



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 Section 2(f) & 12(B) of the UGC act, 1956

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 Association of Consulting Civil Engineers (ACCE), India, Society of Automative Engineers (SAE), Institution of Engineering and Technology (IETE), IEEE and Computer Society of India (CSI).

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 expert faculty members. In addition, students are encouraged to give innovative ideas and do projects under the aegis of Microsoft academic innovative alliance.

1.15 MEMORANDUM 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	Principial	040-29556182
2	Dr. R. Kotaiah	Dean - Academics	08418-255055
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. R Issac	HOD (E.E.E)	9951166558
7	Dr C Balarangadurai	HOD (C.S.E)	8374530302
8	Prof. K. Abdul basith	Professor in CSE	9160400041
9	Dr. B. Ravi Prasad	HOD (IT)	9849356732
10	Dr. V. VaraLakshmi	HOD (CIVIL)	9160404645
11	Dr. K.Ashok	HOD (H&S)	9160404647
12	Dr.P Nageswar Rao	HOD (MECH)	9490217919
13	Dr. Veeraiah	HOD (MBA)	9160404643
14	Dr S Pratap Singh	Website	9527366149
15	Mr. M.Srinivas Reddy	Library	9849924036
16	Mr. G.B.N Saroj	Transport	9160401744
17	Mr Sumanth	Training and Placement Officer	9849568827
18	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 Cements 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 Forecasting 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	2 nd Year	Certificate in AutoCAD
	3 rd Year	Certificate in model bridge
	4 th Year	Certificate in STAAD Pro
Computer Science and Engineering / IT / MCA	2 nd Year	Certificate Information Technology
	3 rd Year	IBM Certified DB2 Database Associate, Infosys Campus Connect
	4 th Year	IBM Certified Rational Application Developer
	4 th Year	SUN Certified Java Programmer
Electronics and Communication Engineering	2 nd Year	Institute of Electronics and Telecommunication Engineering
	3 rd Year	Motorola @ CAMPUS
	4 th Year	IBM Certified DB2 Database Associate
Mechanical Engineering	2 nd Year	Certificate in AutoCAD
	3 rd Year	Certificate in HighPerMesh
	4 th 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 20 students. 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 SILENT 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 out comes

The Civil Engineering Department Faculty, students, and industry advisory board have adopted the Engineering Criteria outcomes and have defined specific outcomes to be achieved by the civil engineering students. Those outcomes are:

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.



6.6 Highlights

- Focus on industry oriented teaching to bridge the gap between industry demands and course curriculum.
- Department Started the student chapters 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. Environmental Engineering Laboratory
9. Advanced Concrete Technology Laboratory (M.Tech Structures)
10. Structural Design Laboratory
11. 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 areas such as Water quality monitoring, concrete technology, Surveying, Strength of material, Geo technology etc.



7. ACADEMIC REGULATIONS OF R19 FOR B.TECH. (REGULAR)

(Effective for the students admitted into I year from the Academic Year 2019-20 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 onwards.
- (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 and 10 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 semester	Regular course of study of second year first 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. IV YEAR – CIVIL ENGINEERING – R19 - COURSE STRUCTURE

IV YEAR B-TECH - I SEMESTER										
S. No	Course Code	Course Title	Course Category	Hours			Credits	Scheme of Examination		
				L	T	P		Internal (CIE)	External (SEE)	Total
1	1970127	Estimation, Costing and Project Management	PCC	3	1	0	4	30	70	100
2	-	Professional Elective - III	PEC	3	0	0	3	30	70	100
3	-	Professional Elective - IV	PEC	3	0	0	3	30	70	100
4	-	Open Elective - II	OEC	3	0	0	3	30	70	100
5		Professional Practice law & Ethics	HSMC	2	0	0	2	30	70	100
6	1970191	Industrial Oriented Mini Project/ Summer Internship	PROJ	0	0	0	2	100	0	100
7	1970192	Seminar	PROJ	0	0	2	1	30	70	100
8	1970193	Project Stage - I	PROJ	0	0	6	3	30	70	100
TOTAL				14	1	8	21	310	490	800
IV YEAR B-TECH - II SEMESTER										
S. No	Course Code	Course Title	Course Category	Hours			Credits	Scheme of Examination		
				L	T	P		Internal (CIE)	External (SEE)	Total
1	-	Professional Elective - V	PEC	3	0	0	3	30	70	100
2	-	Professional Elective - VI	PEC	3	0	0	3	30	70	100
3	-	Open Elective - III	OEC	3	0	0	3	30	70	100
4	1980194	Project Stage - II	PROJ	0	0	14	7	30	70	100
TOTAL				9	0	14	16	120	280	400

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

T – Tutorial

L-Theory

P- Practical

C – Credits



R19 - COURSE OUTCOMES**IV YEAR I SEM**

Course Name	CO code	Course outcome
Estimation, Costing And Project Management - 1970127	CE 411.1	Prepare quantity estimates for Buildings, roads & rails and canal structures as per specifications.
	CE 411.2	Ascertain the quantity of materials required for Civil engineering works as per specifications.
	CE 411.3	Draft detailed specifications and work out Rate Analysis for all works related to civil engineering projects.
	CE 411.4	Understanding contract and types of contract and documentation required
	CE 411.5	Prepare tenders & contract documents. Evaluate contracts and tenders in construction practice.
	CE 411.6	Understand the conceptual clarity about project organization and feasibility analyses
Advanced Structural Design - 1970149	CE 412.1	Enhance the capabilities to design the special structural elements as per Indian standard code of practice.
	CE 412.2	Design and Detailing of cantilever type of Retaining walls
	CE 412.3	Analysis and Design of Flat slabs and Ribbed slabs
	CE 412.4	Design of RCC Circular water tank
	CE 412.5	Design of Reinforced Concrete Slab Bridge decks
	CE 412.6	Design of steel gantry girder
Irrigation And Hydraulic Structures - 1970150	CE 413.1	Understand different types of dams design taking into account the suitability of the site and the different type loads that are likely to be encountered.
	CE 413.2	illustrate the major forces acting on gravity dams and Analyse the stability concrete gravity dams at reservoir empty and full conditions
	CE 413.3	Analyse the stability of earth dams through flow net and know about measures for slopes protection
	CE 413.4	Design and analyse the various types spillways and stilling basins followed by IS recommendations.



