67	Active Learning			
68	5	68	Unit Test - 5			

Important Questions:

Unit – 1

Part – A

1. Differentiate fluid statics and kinematics.
2. What is Vapour pressure?
3. State Newtonian law of Viscosity.
4. Write short note on total pressure and center of pressure

Part – B

1. Define the following properties of fluid: (i) Density (ii) Specific volume (iii) Specific gravity (iv) Kinematic viscosity (v) Dynamic viscosity (vi) Surface tension (vii) Capillarity.

2. State and derive Pascal's law.
3. An oil of viscosity 6 poise is used for lubrication between a shaft and sleeve. The diameter of the shaft is 0.5 m and it rotates at 200 r.p.m. Calculate the power lost in oil for a sleeve length of 100 mm. The thickness of oil film is 1.0 mm.
4. A rectangular plane surface 2 m wide and 3 m deep lies in water in such a way that its plane makes an angle of 45° with the free surface of water. Determine the total pressure force and position of centre of pressure, when the upper edge is 2 m below the free surface.

Unit – 2

Part – A

1. What is velocity potential and stream function?
2. How Bernoulli's equation derived from Euler's equation?
3. What is equipotential line?
4. Define path line, streak line.

Part – B

1. Explain the different types of fluid flow.
2. Water is flowing through a pipe having diameter 300 mm and 200 mm at the bottom and upper end respectively. The intensity of pressure at the bottom end is 30 N/cm2 and the pressure at the upper end is 10 N/cm2. Determine the difference in datum head if the rate of flow through pipe is 42 lit/sec.
3. Derive the continuity equation in 3-Dimension Cartesian coordinate.
4. Water is flowing through a pipe having diameter 30 cm and 20 cm at the bottom and upper end respectively. The intensity of pressure at the bottom end is 20 N/cm2. Discharge through the pipe is 40 lit/sec. Upper end of the pipe is located 5m from datum and lower end is located 2m from datum. Find the intensity of pressure at the upper end of the pipe

Unit – 3

Part – A

1. Distinguish between notch and weir.
2. What is broad crested weir?
3. What are the advantages of a triangular notch over a rectangular notch?
4. Distinguish between notch and weir.

Part – B

1. An orificemeter with orifice diameter 10 cm is inserted in a pipe of 20 cm diameter. The pressure gauges fitted upstream and downstream of the orifice meter give readings of 19.62 N/cm2 and 9.81 N/cm2 respectively. Co-efficient of discharge for the orifice meter is given as 0.65. Determine the discharge of water through pipe.
2. Derive an expression for discharge over a Triangular notch or weir.
3. Derive an expression for discharge over a Venturimeter.
4. Examine the discharge over a rectangular weir of length 100 m. the head of water over the weir is 1.5 m. The velocity of approach is give as 0.5 m/s. take $C_d = 0.6$.

Unit – 4

Part – A

1. List out all major and minor losses.
2. What is water hammer? Where it is occurs?
3. What is meant by energy loss in a pipe?
4. What do you understand by total energy line and hydraulic gradient line?

Part – B

1. Describe Reynolds experiment with neat sketch.
2. The rate of flow of water through a horizontal pipe is 0.25 m^3/sec. The diameter of the pipe is suddenly enlarged from 200 mm to 400 mm. The pressure intensity in the smaller pipe is 12.5 N/cm^2. Determine (i) loss of head due to sudden enlargement (ii) power lost due to enlargement.
3. Evaluate the difference in the elevations between the water surfaces in the two tanks which are connected by a horizontal pipe of diameter 400 mm and length 500 m. The rate of flow of water through the pipe is 200 lit/sec. Consider all minor losses and take f = 0.009.
4. Derive Darcy-Weisbach equation (or) Loss of head due to friction.

Unit – 5

Part – A

1. What is laminar sub-layer?
2. How is the flow in boundary layer controlled?
3. List the methods for preventing the separation of boundary layer
4. Define Displacement thickness and Energy thickness.

Part – B

1. The velocity distribution in the boundary layer is given by $u/U = y/\delta$. Determine the ratio of displacement thickness to momentum thickness.
2. Explain laminar, turbulent boundary layers and boundary layer separation.
3. State the assumptions under which the boundary layer equations for flow over a flat plate are valid. Explain with a neat sketch the boundary layer characteristics when a fluid is flowing over a flat plate.
4. Calculate the displacement thickness, energy thickness and momentum thickness for the velocity distribution in the boundary layer given by $u/U = 2 (y/\delta) – (y/\delta)^2$

2040117 - STRUCTURAL ANALYSIS - I

B.Tech. II Year II Sem	**L T P C**
Pre-requisites: Strength of Materials I & II	**3 0 0 3**

Course Objectives: The objective of the course is

1. To differentiate the statically determinate and indeterminate structures, analyse the propped cantilever and fixed beams
2. To understand the energy methods used to derive the equations to solve engineering problems
3. To understand the nature of stresses developed in perfect frames and three hinged arches for various types of simple loads
4. To analyse the statically indeterminate members such as continuous beams and for various types of loading by slope deflection, moment distribution method and theorem of three moments method.
5. To analyse the pin jointed plane frames under different loading positions.
6. To evaluate the Influence on a beam for different static & moving loading positions

Course Outcomes: At the end of the course the student will able to

1. Understand determinate and indeterminate structure
2. Analyse the statically indeterminate beams and frames
3. Evaluate the normal thrust, radial shear, bending moment of three hinged arch.
4. Analyse the beams and frames using slope and deflection, moment distribution and theorem of three moments method
5. Analyse the pin jointed plane frames
6. Evaluate the structure under moving loads and draw the SFD

UNIT - I
PROPPED CANTILEVER AND FIXED BEAMS

Static and kinematic indeterminacies for beams - Analysis of Propped cantilever and fixed beams subjected to different types of loads - Deflection of Propped cantilever and fixed beams - effect of sinking of support.

Learning Outcomes:

At the end of the unit, students should able to

- Understand the difference between static and kinematic indeterminacy, slope and deflection for various support conditions corresponding to different types of loads.
- Analyse the propped cantilever beam for different loading condition and draw the SFD and BMD. Also to find the maximum deflection of beam.
- Analyse the fixed beam for different loading condition and draw the SFD and BMD. Also to find the maximum deflection of beam.

UNIT - II
ENERGY THEOREMS AND THREE HINGED ARCHES

Energy Theorems: Introduction-Strain energy in linear elastic system, expression of strain

energy due to axial load, bending moment and shear forces - Castigliano's theorem-Unit Load Method - Deflections of simple beams and pin- jointed plane frames - Deflections of statically determinate bent frames.

Three Hinged Arches: Introduction – Types of Arches – Comparison between Three hinged and Two hinged Arches - Linear Arch - Eddy's theorem - Analysis of Three hinged arches - Normal Thrust and radial shear and bending moment - Geometrical properties of parabolic and circular arches - Three hinged parabolic circular arches having supports at different levels.

Learning Outcomes:

At the end of the unit, students should able to

- Know the different types of arches, determinate and indeterminate arches, cables and its behaviour for different loading condition and can able to draw the BMD.
- Perform the calculation to analyse the three hinged arches for various loading condition and find the maximum bending moment, radial shear and horizontal thrust.

UNIT - III

SLOPE DEFLECTION AND MOMENT DISTRIBUTION METHOD

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

Moment Distribution Method and its application to continuous beams with and without settlement of supports. Shear force and bending moment diagrams and Elastic curve.

Learning Outcomes:

At the end of the unit, students should able to

- Understand the concepts behind the analysis of beam using slope deflection and moment distribution method.
- Analyse the continuous beam for different loading condition and draw the SFD and BMD using slope deflection method.
- Analyse the continuous beam for different loading condition and draw the SFD and BMD using moment distribution method.

UNIT - IV

THEOREM OF THREE MOMENTS AND ANALYSIS OF TRUSSES

Theorem of three moments – analysis of continuous beams – shear force and bending moment diagrams.

Types of trusses - Perfect, Imperfect and Redundant pin jointed plane frames - Method of joints, method of sections and tension coefficient method for vertical loads, horizontal loads and inclined loads.

Learning Outcomes:

At the end of the unit, students should able to

- Know the theorem of three moments to solve continuous beams and know the types of trusses and its behaviour for different loading position.