	CE 413.5	Evaluate the essential requirements of the different components of diversion head works and weirs.
	CE 413.6	Design the cross drainage works used in irrigation channels which include canal falls, regulator works, and canal outlets.
Utilization Of Electrical Energy - 1970231	CE 414.1	Understanding the heating methods for industrial applications
	CE 414.2	Understanding the welding methods for industrial applications
	CE 414.3	Understanding of the basic principles of illumination and its measurement
	CE 414.4	understand the method of calculation of various traction system and drives.
	CE 414.5	Understand the basic principles of systems of train lighting
	CE 414.6	Understanding the heating methods for industrial applications
Professional Practice Law & Ethics - 1970013	CE 415.1	Understanding basic purpose of profession, professional ethics and various moral and social issues
	CE 415.2	apply the basic concepts and terminology of the law of contract
	CE 415.3	Understand the processes of arbitration
	CE 415.4	identify all aspects of Labour Law practiced in India
	CE 415.5	Understand the legalities of intellectual property to avoid plagiarism and other IPR relates crimes like copyright infringements, etc.
Industrial Oriented Mini Project/ Summer Internship - 1970191	CE 416.1	Understand real world problem
	CE 416.2	Develop a design solution for a set of requirements
	CE 416.3	Enhance effective communication and interpersonal skills
	CE 416.4	Build multidisciplinary and leadership approach towards all life tasks
	CE 416.5	Hone analytical and logical skills for problem-solving
	CE 416.6	Report and present the findings of the study /research work
	CE 417.1	Establish motivation for any topic of interest and develop a thought process for technical presentation.



Seminar - 1970192	CE 417.2	Organize a detailed literature survey and build a document with respect to technical publications
	CE 417.3	Analysis and comprehension of proof-of-concept and related data.
	CE 417.4	Effective presentation and improve soft skills.
	CE 417.5	Make use of new and recent technology for creating technical reports
Project Stage - I - 1970193	CE 418.1	Undertake problem identification, formulation and solution.
	CE 418.2	Design engineering solutions to complex problems utilising a systems approach.
	CE 418.3	Design engineering solutions to complex problems utilising a systems approach.
	CE 418.4	Integrate information from multiple sources.
	CE 418.5	Communicate with engineers and the community at large in written and oral forms.
	CE 418.6	Demonstrate the knowledge, skills and attitudes of a professional engineer.

IV YEAR – II SEM

Course Name	CO code	Course outcome
Environmental Impact Assessment - 1960103	CE 421.1	Understand the concept, historical context and wider importance of EIA
	CE 421.2	Understand the key steps in the EIA process
	CE 421.3	Understand strengths & limitations of environmental management
	CE 421.4	Understand basic environmental assessment policies and requirements
	CE 421.5	Evaluate applications of environmental assessment case studies
Finite Element Methods For Civil Engineering - 1980158	CE 422.1	Understand the concepts, advantage and disadvantage of FEM
	CE 422.2	Evaluate the shapes, nodes and strain displacement of structure
	CE 422.3	Analyze the bar, beam element using FEA
	CE 422.4	Evaluate the shape function for CST and LST element
	CE 422.5	Analyze the 4, 8 noded isoparametric quadrilateral elements
	CE 422.6	Understand the concepts of numerical integration and evaluate for static loads



Non-Conventional Sources Of Energy	CE423.1	Understand the need of energy conversion and the various methods of energy storage
	CE423.2	Explain the field applications of solar energy
	CE423.3	Identify Winds energy as alternate form of energy and to know how it can be tapped
	CE423.4	Explain bio gas generation and its impact on environment
	CE423.5	Understand the Geothermal & Tidal energy, its mechanism of production and its applications
	CE423.6	Illustrate the concepts of Direct Energy Conversion systems & their applications.
Project Stage-II - 1980194	CE 424.1	Undertake problem identification, formulation and solution.
	CE 424.2	Design engineering solutions to complex problems utilising a systems approach.
	CE 424.3	Design engineering solutions to complex problems utilising a systems approach.
	CE 424.4	Integrate information from multiple sources.
	CE 424.5	Communicate with engineers and the community at large in written and oral forms.
	CE 424.6	Demonstrate the knowledge, skills and attitudes of a professional engineer.



1970127: ESTIMATION, COSTING AND PROJECT MANAGEMENT**B.Tech. IV Year I Sem.****L T P C**
3 1 0 4

Course Objectives: The subject provides process of estimations required for various work in construction. To have knowledge of using SOR & SSR for analysis of rates on various works and the basics of planning tools for construction projects.

Course Outcomes: On completion of the course, the students will be able to:

- Understand the technical specifications for various works to be performed for a project and how these impact the cost of a structure.
- Quantify the worth of a structure by evaluating quantities of constituents, derive their cost rates and build up the overall cost of the structure.
- Understand how competitive bidding works and how to submit a competitive bid proposal.
- An idea of how to optimize construction projects based on costs.
- An idea how construction projects are administered with respect to contract structures and issues.
- An ability to put forward ideas and understandings to others with effective communication processes

UNIT – I

General items of work in Building – Standard Units, Principles of working out quantities for detailed and abstract estimates – Approximate method of Estimation - Detailed Estimates of Buildings.