- Analyse the continuous beam and draw the SFD and BMD for the continuous beam for different loading, end conditions.
- Analyse the trusses using the method of joints, section and tension coefficient for different loading positions.

UNIT – V

MOVING LOADS AND INFLUENCE LINES

Introduction - maximum SF and BM at a given section and absolute maximum shear force and bending moment due to single concentrated load, uniformly distributed load longer than the span, uniformly distributed load shorter than the span, two point loads with fixed distance between them and several point loads-Equivalent uniformly distributed load.

Definition of influence line for shear force and bending moment - load position for maximum shear force and maximum bending moment at a section - Point loads, uniformly distributed load longer than the span, uniformly distributed load shorter than the span.

Learning Outcomes:

At the end of the unit, students should able to

- Know the concepts and application of influence lines and its different classification.
- Perform the calculation for moving loads using influence lines and draw the SFD and BMD
- Analyse the beam for different conditions of moving loads.

TEXT BOOKS:

1. Basic Structural Analysis by KU Muthu et al., I.K. International Publishing House Pvt. Ltd.
2. Indeterminate Structural Analysis by KU Muthu et al., I.K. International Publishing House Pvt. Ltd.
3. Analysis of Structures, Vol & II, Vazirani.V.N and Ratwani, M.M, Khanna Publishers, 2015.
4. Structural Analysis Vol I & II by G.S.Pandit and S.P. Gupta, Tata McGraw Hill Education Pvt. Ltd. 2008
5. Punmia. B.C, Ashok Kumar Jain & Arun Kumar Jain, Theory of structures, Laxmi Publications, New Delhi, 2004.
6. R. Vaidyanathan & P. Perumal, Structural Analysis Vol I & II, (Fourth Edition), Laxmi Publications, New Delhi, 2016.

REFERENCES:

1. William Weaver, J and James M.Gere, Matrix analysis of framed structures, CBS Publishers & Distributors, Delhi,1995
2. Hibbeler, R.C.,Structural Analysis, VII Edition, Prentice Hall, 2012.
3. Reddy.C.S, "Basic Structural Analysis",Tata McGraw Hill Publishing Company,2005.

4. Rajasekaran. S, & G. Sankarasubramanian., "Computational Structural Mechanics", PHI Learning Pvt. Ltd, 2015
5. Negi L.S.and Jangid R.S.,Structural Analysis, Tata McGraw Hill Publishing Co.Ltd.2004.
6. Structural analysis T. S Thandavamoorthy, Oxford university Press, 2011

Session Planner:

S.No	Unit No.	L.No	Topic Details	Date Planned	Date Conducted	Remarks
1	1	1	PROPPED CANTILEVER AND FIXED BEAMS - Introduction			
2	1	2	Static and kinematic indeterminacies for beams			
3	1	3	Analysis of Propped cantilever beams subjected to different types of loads			
4	1	4	Analysis of Propped cantilever beams subjected to different types of loads			
5	1	5	Analysis of Propped cantilever beams subjected to different types of loads			
6	1	6	Analysis of Propped cantilever beams subjected to different types of loads			
7	1	7	Analysis of fixed beams subjected to different types of loads			
8	1	8	Analysis of fixed beams subjected to different types of loads			
9	1	9	Analysis of fixed beams subjected to different types of loads			
10	1	10	Deflection of Propped cantilever beams - effect of sinking of support.			
11	1	11	Deflection of Propped cantilever beams - effect of sinking of support.			
12	1	12	Deflection of fixed beams - effect of sinking of support.			
13	1	13	Deflection of fixed beams - effect of sinking of support.			
14	1	14	PPT			

15	1	15	Active Learning			
16	1	16	Unit Test - 1			
17	2	17	Energy Theorems: Introduction-Strain energy in linear elastic system			
18	2	18	Expression of strain energy due to axial load			
19	2	19	Expression of strain energy due to bending moment and shear forces - Castigliano's theorem-Unit Load Method - Deflections of simple beams and pin-jointed plane frames - Deflections of statically determinate bent frames.			
20	2	20	Expression of strain energy due to shear forces			
21	2	21	Castigliano's theorem-Unit Load Method			
22	2	22	Deflections of simple beams			
23	2	23	Deflections of pin- jointed plane frames			
24	2	24	Deflections of statically determinate bent frames.			
25	2	25	Three Hinged Arches: Introduction			
26	2	26	Types of Arches – Comparison between Three hinged and Two hinged Arches			
27	2	27	Linear Arch - Eddy's theorem			
28	2	28	Analysis of Three hinged arches - Normal Thrust and radial shear and bending moment			
29	2	29	Analysis of Three hinged arches - Normal Thrust and radial shear and bending moment			
30	2	30	Analysis of Three hinged arches - Normal Thrust and radial shear and bending moment			
31	2	31	Geometrical properties of parabolic and circular arches			
32	2	32	Three hinged parabolic circular arches having supports at different levels.			
33	2	33	Three hinged parabolic circular arches having supports at different levels.			

34	2	34	Three hinged parabolic circular arches having supports at different levels.			
35	2	35	PPT			
36	2	36	Active Learning			
37	2	37	Unit Test - 2			
38	3	38	Derivation of slope-deflection equation			
39	3	39	Application to continuous beams with settlement of supports.			
40	3	40	Application to continuous beams with settlement of supports.			
41	3	41	Application to continuous beams without settlement of supports.			
42	3	42	Application to continuous beams without settlement of supports.			
43	3	43	Shear force and bending moment diagrams			
44	3	44	Elastic curve			
45	3	45	Moment Distribution Method and its application			
46	3	46	MDM to continuous beams with settlement of supports.			
47	3	47	MDM to continuous beams with settlement of supports.			
48	3	48	MDM to continuous beams without settlement of supports.			
49	3	49	MDM to continuous beams without settlement of supports.			
50	3	50	Shear force and bending moment diagrams			
51	3	51	Elastic curve.			
52	3	52	PPT			
53	3	53	Active Learning			
54	3	54	Unit Test - 3			
55	4	55	Theorem of three moments			
56	4	56	Analysis of continuous beams – shear force and bending moment diagrams.			
57	4	57	Analysis of continuous beams – shear force and bending moment diagrams.			

58	4	58	Types of trusses - Perfect, Imperfect and Redundant pin jointed plane frames			
59	4	59	Method of joints for vertical loads, horizontal loads and inclined loads.			
60	4	60	Method of sections for vertical loads, horizontal loads and inclined loads.			
61	4	61	Tension coefficient method for vertical loads, horizontal loads and inclined loads.			
62	4	62	PPT			
63	4	63	Active Learning			
64	4	64	Unit Test - 4			
65	5	65	Moving Loads - Introduction			
66	5	66	Maximum SF and BM at a given section and absolute maximum shear force and bending moment due to single concentrated load			
67	5	67	Uniformly distributed load longer than the span			
68	5	68	Uniformly distributed load shorter than the span			
69	5	69	two point loads with fixed distance between them			
70	5	70	Several point loads-Equivalent uniformly distributed load.			
71	5	71	Definition of influence line for shear force and bending moment - load position for maximum shear force and maximum bending moment at a section			
72	5	72	Point loads			
73	5	73	UDL longer than the span			
74	5	74	UDL shorter than the span			
75	5	75	PPT			
76	5	76	Active Learning			
77	5	77	Unit Test - 4			

Important Questions:

Unit – 1

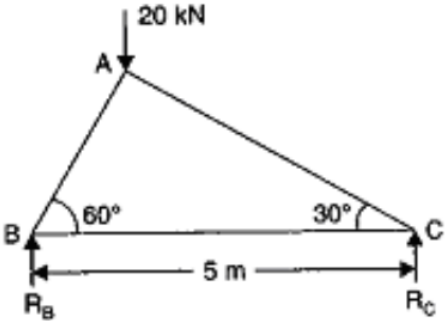
Part – A

1. What is mean by perfect frame? (or) Define perfect frame. (JNTUH-2017)

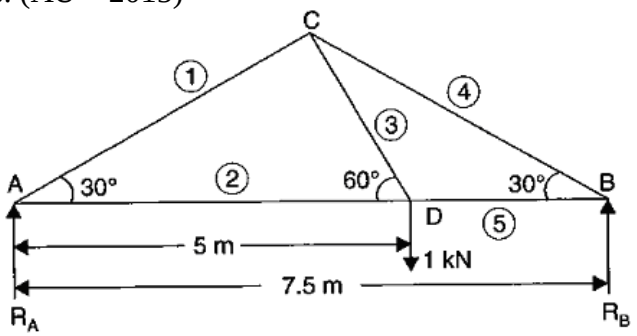
2. What are the different types of frames? (or) List the classifications of frames. (JNTUH-2018)
3. What is mean by Imperfect frame? (or) Define Imperfect frame. (JNTUH-2017)
4. What is mean by deficient frame? (or) What is the condition for deficient frame? (JNTUH-2016)
5. What is mean by redundant frame? (or) What is the condition for redundant frame? (JNTUH-2017)
6. What are the assumptions made in finding out the forces in a frame? (or) List the assumptions made in the analysis of pin jointed frames.
7. What are the reactions of supports of a frame? (or) List the reactions of supports of a frame.
8. How will you analysis a frame? (or) Steps for analyzing a frame.
9. What are the methods for analysis the frame? (or) List the analysis methods available for a pin jointed frames.
10. How method of joints applied to trusses carrying Horizontal loads. (or) Explain the procedure for analyzing truss carrying horizontal loads.
11. How method of joints applied to trusses carrying inclined loads. (or) Explain the procedure for analyzing truss carrying inclined loads.
12. What is mean by compressive and tensile force? (or) Differentiate compressive and tensile force. (JNTUH-2015)
13. How will you determine the forces in a member by method of joints? (or) How will you select the joint in a truss for analysis by method of joints?

Part - B

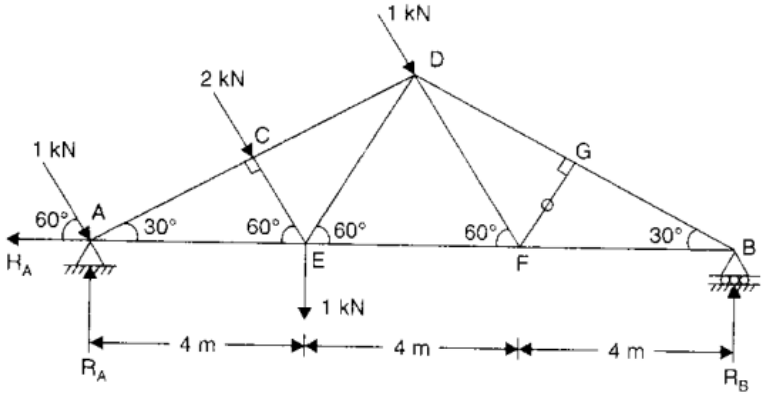
1. Find the forces in the members AB, AC and BC of the truss as shown in the below figure. Solve the truss by *method of joints*. (AU-2013)



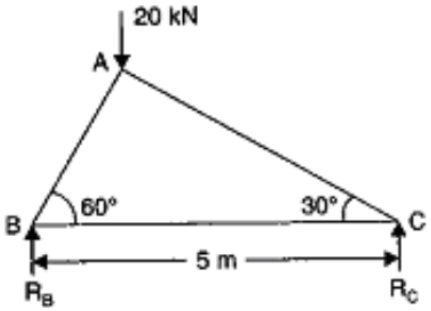
2. A truss of span 7.5m carries a point load of 1 kN at joint D as shown in the below figure. Find the reactions and forces in the members of the truss? Solve the truss by *method of joints*. (AU – 2015)



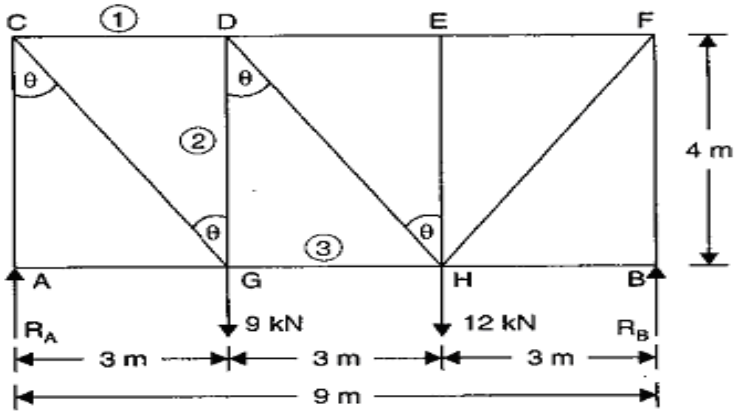
3. Determine the forces in the truss shown in the below figure. Which is subjected to inclined loads? Solve the truss by *method of joints*. (JNTUH – 2017)



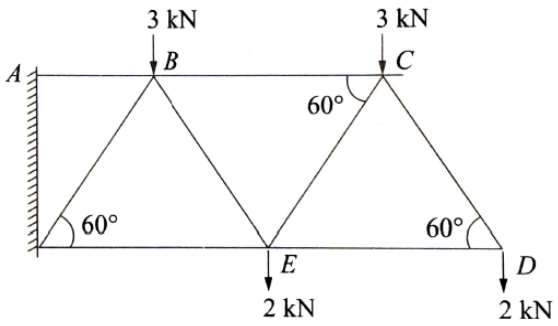
4. Find the forces in the members AB and AC of the truss as shown in the below figure using *method of section*? (AU – 2013)



5. A truss of span 9m is loaded as shown in the below figure. Find the reactions and forces in the members marked 1, 2 and 3. Calculate the member forces by *method of section*. (JNTUK – 2016)



6. Figure shows the Warren type cantilever truss along with the imposed loads. Determine the forces in all the members using the *method of joints* and *tension coefficient method*. (AU - 2008)

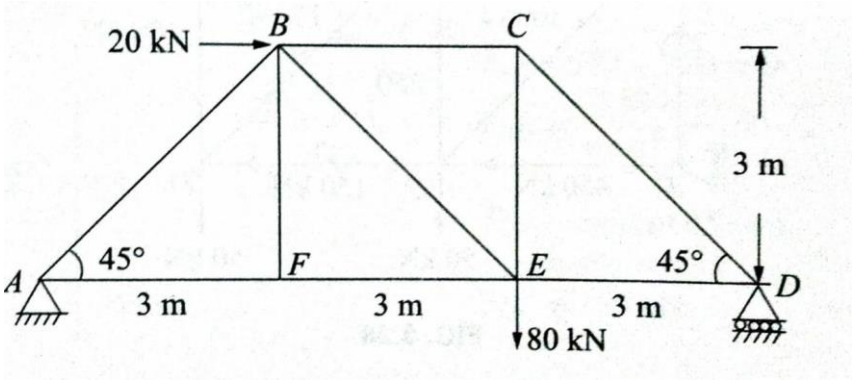


Unit – 2
Part – A

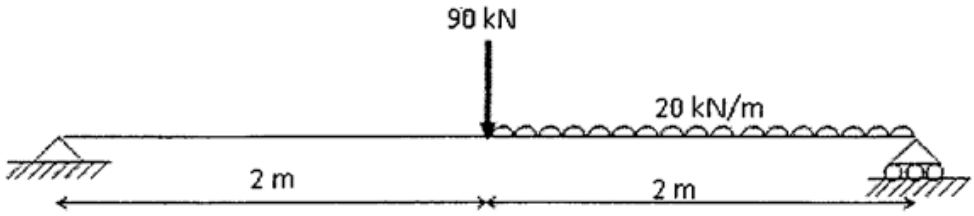
1. Why is it necessary to compute deflections in structures? (AU-2011)
2. Name any four methods used for computation of deflections in structures. (AU-2011)
3. State the difference between strain energy method and unit load method in
4. What are the assumptions made in the unit load method? (JNTUK-2015)
5. Give the equation that is used for the determination of deflection at a given point in beams and frames. (AU-2008)
6. Distinguish between pin jointed and rigidly jointed structure. (JNTUH-2012)
7. Write down the two methods of determining displacements in pin jointed plane frames by the unit load concept. (AU-2008)
8. Define static indeterminacy of a structure. (AU-2012)
9. Differentiate the statically determinate structures and statically indeterminate structures? (JNTUH-2015)
10. Define: Unit load method. (JNTUH-2015)
11. What is an arch? Explain. (AU – 2018)
12. What is a linear arch? (AU – 2018)
13. State Eddy's theorem.(JNTUH -2016)
14. What is the degree of static indeterminacy of a three hinged parabolic arch? (JNTUK-2015)
15. Under what conditions will the bending moment in an arch be zero throughout? (JNTUH-2016)
16. Distinguish between two hinged and three hinged arches. (JNTUH-2016)
17. Write down the classification of arches. (JNTUK-2015)

Part – B

1. Calculate the vertical deflection of joint B of the truss loaded as shown in fig. by unit load method. Take area of each member = $500x10^{-6}m^2$, E = $200x10^6$ kN/m^2 .(JNTUH – 2002)
2. A steel truss of span 15 m is loaded as shown in fig. The cross section of each member is such that it is subjected to a stress of 100 N/mm^2. Find the vertical deflection at joint C. Take E = 200 kN/mm^2.
3. Determine the vertical deflection of joint E of the truss shown in fig. Take AE = $3.6x10^5$ kN.

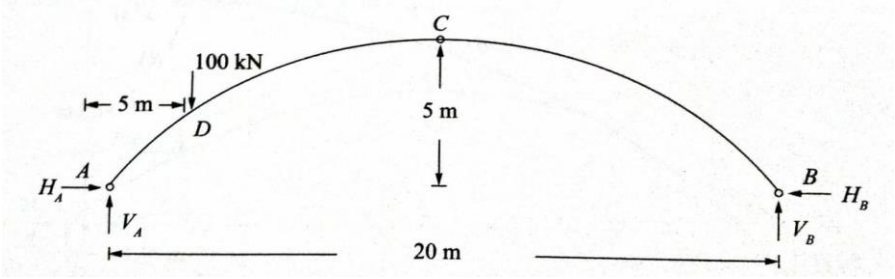


4. Determine the vertical deflection at point B of the beam as shown in fig. Take E = $2x10^5$ MPa, I = $825x10^7$ mm^4
5. A simply supported beam of span 6m is subjected to a concentrated load of 45 kN at 2m from the left support. Calculate the deflection under the load point. Take E = $200x10^6$ kN/m^2 and I = $14x10^{-6}$ m^4.
6. Using unit load methods determine the vertical deflection at mid span of a simply supported beam shown in fig. Assume flexural rigidity is 3000 kNm^2.



7.

8. A three hinged parabolic arch is shown in fig. It has a span of 20m and central rise of 5m. It carries a concentrated load of 100 kN at a distance of 5m from the left support. Determine the maximum bending moment and plot the BMD.

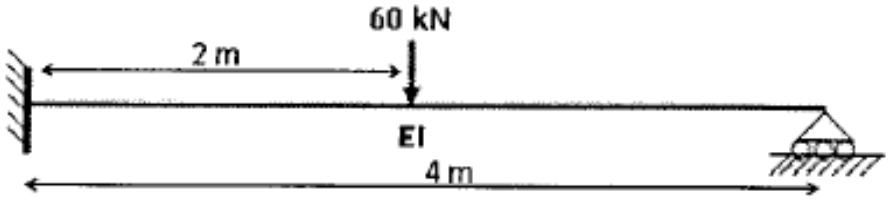


9. A three hinged parabolic arch is shown in fig. Determine the normal thrust, radial shear and bending moment at quarter span points and draw BMD.
10. Three hinged circular arch of span 10m and central rise 2.5m supports a point load of 100 kN at left quarter span and a UDL of 20 kN/m over the right half of the span. Determine the reaction, normal thrust and radial shear at right quarter span point (JNTUH – 2004)
11. A three hinged parabolic arch loaded as shown in fig. Calculate the reactions, bending moment, normal thrust and radial shear at quarter span from left support.

Unit – 3

Part – A

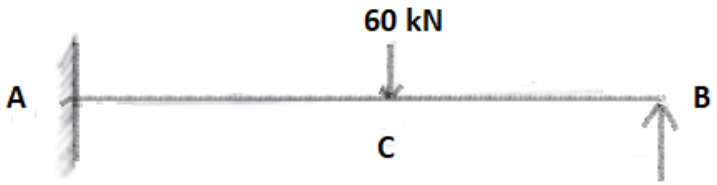
1. What is propped cantilever beam? What is it static indeterminacy?(JNTU-2016, AUC-2012)
2. Determine the reaction at the prop of a beam loaded as shown in fig. (JNTU-2018)



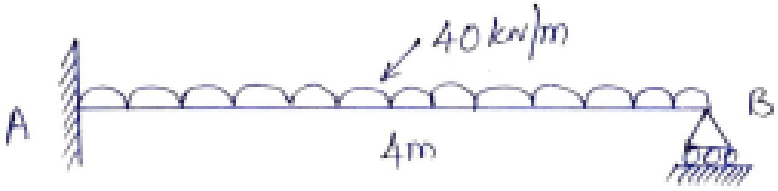
3. Define statically indeterminate beams.
4. State the degree of indeterminacy in a fixed beam. (JNTU-2018)
5. State the methods available for analyzing statically indeterminate structures.
6. Explain the effect of settlement of supports in a continuous beam. (AUC - 2003)
7. What is a fixed beam? (AUC - 2011)
8. Write the expression fixed end moments and deflection for a fixed beam carrying point load at centre.
9. Write the expression fixed end moments and deflection for a fixed beam carrying eccentric point load.
10. Write the expression fixed end moments for a fixed due to sinking of support.
11. What are the advantages of fixed beams? (AUC – 2015)
12. What are the disadvantages of a fixed beam? (AUC – 2015)

Part – B

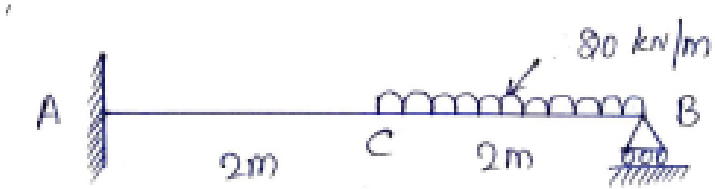
1. Draw the SFD and BMD for the propped cantilever beam loaded as shown in fig. Use moment area method.



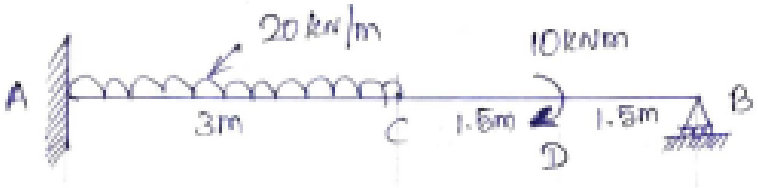
2. Analyse the propped cantilever beam as shown in figure and draw SFD and BMD. (JNTUH – 2006)



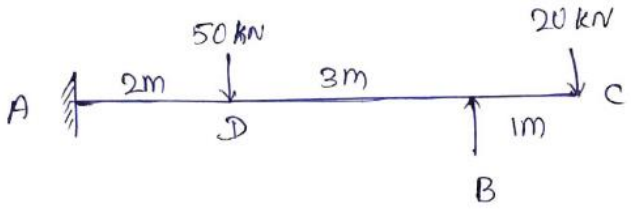
3. Analyse the propped cantilever beam as shown in figure and draw SFD and BMD. Assume EI=Constant. (JNTUH -2019)



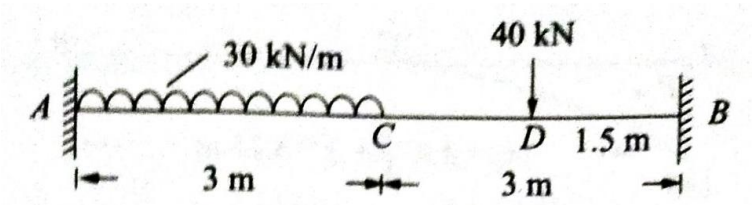
4. A propped cantilever beam supports loads as shown in fig. During loading the prop sinks by 5mm. Determine prop reaction and draw SFD, BMD. E=2x10^5 N/mm^2, I=80x10^6 mm^4.