UNIT – II

Reinforcement bar bending and bar requirement schedules - Earthwork for roads and canals.

UNIT – III

Rate Analysis – Working out data for various items of work over head and contingent charges.

UNIT- IV

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

UNIT- V

Construction project planning- Stages of project planning: pre-tender planning, pre-construction planning, detailed construction planning, role of client and contractor, level of detail. Process of development of plans and schedules, work break-down structure, activity



lists, assessment of work content, concept of productivities, estimating durations, sequence of activities, activity utility data; Techniques of planning- Bar charts, Gantt Charts.

Networks: Basic terminology, types of precedence relationships, preparation of CPM networks: activity on link and activity on node representation, computation of float values, critical and semi critical paths, calendaring networks. PERT- Assumptions underlying PERT analysis, determining three-time estimates, analysis, slack computations, calculation of probability of completion

NOTE: NUMBER OF EXERCISES PROPOSED:

1. Three in Flat Roof & one in Sloped Roof
2. Exercises on Data – three Nos.

TEXT BOOKS:

1. Estimating and Costing by B.N. Dutta, UBS publishers, 2000.
2. Estimating and Costing by G.S. Birdie
3. Punmia, B.C., Khandelwal, K.K., Project Planning with PERT and CPM, Laxmi Publications, 2016
4. Chitkara, K. K. Construction Project Management. Tata McGraw-Hill Education, 2014

REFERENCE BOOKS:

1. Standard Schedule of rates and standard data book by public works department.
2. S. 1200 (Parts I to XXV – 1974/ method of measurement of building and Civil Engineering works – B.I.S)
3. Estimation, Costing and Specifications by M. Chakraborti; Laxmi publications.
4. Peurifoy, R.L. Construction Planning, Methods and Equipment, McGraw Hill, 2011
5. Nunnally, S.W. Construction Methods and Management, Prentice Hall, 2006
6. Jha, Kumar Neeraj., Construction Project management, Theory & Practice, Pearson Education India, 2015.

Session Planner:

S.No	Unit No.	L.No	Topic Details	Date Planned	Date Conducted	Remarks
1	1	1	General items of work in Building			
2	1	2	Standard Units			
3	1	3	Principles of working out quantities for detailed and abstract estimates			
4	1	4	Principles of working out quantities for detailed and abstract estimates			
5	1	5	Principles of working out quantities for detailed and abstract			



			estimates			
6	1	6	Principles of working out quantities for detailed and abstract estimates			
7	1	7	Approximate method of Estimation			
8	1	8	Approximate method of Estimation			
9	1	9	Approximate method of Estimation			
10	1	10	Detailed Estimates of Buildings.			
11	1	11	Detailed Estimates of Buildings.			
12	1	12	Detailed Estimates of Buildings.			
13	1	13	Detailed Estimates of Buildings.			
14	1	14	PPT			
15	1	15	Active learning			
16	1	16	Unit test - 1			
17	2	17	Reinforcement bar bending			
18	2	18	Reinforcement bar bending			
19	2	19	Bar requirement schedules			
20	2	20	Bar requirement schedules			
21	2	21	Bar requirement schedules			
22	2	22	Earthwork for roads and canals.			
23	2	23	Earthwork for roads and canals.			
24	2	24	Earthwork for roads and canals.			
25	2	25	Earthwork for roads and canals.			
26	2	26	Earthwork for roads and canals.			
27	2	27	PPT			
28	2	28	Active learning			
29	2	29	Unit test - 2			
30	3	30	Rate Analysis			
31	3	31	Rate Analysis			
32	3	32	Working out data for various items of work			
33	3	33	Working out data for various items of work			
34	3	34	Working out data for various items of work			
35	3	35	over head and contingent charges.			
36	3	36	over head and contingent charges.			
37	3	37	over head and contingent charges.			
38	3	38	PPT			



39	3	39	Active learning			
40	3	40	Unit test - 3			
41	4	41	Contracts			
42	4	42	Types of contracts			
43	4	43	Contract Documents			
44	4	44	Contract Documents			
45	4	45	Conditions of contract			
46	4	46	Conditions of contract			
47	4	47	Valuation			
48	4	48	Valuation			
49	4	49	Standard specifications for different items of building construction.			
50	4	50	Standard specifications for different items of building construction.			
51	4	51	PPT			
52	4	52	Active learning			
53	4	53	Unit test - 4			
54	5	54	Stages of project planning: pre-tender planning, pre-construction planning			
55	5	55	Detailed construction planning, role of client and contractor, level of detail			
56	5	56	Process of development of plans and schedules			
57	5	57	Work break-down structure, activity lists, assessment of work content			
58	5	58	Concept of productivities, estimating durations, sequence of activities			
59	5	59	Activity utility data; Techniques of planning- Bar charts, Gantt Charts			
60	5	60	Networks: Basic terminology, types of precedence relationships			
61	5	61	Preparation of CPM networks: activity on link and activity on node representation			
62	5	62	computation of float values, critical and semi critical paths			
63	5	63	Calendaring networks.			
64	5	64	PERT- Assumptions underlying PERT analysis			



65	5	65	Determining three-time estimates			
66	5	66	Analysis, slack computations			
67	5	67	Calculation of probability of completion			
68	5	68	PPT			
69	5	69	Active learning			
70	5	70	Unit test - 5			

Important Questions:

Unit – 1

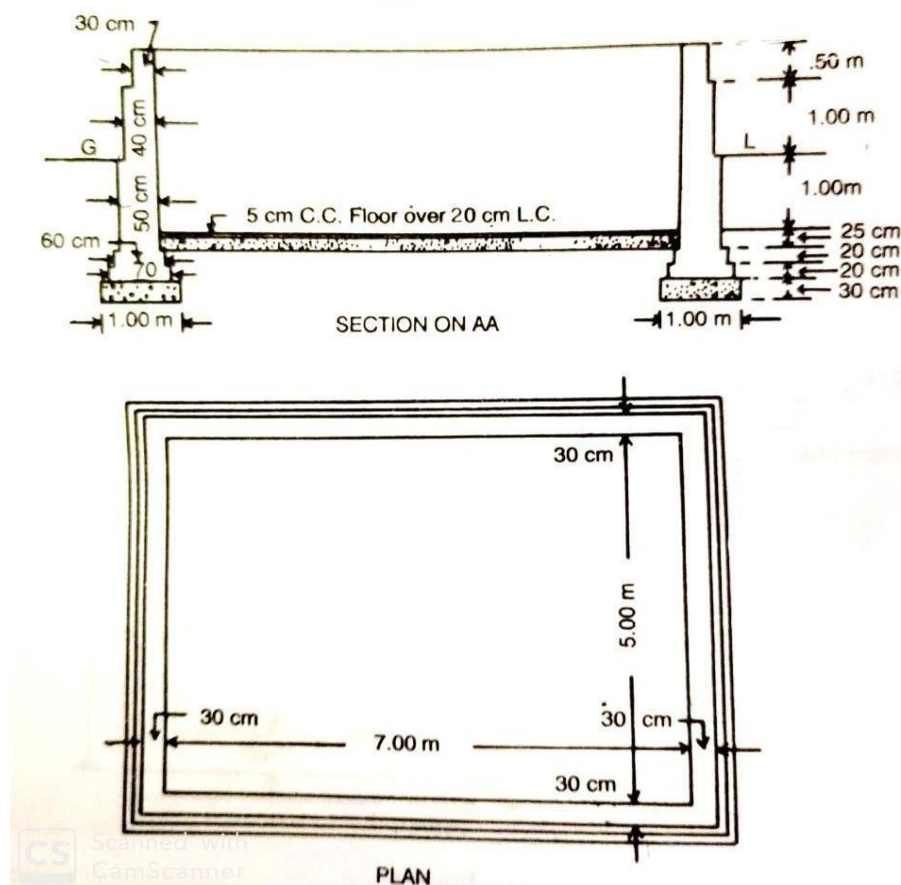
Part – A

1. What is analysis of rates?
2. What is overhead cost?
3. The actual expenditure incurred in the construction of school building which have a total length of main walls 140m is Rs. 14.97 Lakhs. Estimate the approximate cost of a school building which will have 180 m length of main walls.
4. What do you infer from schedule of rates?
5. Explain the term market rates.
6. How will you analyze a rate of particular item?
7. Discuss Measurement Book.
8. Write a short note on standard schedule of rates.
9. What is work-charged establishment?
10. Define the term Lump-sum.
11. Define out-turn work.
12. State the importance of rate analysis.
13. What are the factors on which the rate of particular item?
14. List out the purpose and requirements of rate analysis.
15. Calculate the materials required for brick tile flooring in 1:6 cement mortar and 1:2 cement mortar for pointing.
16. List the fitting requirements for paneled doors.
17. What are the general tolerances adopted in measurements?
18. Define surface dressing.
19. List the conditions which require no deduction or addition in the calculation of wall thickness.
20. Classify the timber for construction.
21. List the types of road.
22. How is the direct and overhead cost calculated?
23. Give the percentage breakup of building works in terms of whole cost.
24. List the thumb rules to calculate reinforcement quantity for concrete elements.
25. List the thumb rules to calculate the number of bricks for walls and brick columns.

Part - B



1. Explain in detail about schedule of rates.
2. Explain in detail the factors affecting schedule of rates
3. Explain in detail about the standard data for man hours and machineries in civil works.
4. Describe in detail about rate analysis for canal work.
5. Write in detail about preparing rate analysis for road works.
6. Prepare the analysis of rate for Lime Concrete in foundation with 40mm brick ballast per cu.m. Assume the required data.
7. Prepare the analysis of rate of R.C.C. work 1:1.5:3 for 5 columns of size 250mm x 350 mm. Assume the required data.
8. Prepare a rate analysis for brick masonry work for the masonry tank in fig.1 Assume the required data for I class brickwork with cement mortar 1:6

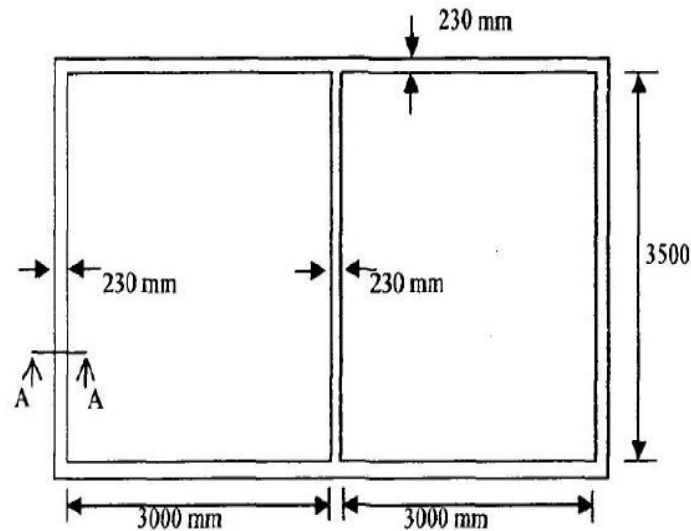


9. Prepare a rate analysis for brick masonry work for fig.2. Assume I class brickwork with cement mortar 1:6.
10. Explain in detail on the preparation of analysis of rate for cement concrete floor.
11. Prepare analysis of rate for centering and shuttering for a RCC beam of 60 cm x 30 cm for a span of 8 m. Assume 4.5 m as the height of room.
12. Describe in detail about the practical data and information for build works.
13. Describe in detail about the Rate Analysis of Civil Works – its Elements and