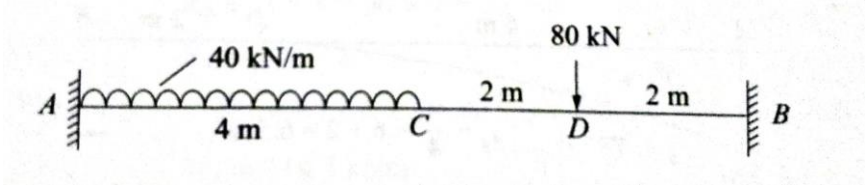
5. Compute the reactions and draw the SFD and BMD for the given propped cantilever beam loaded as shown in fig. (VTU – 2007)



6. A fixed beam AB of length 6m carries point load of 160 kN and 120 kN at a distance of 2m and 4m from the left end A. Find the fixed end moments and the reactions at the supports. Draw B.M and S.F diagrams. (AUC - 2008)
7. Determine the moments at supports of a fixed beam shown in fig. (VTU- 2004)
8. Analyse the beam shown in fig. Also draw BMD. (VTU - 2009)
9. Determine the fixed end moments at the ends of the fixed beam. Also draw SFD & BMD. (MSRIT -2009)



10. A fixed beam of 8m span carries an UDL of 40 kN/m over 4m length starting from left end and a concentrated load of 80 kN at a distance of 6m from left end. Find moment at the supports. Take EI = 15000 kN/m^2. (AUC – 2008)

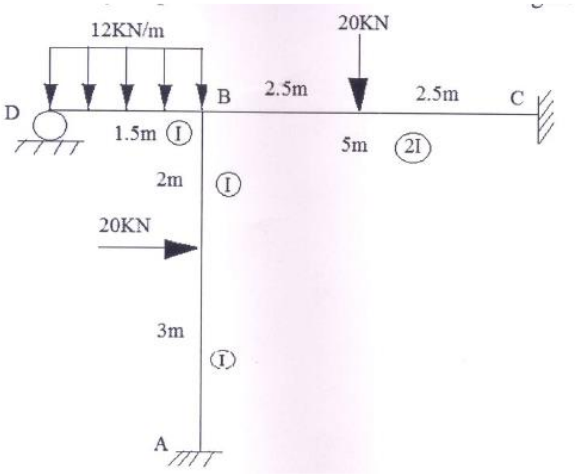


Unit – 4
Part – A

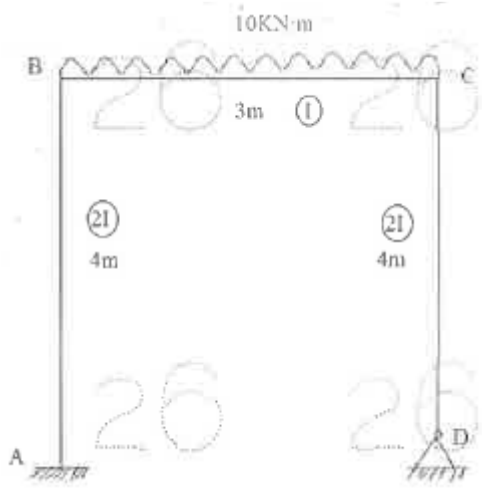
1. State Claypeyron's Three Moment theorem (April/May 2018)
2. What are the advantages of fixed beams? (April/May 2018)
3. Define slope deflection method. (April/May 2018)
4. Write the steps involved in Claypeyron's Three Moment theorem. (April/May 2018).
5. State the assumptions made in the slope deflection methods. (April/May 2018).
6. What is a continuous beam? Explain with figure. (April/May 2018).
7. Explain why the use of slope deflection method is not encouraged in modern design offices? (April/May 2018).
8. Write the steps involved in slope deflection method. (November 2018)
9. Define a continuous beam. And Write down the formula of Theorem of three moments. (November 2018)

Part – B

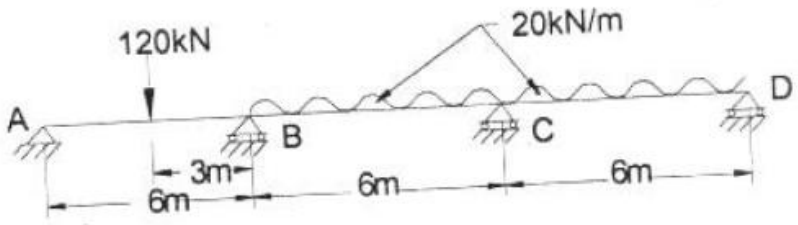
1. A continuous beam ABC is fixed at A and simply supported at B and C. The span AB is 6m and carries a uniformly distributed load of 10 kN/m. The span BC is 4m and carries uniformly distributed load of 30 kN/m. Draw the SFD and BMD using theorem of three moments.
2. A simply supported beam ABC is continuous over two pans AB and BC of 6m and 5m respectively. The span AB is carrying a uniformly distributed load of 20kN/m and span BC is carrying a point load of 50kN at a distance of 2m from B. Find the support moment at B. Also draw the bending moment diagram. Use slope deflection method. (April/May 2018).
3. Analyze the frame shown in figure by Slope Deflection Method. (May 2016).



4. A continuous beam ABC is fixed at A and simply supported at B and C. The span AB is 8m and carries a uniformly distributed load of 15 kN/m. The span BC is 5m and carries uniformly distributed load of 40 kN/m. Draw the SFD and BMD using slope deflection method. (April/May 2018).
5. A simply supported beam ABC is continuous over two pans AB and BC of 8m and 6m respectively. The span AB is carrying a uniformly distributed load of 20kN/m and span BC is carrying a point load of 60kN at a distance of 2m from B. Find the support moment at B. Also draw the bending moment diagram. Use slope deflection method. (April/May 2018).
6. Analyze the frame shown in figure by Slope Deflection Method. (May 2017).



7. A Continuous beam is fixed at A and is supported over rollers at B and C. AB=BC=12M.The beam carries a uniformly distributed load of 30kN/m over AB and a point load of 240kN at a distance of 4M from B on span BC.B has an settlement of 30mm. E= $2x10^5$ N/mm^2 ,I= $2x10^9$ mm^4. Analyse the beam by slope deflection method. (November 2018)
8. A fixed beam of span 4 m carries two point loads of 40kN and 60 kN at 1m and 2m from the left end respectively. Determine the i) Fixed end moments ii) Also draw BMD and SFD. Using theorem of three moments. (April/May 2019).
9. Analyze the continuous beam shown in figure by Slope Deflection Method. (April/May 2019).



Unit – 5

Part – A

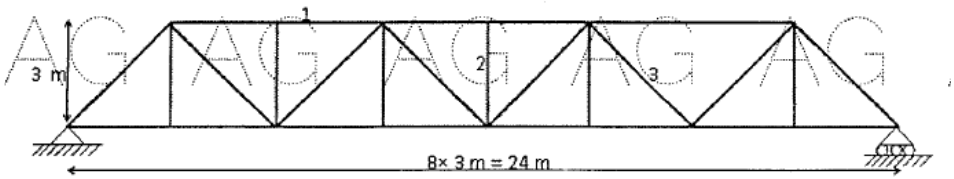
1. Write the assumptions on which the influence lines for the trussed bridges are drawn. (April/May 2018).
2. What important rule does it play in drawing the influence line diagram? (April/May 2018).
3. What do you understand by the word rolling loads? (April/May 2018).
4. Draw the influence diagram for a shear force at any section of a simply supported beam? (November 2018)
5. When a series of wheel loads move along a girder, what is the condition for getting maximum bending moment under any one point load? (April/May 2019).
6. Draw influence lines for support reactions in a simply supported beam. (April/May 2019).
7. Define the influence line. Draw a I.L.D. (November 2018)
8. Distinguish between influence line diagram and bending moment diagram. (May 2016).
9. What is the condition for absolute maximum bending moment due to moving UDL longer than the span? (May 2016).

Part – B

1. A girder of span 16m is subjected to a dead load of 30kN/m .Calculate the portion of the girder for which shear force changes sign, when an equivalent distributed load of 60 kN/m crosses the girder. (April/May 2018).
2. Draw the influence line diagram for a Pratt Truss with parallel chords. (April/May 2018).
3. Draw the Influence line diagram for reactions of a simply supported beam of 12m span. Also draw the influence line diagrams for Shear force and bending moments at quarter span and mid-span sections. (November 2018).
4. Define ILD and construct a ILD for shear force for a simply supported beam carrying a point load W. Explain how this generated ILD can be used for calculating shear and bending moment for a simply supported beam carrying UDL shorter than the span. (April/May 2019).
5. Two point loads of 500 kN and 300kN spaced at 6m apart cross a girder of 36m span from left to right with 400 kN leading. Construct the maximum shearing force and bending moment diagrams stating the absolute maximum values. (April/May 2019).
6. Uniformly distributed load of intensity 32 KN/M crosses a simply supported span of 60m from left to right. The length of the udl is 15m. Find the value of maximum S.F maximum B.M at a section of 18 m from left end. Find also the absolute value of maximum B.M of the S.F in the section. (April/May 2019).
7. A) An UDL of 20kN/m, 5m long crosses a girder of 20m span from left to right. Calculate the max shear force and bending moment at a section 8m from the left hand support.

   B) A train of three wheel loads of magnitude 45kN, 90kN and 90kN passes over a span of 40m. The horizontal distance between the loads is 5m and 10m. Find the greatest bending moment. (May 2016).

8. An UDL of 40kN/m and of length 3m transverse across the span of simply supported length of 18m. Compute the maximum bending moment at 4m from the left support and absolute bending moment. (May 2016).
9. Draw the influence lines for the members 1, 2 and 3 of a truss as shown in fig. (May 2017).



2040118 - ENGINEERING GEOLOGY

B.Tech. II Year II Sem **L T P C**

Prerequisites:- **2 0 0 2**

Course Objective: The objective of the course is

1. To understand the role of Geological concepts in Civil Engineering.
2. To understand weathering process and mass movement rocks
3. To evaluate different types of minerals and rock compositions.
4. To understand different geological structures and its suitability for groundwater and building construction
5. To evaluate subsurface information through geophysical investigations
6. To apply geological principles in selecting sites for tunnels, dams and reservoirs

Course Outcomes: At the end of the course the student will able to

1. Understand the role of Geological concepts in Civil Engineering.
2. Understand weathering process and mass movement rocks
3. Evaluate different types of minerals and rock compositions.
4. Understand different geological structures and its suitability for groundwater and building construction
5. Evaluate subsurface information through geophysical investigations
6. Apply geological principles in selecting sites for tunnels, dams and reservoirs

UNIT - I

Introduction: Importance of geology from Civil Engineering point of view, Case histories of failure of some Civil Engineering constructions, Importance of Physical geology, Petrology and Structural geology.

Weathering of Rocks: Its effect over the properties of rocks importance of weathering.

Learning Outcomes:

At the end of this unit, the students will able to

- Understand the importance of various geological aspects in the field of Civil Engineering
- Acquire the knowledge of weathering on various types of Rocks

UNIT - II

Mineralogy: Definition of mineral, Importance of study of minerals, Different methods of study of minerals. Advantages of study of minerals by physical properties. Role of study of physical properties of minerals in the identification of minerals.

Petrology: Definition of rock: Geological classification of rocks into igneous, Sedimentary and metamorphic rocks. Dykes and sills.

Learning Outcomes:

At the end of this unit, the students will able to

- Analyze the various minerals by using the physical identification
- Acquire the knowledge of various types of Rocks and their utilization in constructions

UNIT – III

Structural Geology: Out crop, strike and dip study of common geological structures associating with the rocks such as folds, faults, unconformities, and joints.

Ground water: Ground water, Water table, common types of ground water, springs, cone of depression, zone of saturation, cone of depression, ground water exploration.

Learning Outcomes:

At the end of this unit, the students will able to

- Analyze the secondary structures present in the rocks
- Understand the formation and various stages of groundwater

UNIT – IV

Earth Quakes: Causes and effects, shield areas and seismic belts. Seismic waves. Landslides, their causes and effect;

Importance of Geophysical Studies: Principles of geophysical study by Gravity methods, Magnetic methods, Electrical methods, Seismic methods, Radio metric methods and geothermal method.

Learning Outcomes:

At the end of this unit, the students will able to

- Analyze the effects and causes of earthquakes and landslides in selecting the site for construction
- Study the various sub structures present below the surface without effecting the surface features by using geophysical investigations.

UNIT – V

Geology of Dams, Reservoirs, and Tunnels: Types of dams and Geological Considerations in the selection of a dam site. Geological factors influencing water Tightness and life of reservoirs. Tunnels - Purposes of tunneling, Effects of Tunneling on the ground Role of Geological Considerations (i.e. Lithological, structural and ground water).

Learning Outcomes:

At the end of this unit, the students will able to

- Apply the knowledge in selecting the location of site for the dams and reservoirs constructions.
- Analyze the role of groundwater, lithology and secondary structures in tunneling

TEXT BOOKS:

1. Engineering Geology by N. Chennakesavulu, McMillan, India Ltd. 2005
2. Engineering Methods by D. Venkat Reddy; Vikas Publishers 2015.
3. Engineering Geology by S K Duggal, H K Pandey Mc Graw Hill Education Pvt Ltd 2014
4. Principles of Engineering Geology by K.V.G.K. Gokhale – B.S publications
5. Engineering Geology by Vasudev Kanithi, University Press.

REFERENCES:

1. Fundamental of Engineering by F.G. Bell, B.S. Publications, 2005.
2. Principles of Engineering Geology & Geotechnics by Krynine & Judd, CBS Publishers
3. Engineering Geology by Subinoy Gangopadhyay, Oxford university press.
4. Engineering Geology for Civil Engineers by P.C. Varghese , PHI

Session Planner:

S.No	Unit No.	L.No	Topic Details	Date Planned	Date Conducted	Remarks
1	1	1	Introduction			
2	1	2	Importance of geology from Civil Engineering point of view			
3	1	3	Case histories of failure of some Civil Engineering constructions			
4	1	4	Importance of Physical geology			
5	1	5	Importance of Petrology			
6	1	6	Importance of Structural geology.			
7	1	7	Weathering of Rocks			
8	1	8	Weathering effect over the properties of rocks			
9	1	9	Importance of weathering.			
10	1	10	PPT			
11	1	11	Active Learning			
12	1	12	Unit Test - 1			
13	2	13	Mineralogy: Definition of mineral			

14	2	14	Importance of study of minerals			
15	2	15	Different methods of study of minerals.			
16	2	16	Advantages of study of minerals by physical properties			
17	2	17	Role of study of physical properties of minerals in the identification of minerals.			
18	2	18	Petrology: Definition of rock			
19	2	19	Geological classification of rocks into igneous			
20	2	20	Geological classification Sedimentary			
21	2	21	Geological classification of metamorphic rocks			
22	2	22	Dykes and sills			
23	2	23	PPT			
24	2	24	Active Learning			
25	2	25	Unit Test - 2			
26	3	26	Structural Geology: Out crop			
27	3	27	Strike and dip			
28	3	28	Study of common geological structures			
29	3	29	Folds, faults, unconformities, and joints.			
30	3	30	Ground water, Water table			
31	3	31	Common types of ground water, springs			
32	3	32	Cone of depression, zone of saturation			
33	3	33	Cone of depression, ground water exploration			
34	3	34	PPT			
35	3	35	Active Learning			
36	3	36	Unit Test - 3			
37	4	37	Earth Quakes: Causes and effects			
38	4	38	Shield areas and seismic belts.			
39	4	39	Seismic waves. Landslides, their causes and effect;			
40	4	40	Importance of Geophysical Studies:			
41	4	41	Principles of geophysical study by Gravity methods			
42	4	42	Principles of geophysical study by Magnetic methods			

43	4	43	Principles of geophysical study by Electrical methods			
44	4	44	Principles of geophysical study by Seismic methods			
45	4	45	Principles of geophysical study by Radio metric methods			
46	4	46	Principles of geophysical study by geothermal method.			
47	4	47	PPT			
48	4	48	Active Learning			
49	4	49	Unit Test - 4			
50	5	50	Geology of Dams, Reservoirs, and Tunnels			
51	5	51	Types of dams			
52	5	52	Geological Considerations in the selection of a dam site			
53	5	53	Geological factors influencing water Tightness			
54	5	54	Geological factors influencing life of reservoirs			
55	5	55	Tunnels - Purposes of tunneling			
56	5	56	Effects of Tunneling on the ground			
57	5	57	Role of Geological Considerations			
58	5	58	PPT			
59	5	59	Active Learning			
60	5	60	Unit Test - 5			

Important Questions:

Unit – 1

Part – A

1. What are the Geological Considerations necessary in the selection of a Dam Site?
2. Explain the importance of physical, structural geology & petrology in civil Engineering?
3. Explain the weathering properties for different types of rocks?
4. Define Engineering Geology? How the geological drawbacks play a major role in construction failures?
5. Explain the geological causes for failure dams Quote a few case histories

Part – B

1. Explain what is weathering and its importance in civil engineering constructions?
2. Explain some of the failures of civil engineering structures due to geological drawbacks?