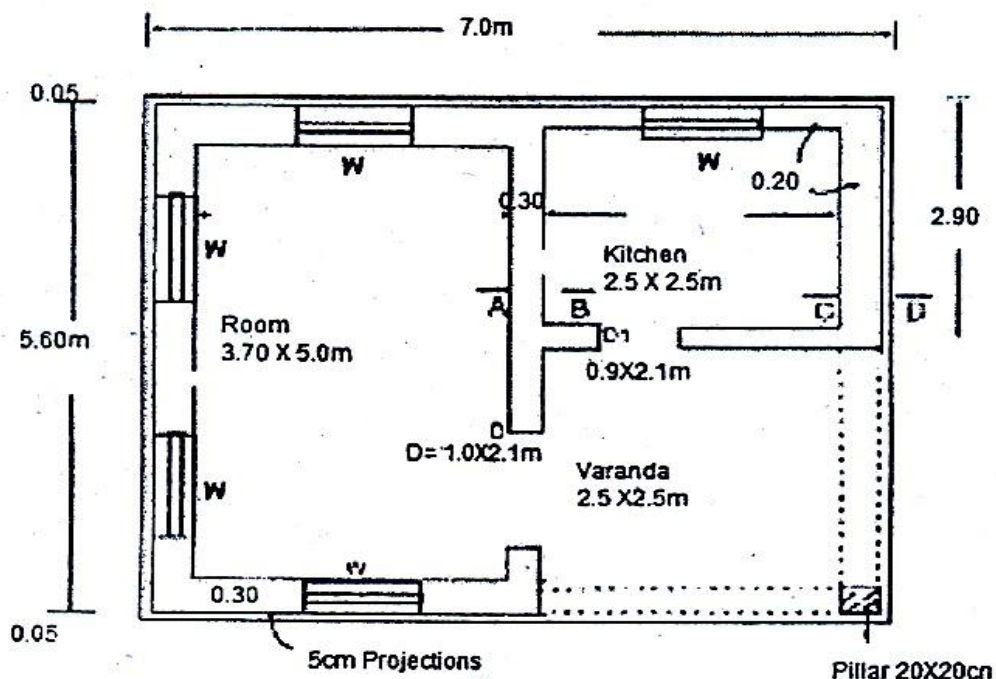
Requirements.

14. Explain how to calculate the quantity requirements to prepare rate analysis for brickwork.
15. Explain the various requirements to prepare analysis of rates for sanitary and water supply works.
16. Write a detailed note on the schedule of rates given by PWD.
17. Calculate costing of internal and external plastering for the fig below. Assume cement mortar of 12 mm thickness 1:6 for internal and 1:4 for



external.Fig.2

18. Prepare analysis of rate for 7.5mm thick lime concrete and 2.5mm thick cement concrete flooring for fig.3.



Unit - 2**Part - A**

1. Define general specification.
2. Identify the content of tender.
3. Differentiate between detailed specification and general specification
4. Explain TTT Act.
5. Illustrate the term arbitration.
6. What is a tender notice?
7. Justify the objective of specification
8. Formulate the reason for rejection of all tender.
9. Write out the specification for second class Brickwork?
10. Evaluate the general specification for Cement Concrete Floor?
11. What are the specifications for White lime mortar?
12. Define Detailed specification.
13. What are the principle of report preparation?
14. List the factors involved in locating a site?
15. What are the set of drawings required for preparing a report?
16. Select any two principles for the preparation of residential building?
17. Definition of report.
18. What are the types of reports?
19. State the necessity of report
20. List the major Parameters considered for a report in a design of RCC Beam
21. Identify the different methods for calculating the discharge in a bridge or culvert
22. What is sand flushing?
23. List the components of the value and verification of unused materials report.
24. What are the sub-heads of tools and plants account?
25. Identify revenue and remittance head.

Part - B

1. Write the important particulars in tender documents and describe about it?
2. Show the general specification for first class buildings
3. Demonstrate the processes "Opening and scrutiny of tender"
4. Write down the detailed specification of the following
 - (i) Cement concrete in foundation
 - (ii) Plastering in cement mortar 1:6
5. (i) Define the Procedure for preparation of reports?(6)
(ii) State how will you prepare a report on estimate of Box culvert?(7)
6. Write down the general specifications of a residential building.



7. Prepare a report on estimate for the following items in Single storey Residential building
 - (i) Sub structure (7)
 - (ii) Super Structure(6)
8. Illustrate the following in brief
 - i) General or brief specification (5)
 - ii) Detailed specification (4)
 - iii) Standard specification (4)
9. Select the content in specifications for a septic tank and explain it.
10. Illustrate a detailed specification of super structure.
11. Mention and describe the general specifications of a bituminous road.
12. Estimate the detailed specification of earth work.
13. Explain the report on estimation for construction of bituminous roads
14. Write a report on estimate for construction of cement concrete roads
15. Explain in detail about the preparation of tender notice and document
16. Describe the detailed specification of various items of works for the following
 - (i) RCC (4)
 - (ii) Color washing (4)
 - (iii) Brick I Class (4)
 - (iv) Plastering cement Mortar or lime mortar (3)
17.
 - (i) Explain E-tendering-Digital signature certificates (7)
 - (ii) Explain the principle of specification writing.(8)
18. Write a report to accompany an estimate for a residential to executive engineer

Unit – 3

Part - A

1. Define general specification.
2. Identify the content of tender.
3. Differentiate between detailed specification and general specification
4. Explain TTT Act.
5. Illustrate the term arbitration.
6. What is a tender notice?
7. Justify the objective of specification
8. Formulate the reason for rejection of all tender.
9. Write out the specification for second class Brickwork?
10. Evaluate the general specification for Cement Concrete Floor?
11. What are the specifications for White lime mortar?
12. Define Detailed specification.
13. What are the principle of report preparation?
14. List the factors involved in locating a site?
15. What are the set of drawings required for preparing a report?
16. Select any two principles for the preparation of residential building?