3. Explain some of the physical properties of rock or a mineral and why they are useful for civil engineer?
4. Explain the branches of geology in detail?

Unit – 2

Part – A

1. Discuss the chemical composition, structure, mode of formation, physical properties of any four minerals (a) Quartz (b) Feldspar (c) Mica (d) Augite (e) Hornblende (f) Garnet.
2. (a) Differentiate the following: i. Rock forming and ore minerals ii. Felsic and Mafic Minerals iii. Minearlogy and Crystallography iv. Streak and Cleavage. (b) Discuss Chemical composition physical properties, occurrence verieties anduses of varieties quartz
3. (a) Discuss briefly on mode of formation of Minerals. (b) Define the following: i. Isomorphism ii. Polymorphism iii. Pseudomorphism
4. Write the physical properties, chemical composition, atomic structure and uses ofthe following minerals (a) Chromite. (b) Hornblende. (c) Augite. (d) Asbestos.
5. Write short note on the following: (a) Mohr's Scale of hardness with examples.

Part – B

1. Compare and contrast the following pairs: (a) Lava and Magma (b) Sills and Dykes (c) Plutonic and Volcanic rocks.
2. Give an account of different types of rocks among igneous, sedimentary and meta-metamorphic groups which occur more frequently and abundantly in nature. Add a note on rock cycle.
3. a) Define Dyke? Explain different types of dykes with neat sketches? b) Explain textures of igneous and metamorphic rocks?
4. Explain the cata elastic, porphyoclastic, maculose structures in rocks with neat sketches?
5. Write short notes on the following: (a) Graphic texture (b) Porphyritic texture (c) Progressive metamorphism (d) Ripple marks

Unit – 3

Part – A

1. (a) Write an essay on the Geological time scale (b) Explain the principles of stratigraphy.
2. Explain how the unconformities are formed with neat sketch. What is their Importance from Civil Engineering of view?
3. a) Explain the following types of faults i) Dip – slip ii) Reverse fault iii) Oblique slip fault b) Explain the criteria for the identification of fault?
4. Write short notes on the following with sketches. (a) Fan Fold. (b) Columnar joints (c) Angular unconformity (d) Radial faults
5. Distinguish between normal fault and reverse fault. What is the role of faultsin the selection of sites for dams, reservoirs, tunnels, Quarrying, roads and railwaytracks along hill slopes?

Part – B

1. (a) What is meant by earthquake? What are the effects o f earthquakes? (b) What are the precautionary measures taken in the construction of buildings? in earthquake prone zones?
2. a) what is meant by earthquake? What are the effects of earthquakes? b) What are the precautionary measures taken in the construction of buildings in earthquake prone zones?
3. Describe with a neat sketch the different types of sub-surface water? Brief explain the terms `Drawdown' and `Cone of depression.
4. Describe the Groundwater Exploration?
5. What are Landslides? Describe the Causes and effects of Landslides. Add a note on their preventative measures.

Unit – 4

Part – A

1. What are the Geological Considerations necessary in the selection of a Dam Site?
2. Explain the geological causes for failure dams Quote a few case histories.
3. What are the influencing factors for a successful reservoir? And explain.
4. Distinguish between normal fault and reverse fault. What is the role of faults in the selection of sites for dams, reservoirs, tunnels, Quarrying, roads and railway tracks along hill slopes?
5. Explain the influencing factors for the water - tightness of the reservoir.

Part – B

1. Explain the following: a) Equipotential method b) Wenner method c) Resistivity traversing method d) Self potential method.
2. a) Explain the geophysical studies by seismic and radiometric methods in detail? b) What are the fundamental aspects of rock mechanics and environmental Geology?
3. Explain the Electrical Resistivity surveys for ground water prospection.
4. Explain in brief about Seismic refraction method.
5. Describe different Geophysical methods in terms of principle, parameters methods, equipment and applications of Seismic methods, Radiometric methods and Geothermal method?

Unit – 5

Part – A

1. Describe the geological consideration for successful tunneling.
2. Write short notes on (a) Different purposes of tunnels (b) Tunnels in faulted strata. (c) Tunnels in folded strata.
3. Write short note on (a) Effects of tunneling on the ground (b) Lining of tunnel (c) Overbreak.

Part – B

1. Sand stones, Shales, Lime stones, Laterites and Conglomerate are the common sedimentary rocks found in nature". Discuss their suitability or otherwise at dam sites, reservoir sites and tunnel sites?
2. a) What are the effects of tunneling on the ground? b) Describe the purpose of tunnels?

2040505 – PYTHON

B.Tech. II Year II Sem. **L T P C**

Prerequisites:- **2 0 0 2**

Course Objectives: The objective of the course is

1. To handle Strings and Files in Python.
2. To understand Lists, Dictionaries and Regular expressions in Python.
3. To understand FILES, Multi thread programming in Python.

Course Outcomes: At the end of the course the student will able to

1. Examine Python syntax and semantics and be fluent in the use of Python flow control and functions.
2. Demonstrate proficiency in handling Strings and File Systems.
3. Create, run and manipulate Python Programs using core data structures like Lists, Dictionaries and use Regular Expressions.

UNIT - I

Python Introduction, History & Installing of Python, Python basics, Python Objects, Standard Types, Other Built-in Types, Internal Types, Standard Type Operators, Standard Type Built-in Functions, Categorizing the Standard Types, Unsupported Types Numbers - Introduction to Numbers, Integers, Floating Point Real Numbers, Complex Numbers, Operators, Built-in Functions. Control structures

UNIT - II

Related Modules Sequences - Strings, Lists, and Tuples, Mapping and Set Types. Iterators, List comprehensions, Generator Expressions

UNIT - III

FILES: File Objects, File Built-in Functions, File Built-in Methods, File Built-in Attributes, Standard Files, Command-line Arguments, File System, File Execution, Persistent Storage Modules, Related Modules

UNIT - IV

Exceptions: Exceptions in Python, Detecting and Handling Exceptions, Context Management, Exceptions as Strings, Raising Exceptions, Assertions, Standard Exceptions, Creating Exceptions, Exceptions and the sys Module, Modules and Files, Namespaces, Importing Modules, Importing Module Attributes

Multithreaded Programming: Introduction, Threads and Processes, Python, Threads, and the Global Interpreter Lock, Thread Module, Threading Module, Related Modules

UNIT - V

GUI Programming: Introduction, Tkinter and Python Programming, Brief Tour of Other GUIs, Related Modules and Other GUIs

Regular Expressions: Introduction, Special Symbols and Characters, Res and Python

TEXT BOOKS:

1. Core Python Programming, Wesley J. Chun, Second Edition, Pearson.

REFERENCES:

1. Think Python, Allen Downey, Green Tea Press
2. Introduction to Python, Kenneth A. Lambert, Cengage
3. Python Programming: A Modern Approach, Vamsi Kurama, Pearson

Session Planner:

S.No	Unit No.	L.No	Topic Details	Date Planned	Date Conducted	Remarks
1	1	1	Python Introduction, History & Installing of Python			
2	1	2	Python basics, Python Objects			
3	1	3	Standard Types, Other Built-in Types			
4	1	4	Internal Types, Standard Type Operators			
5	1	5	Standard Type Built-in Functions, Categorizing the Standard Types			
6	1	6	Unsupported Types Numbers - Introduction to Numbers, Integers			
7	1	7	Floating Point Real Numbers			
8	1	8	Complex Numbers, Operators			
9	1	9	Built-in Functions			
10	1	10	Control structures			
11	1	11	PPT			
12	1	12	Active Learning			
13	1	13	Unit Test - 1			
14	2	14	Related Modules Sequences			
15	2	15	Strings			
16	2	16	Lists			
17	2	17	Tuples			
18	2	18	Mapping and Set Types			
19	2	19	Iterators			
20	2	20	List comprehensions			
21	2	21	Generator Expressions			
22	2	22	PPT			
23	2	23	Active Learning			
24	2	24	Unit Test - 2			
25	3	25	File Objects			
26	3	26	File Built-in Functions			
27	3	27	File Built-in Methods			
28	3	28	File Built-in Attributes			

29	3	29	Standard Files, Command-line Arguments			
30	3	30	File System			
31	3	31	File Execution			
32	3	32	Persistent Storage Modules			
33	3	33	Related Modules			
34	3	34	PPT			
35	3	35	Active Learning			
36	3	36	Unit Test - 3			
37	4	37	Exceptions in Python			
38	4	38	Detecting and Handling Exceptions			
39	4	39	Context Management, Exceptions as Strings			
40	4	40	Raising Exceptions, Assertions			
41	4	41	Standard Exceptions, Creating Exceptions			
42	4	42	Exceptions and the sys Module			
43	4	43	Modules and Files, Namespaces			
44	4	44	Importing Modules, Importing Module Attributes			
45	4	45	Multithreaded Programming: Introduction			
46	4	46	Threads and Processes			
47	4	47	Python Threads			
48	4	48	Global Interpreter Lock			
49	4	49	Thread Module			
50	4	50	Threading Module			
51	4	51	Related Modules			
52	4	52	PPT			
53	4	53	Active Learning			
54	4	54	Unit Test - 4			
55	5	55	GUI Programming: Introduction			
56	5	56	Tkinter and Python Programming			
57	5	57	Brief Tour of Other GUIs			
58	5	58	Related Modules and Other GUIs			
59	5	59	Regular Expressions: Introduction			
60	5	60	Special Symbols and Characters			
61	5	61	Res and Python			
62	5	62	PPT			
63	5	63	Active Learning			
64	5	64	Unit Test - 4			

2040172 - STRENGTH OF MATERIALS LABORATORY

B.Tech. II Year II Sem.	**L**	**T**	**P**	**C**
Pre-requisites: Strength of Materials - I	**0**	**0**	**3**	**1.5**

Course Objectives: The objective of the course is

1. To make measurements of different strains, stress and elastic properties of materials used in Civil Engineering.
2. To provide physical observations to complement concepts learnt
3. To introduce experimental procedures and common measurement instruments, equipment, devices.
4. To exposure to a variety of established material testing procedures and techniques
5. To different methods of evaluation and inferences drawn from observations

Course Outcomes: At the end of the course the student will able to

1. Evaluate properties of steel, Brick and concrete
2. Evaluate deflection, bending strength and young's modulus of cantilever and simply supported beam.
3. Determine modulus of rigidity of materials
4. Determine hardness value of material
5. Determine impact and shear strength of material
6. Determine stiffness and modulus of elasticity of material

List of Experiments:

1. Tension test
2. Bending test on (Steel / Wood) Cantilever beam.
3. Bending test on simple support beam.
4. Torsion test
5. Hardness test
6. Spring test
7. Compression test on wood or concrete or bricks
8. Impact test
9. Shear test
10. Verification of Maxwell's Reciprocal theorem on beams.
11. Use of electrical resistance strain gauges
12. Continuous beam – deflection test.

REFERENCES:

1. Strength of Materials by R. K Rajput, S. Chand & Company Ltd.
2. Strength of Materials by R.K. Bansal, Lakshmi Publications Pvt. Ltd.

2040173 – COMPUTER AIDED CIVIL ENGINEERING DRAWING LABORATORY

B.Tech. II Year II Sem **L T P C**

Pre-requisites: Engineering Drawing Practice **0 0 2 1**

Course Objectives: The objective of the course is

1. To teach the student usage of Auto cad, basic drawing fundamentals in various civil engineering applications, especially in building drawing.
2. To teach students the basic commands and tools necessary for professional 2D drawing, 3D drawing and drafting using AutoCAD
3. To sketch and take field dimensions.
4. To take data and transform it into graphic drawings.
5. To learn basic engineering drawing formats

Course Outcomes: At the end of the course the student will able to

1. Understand CAD software and basic functions
2. Evaluate plans of Single storied building & multi-storeyed buildings
3. Develop different sections at different elevations
4. Detailing of building components like doors, windows roof trusses
5. Develop section and elevation for single and multi-storeyed buildings using CAD software.
6. Understand development concepts in detailing

List of Experiments

1. Introduction to computer aided drafting & coordinate system.
2. Exercise on Draw & Modify tool bars.
3. Exercise on Layer, Dimension, Texting & Block etc.
4. Drawing a plan of Building and dimensioning using layers.
5. Single storied buildings b) Multi storied buildings.
6. Developing sections and elevations for given
7. a) Single storied buildings b) Multi storied buildings.
8. Drawing of building components like walls, lintels, Doors, and Windows.
9. Introduction to 3 – D view.
10. Exercise on 3 – D.
11. Developing a 3-D plan from a given 2-D plan.
12. Developing section and elevation of a residential building.

TEXT BOOKS:

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

2040575 - PYTHON LABORATORY

B.Tech. II Year II Sem **L T P C**

Pre-requisites:- **0 0 2 1**

Exercise 1 - Basics

a) Running instructions in Interactive interpreter and a Python Script
b) Write a program to purposefully raise Indentation Error and Correct it

1 **Exercise 2 -Operations**

a) Write a program to compute distance between two points taking input from the user (Pythagorean Theorem)
b) Write a program add.py that takes 2 numbers as command line arguments and prints its sum.

2 **Exercise - 3 Control Flow**

a) Write a Program for checking whether the given number is a even number or not.
b) Using a for loop, write a program that prints out the decimal equivalents of 1/2, 1/3, 1/4, . . . , 1/10
c) Write a program using a for loop that loops over a sequence. What is sequence?
d) Write a program using a while loop that asks the user for a number, and prints a countdown from that number to zero.

3 **Exercise 4 - Control Flow -Continued**

a) Find the sum of all the primes below two million.

Each new term in the Fibonacci sequence is generated by adding the previous two terms. By starting with 1 and 2, the first 10 terms will be:

1, 2, 3, 5, 8, 13, 21, 34, 55, 89, ...

b) By considering the terms in the Fibonacci sequence whose values do not exceed four million, find the sum of the even-valued terms.

4 **Exercise - 5 Files**

a) Write a program to print each line of a file in reverse order.
b) Write a program to compute the number of characters, words and lines in a file.

5 **Exercise - 6 Functions**

a) Write a function ball_collide that takes two balls as parameters and computes if they are colliding. Your function should return a Boolean representing whether or not the balls are colliding.

Hint: Represent a ball on a plane as a tuple of (x, y, r), r being the radius

If (distance between two balls centers) <= (sum of their radii) then (they are colliding)

b) Find mean, median, mode for the given set of numbers in a list.

6 **Exercise - 7 Functions - Continued**

a) Write a function nearly_equal to test whether two strings are nearly equal. Two strings a and b are nearly equal when a can be generated by a single

mutation on b.

b) Write a function dups to find all duplicates in the list.

c) Write a function unique to find all the unique elements of a list.

7 **Exercise - 8 - Functions - Problem Solving**

a) Write a function cumulative_ product to compute cumulative product of a list of numbers.

b) Write a function reverse to reverse a list. Without using the reverse function.

c) Write function to compute gcd, lcm of two numbers. Each function shouldn't exceed one line.

8 **Exercise 9 - Multi-D Lists**

a) Write a program that defines a matrix and prints

b) Write a program to perform addition of two square matrices

c) Write a program to perform multiplication of two square matrices

9 **Exercise - 10 GUI, Graphics**

1. Write a GUI for an Expression Calculator using tk

2. Write a program to implement the following figures using turtle