17. Definition of report.
18. What are the types of reports?
19. State the necessity of report
20. List the major Parameters considered for a report in a design of RCC Beam
21. Identify the different methods for calculating the discharge in a bridge or culvert
22. What is sand flushing?
23. List the components of the value and verification of unused materials report.
24. What are the sub-heads of tools and plants account?
25. Identify revenue and remittance head.

Part - B

1. Write the important particulars in tender documents and describe about it?
2. Show the general specification for first class buildings
3. Demonstrate the processes "Opening and scrutiny of tender"
4. Write down the detailed specification of the following
 - (iii) Cement concrete in foundation
 - (iv) Plastering in cement mortar 1:6
5. (iii) Define the Procedure for preparation of reports?(6)
(iv) State how will you prepare a report on estimate of Box culvert?(7)
6. Write down the general specifications of a residential building.
7. Prepare a report on estimate for the following items in Single storey Residential building
 - ((i) Sub structure (7)
 - (ii) Super Structure(6)
8. Illustrate the following in brief
 - iv) General or brief specification (5)
 - v) Detailed specification (4)
 - vi) Standard specification (4)
9. Select the content in specifications for a septic tank and explain it.
10. Illustrate a detailed specification of super structure.
11. Mention and describe the general specifications of a bituminous road.
12. Estimate the detailed specification of earth work.
13. Explain the report on estimation for construction of bituminous roads
14. Write a report on estimate for construction of cement concrete roads
15. Explain in detail about the preparation of tender notice and document
16. Describe the detailed specification of various items of works for the following
 - (v) RCC (4)
 - (vi) Color washing (4)
 - (vii) Brick I Class (4)
 - (viii) Plastering cement Mortar or lime mortar (3)
17. (iii) Explain E-tendering-Digital signature certificates (7)
(iv) Explain the principle of specification writing.(8)



18. Write a report to accompany an estimate for a residential to executive engineer

Unit - 4

Part - A

1. What is Contracts?
2. List the Function of Contracts.
3. Classify the types of Contracts – Formation?
4. What is Formation of contract?
5. Illustrate the requirements of a contract.
6. Differentiate the types of termination of contract
7. Identify the content for Drafting of contract.
8. What do you infer from extension of time in contract system ?
9. List the different form of Contract conditions
10. What is Debitable agency?
11. Classify and explain the types of penalties that are imposed on a contract and why are they imposed?
12. Illustrate, what are the information should a contract document contain.
13. Compare the types of contract.
14. Explain TTT Act.
15. Examine the qualification of contractor.
16. Elaborate the important legal implications of a contract.
17. Illustrate the term arbitration.
18. What is Contract conditions?
19. What does a construction cost covers and what does not?
20. Justify the different methods of carrying out work ?
21. List the important content in contract documents
22. Write short note labor and material payment bond
23. Examine the Contract problems.
24. Evaluate the Architect-Prepared Contract
25. Define IBRD & MORTH

Part - B

1. List and explain the different forms of contracts with respect to suitability advantage and disadvantages.
2. Show the general details in Muster roll. and rules for preparation of Muster roll.
3. Demonstrate the problem in Contract System
4. Write down in detailed about the following
 - (i) Contract conditions
 - (ii) Formation of contract
5. Examine the various types of contract system
6. Write down the general system for Design contract and Construction contract
7. Explain in detail about different methods of carrying out work?



8. Illustrate the following in brief
 - (i) Piecework agreement (5)
 - (ii) Work order (4)
 - (iii) Labour Report (4)
9. Illustrate a detailed about Labour Contract and Material Contract
10. Mention and describe the Condition for Contract system
11. Explain the following
 - (i) Penalty(4)
 - (ii) Compensation for delay in completion(4)
 - (iii) Damages(5)
12. Explain the following
 - (i) Lumpsum Contract (5)
 - (ii) Lumpsum Contract and schedule contract (5)
 - (iii) Item rate Contract (4)
13. Analyze the contents of contract document and explain the each quantity.
14. Write the important particulars in Drafting of contract documents based on IBRD /MORTH Standard bidding documents?
15. Explain in detail about the preparation of Contract document with all content.
16. Describe the various types of contract system.
17. Describe about arbitration and legal Requirements
18. Draft a model contract document for Construction Contract Agreement?

Unit - 5

Part - A

1. List the different methods of depreciation?
2. Define valuation?
3. What is obsolescence?
4. Find the plinth area required for the residential accommodation for an assistant Engineer in the pay scale of Rs.36100 to 47500 per month.
5. Define the Gross income:
6. What is scrap value?
7. Summarize why we calculate standard rent of building?
8. Explain Gross income
9. Describe Net income
10. A property fetches a net income of Rs.900.00 deducting all outgoings. Workout the capitalized value of the property if the rate of interest is 6% per annum.
11. Demonstrate the meaning of salvage value?
12. Illustrate about Annuity
13. Illustrate about book value
14. Differentiate between market value and book value.
15. Point out factors influencing compaction?



16. A pumping set with a motor has been installed in a building at a cost Rs.2500.00. Assuming the life of the pump as 15 years, workout the amount of annual installment of sinking fund to be deposited to accumulate the whole amount of 4% compound interest.
17. An old building has been purchased by a person at a cost of Rs.30,000/-excluding the cost of the land. Evaluate the amount of annual sinking fund at 4% interest assuming the future life of the building as 20 years and scarp value of the building as 10% of the cost of purchase.
18. Sinking fund method of depreciation is more reliable” - Justify
19. Write the necessity of valuation.
20. Write short note on Escalation?
21. What are the different methods of valuation?
22. Define differed Annuity.
23. What is capital cost?
24. Describe about Capitalized Value?
25. List the various Outgoing consider for a building estimates.

Part - B

1. Define the following :
 - (i) Type of lease (5)
 - (ii) Mortgage (4)
 - (iii) Escalation (4)
2. State the following terms :
 - (i) Scrap value (3)
 - (ii) Salvage value (3)
 - (iii) Book Value (3)
 - (iv) Market value (4)
3. In a plot of land costing Rs 20,00,000 a building has been newly constructed at a local cost of Rs80,00,000 including sanitary and water supply works, electrical installation etc . The building consists of four flats of four tenants.
The owner expects 8 % return on the cost of construction and 5 % of return on the land. Calculate the standard rent for each flat of the building assuming.
 - (i) The life of the building is 60 yrs and the sinking fund will be created on 4% interest basis
 - (ii) Annual repair cost 1% of the cost of construction
 - (iii) Other outgoings including taxes at 30% of the net return on the building?
4.
 - (i) Explain differ forms of valve (6)
 - (ii) (ii) Discuss about a freehold property (7)
5. Discuss the following terms :
 - (i) Methods of Depreciation (5)
 - (ii) Carpet Area (4)
 - (iii) Plinth Area (4)



6. Explain the terms clearly:
 - (i) Annuity Head rent (4)
 - (ii) Deferred income (3)
 - (iii) Deferred annuities (3)
 - (iv) Single rate Y.P. (3)
7. Calculate the annual rent of a building with the following data. Cost of land = Rs.20,000/-
Cost of building = Rs.80,000/-
Estimate life = 80 years
Return expected = 5% on land 6% on building
Annual repairs are expected to be 0.7% of the cost construction and other outgoings will be 25% of the gross rent. There is no proposal to set up a sinking fund
8. The capitalized cost of a building is Rs. one lac, including all fittings of first class construction. If the rate of interest is 6%, Calculate net return from the property. Assume outgoings as 15% on gross income.
9. A plot measure 800sq.m. the built up area rate of this 1st class building is Rs.600/- per sq.m. this rate includes cost of water supply, sanitary and electric installations. The age of the building is 50 years. The cost of the land is Rs.1800/- per sq.m. Calculate the standard rent for a building located in CMA assuming the required parameters
10. A Owner occupied property is required to be valued for the wealth tax purpose of land and building. The following particulars are available. Evaluate the present value of the property
Value of the land = Rs4,00,000.00
Cost of the building to put up such a building present = Rs10,00,000 Age of the building = 40 year
Estimate cost of repair = Rs.50,000.00
Depreciation to be allowed for the building = 0.75% per annum
11. Differentiate clearly between the following:
 - (i) Capitalized value and year's purchase (5)
 - (ii) Freehold property and leasehold property (4)
 - (iii) Depreciation and obsolescence. (4)
12. Examine in detail about various methods of calculations Depreciation
13. Explain in detail about various methods of Valuation
14. Write Short note on the following terms:
 - (i) Sinking fund (4)
 - (ii) Outgoings (3)
 - (iii) Capitalized value (3)
 - (iv) Price and Cost (3)



15. Describe briefly about
 - (i) Rental method of valuation (4)
 - (ii) Valuation based on profit and cost (4)
 - (iii) Development method of valuation (4)
 - (iv) Depreciation method of valuation (3)
16.
 - (i) Explain the purposes of valuation.(7)
 - (ii) Write short notes on compound interest factor and discount factor.(6)
17. Out list the procedure to work out the value of a property by rental method of valuation.
18.
 - (i) Discuss about free hold property(7)
 - (ii) Outcome of valuation.(6)



1970147: REMOTE SENSING & GIS**(Professional Elective – III)****B.Tech. IV Year I Sem.****L T P C****3 0 0 3****Course Objectives:**

- Know the concepts of Remote Sensing, its interpreting Techniques and concepts of Digital images
- Know the concept of Geographical Information System (GIS), coordinate system GIS Data and its types
- Understand the students managing the spatial Data Using GIS.
- Understand Implementation of GIS interface for practical usage.

Course Outcomes: After the completion of the course student should be able to

- Describe different concepts and terms used in Remote Sensing and its data
- Understand the Data conversion and Process in different coordinate systems of GIS interface
- Evaluate the accuracy of Data and implementing a GIS
- Understand the applicability of RS and GIS for various applications.

UNIT - I:

Concepts of Remote Sensing Basics of remote sensing- elements involved in remote sensing, electromagnetic spectrum, remote sensing terminology & units, energy resources, energy interactions with earth surface features & atmosphere, atmospheric effects, satellite orbits, Sensor Resolution, types of sensors. Remote Sensing Platforms and Sensors, IRS satellites.

Remote Sensing Data Interpretation Visual interpretation techniques, basic elements, converging evidence, interpretation for terrain evaluation, spectral properties of soil, water and vegetation. Concepts of Digital image processing, image enhancements, qualitative & quantitative analysis and pattern recognition, classification techniques and accuracy estimation.

UNIT - II:

Introduction to GIS: Introduction, History of GIS, GIS Components, GIS Applications in Real life, The Nature of geographic data, Maps, Types of maps, Map scale, Types of scale, Map and Globe, Co-ordinate systems, Map projections, Map transformation, Geo-referencing.



UNIT - III:

Spatial Database Management System: Introduction: Spatial DBMS, Data storage, Database structure models, database management system, entity-relationship model, normalization

Data models and data structures: Introduction, GIS Data model, vector data structure, raster data structure, attribute data, geo-database and metadata.

UNIT - IV:

Spatial Data input and Editing: Data input methods – keyboard entry, digitization, scanning, conversion of existing data, remotely sensed data, errors in data input, Data accuracy, Micro and Macro components of accuracy, sources of error in GIS. **Spatial Analysis:** Introduction, topology, spatial analysis, vector data analysis, Network analysis, raster data analysis, Spatial data interpolation techniques.

UNIT - V: Implementing a GIS and Applications

Implementing a GIS: Awareness, developing system requirements, evaluation of alternative systems, decision making using GIS.

Applications of GIS: GIS based road network planning, Mineral mapping using GIS, Shortest path detection using GIS, Hazard Zonation using remote sensing and GIS, GIS for solving multi criteria problems, GIS for business applications.

TEXT BOOKS:

1. Remote Sensing and GIS by Basudeb Bhatta, Oxford University Press, 2nd Edition, 2011.
2. Introduction to Geographic Information systems by Kang-tsung Chang, McGraw Hill Education (Indian Edition), 7th Edition, 2015.
3. Fundamentals of Geographic Information systems by Michael N. Demers, 4th Edition, Wiley Publishers, 2012.

REFERENCE BOOKS:

1. Remote Sensing and Image Interpretation by Thomas M. Lillesand and Ralph W. Kiefer, Wiley Publishers, 7th Edition, 2015.\
2. Geographic Information systems – An Introduction by Tor Bernhardsen, Wiley India Publication, 3rd Edition, 2010.
3. Advanced Surveying: Total Station, GIS and Remote Sensing by Satheesh Gopi, R. SathiKumar, N. Madhu, Pearson Education, 1st Edition, 2007.
4. Textbook of Remote Sensing and Geographical Information systems by M. Anji Reddy.



1970148: GROUND IMPROVEMENT TECHNIQUES**(Professional Elective – III)****B.Tech. IV Year I Sem.****L T P C****3 0 0 3****Prerequisites:** Geo-Technical Engineering, Foundation Engineering**Course Objectives:**

- To know the need of ground improvement
- To acquire the knowledge on the various ground improvement techniques available and their applications for different types of soils
- To understand suitable ground improvement technique for given soil conditions.

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

- Know the necessity of ground improvement
- Understand the various ground improvement techniques available
- Select & design suitable ground improvement technique for existing soil conditions in the field

UNIT - I:

Introduction to Engineering Ground Modification: Need and objectives, Identification of soil types, In-situ and laboratory tests to characterize problematic soils; Mechanical, Hydraulic, Physico-chemical, Electrical, Thermal methods, and their applications.

UNIT - II:

Mechanical Modification: Shallow Compaction Techniques- Deep Compaction Techniques- Blasting- Vibrocompaction- Dynamic Tamping and Compaction piles.

UNIT - III:

Hydraulic Modification: Objectives and techniques, traditional dewatering methods and their choice, Design of dewatering system, Electro-osmosis, Electro-kinetic dewatering- Filtration, Drainage and Seepage control with Geosynthetics, Preloading and vertical drains.

UNIT - IV:

Physical and Chemical Modification – Modification by admixtures, Modification Grouting, Introduction to Thermal Modification including freezing.



UNIT - V:

Modification by Inclusions and Confinement - Soil reinforcement, reinforcement with strip, and grid reinforced soil. In-situ ground reinforcement, ground anchors, rock bolting and soil nailing.

TEXT BOOKS:

- Hausmann, M. R. (1990) – Engineering Principles of Ground Modifications, McGraw Hill publications
- M. P. Moseley and K. Krisch (2006) – Ground Improvement, II Edition, Taylor and Francis

REFERENCE BOOKS:

- Koerner, R. M (1994) – Designing with Geosynthetics – Prentice Hall, New Jersey
- Jones C. J. F. P. (1985) – Earth Reinforcement and soil structures – Butterworths, London.
- Xianthakos, Abreimson and Bruce - Ground Control and Improvement, John Wiley & Sons, 1994.
- K. Krisch & F. Krisch (2010) - Ground Improvement by Deep Vibratory Methods, Spon Press, Taylor and Francis
- Donald P Coduto – Foundation Design Principles and Practices, 2nd edition, Pearson, Indian edition, 2012.



1970149: ADVANCED STRUCTURAL DESIGN**(Professional Elective – III)****B.Tech. IV Year I Sem.****L T P C****3 0 0 3****Prerequisites:** Structural Engineering - I (RCC) & II (STEEL) and Structural analysis**Course Objective:** To make the student more conversant with the design principles of critical structures using limit state approach.**Course Outcomes:** At the end of the course the student will be able to:

- Enhance the capabilities to design the special structural elements as per Indian standard code of practice.
- Analyze, design, draw and detailing of critical structural components with a level of accuracy

UNIT – I

Design and Detailing of cantilever type of Retaining walls – Stability Check. Principles & Design of Counter fort Retaining walls.

UNIT – II**Flat slabs:** Direct design method – Distribution of moments in column strips and middle strip-moment and shear transfer from slabs to columns – Shear in Flat slabs-Check for one way and two way shears.**Ribbed slabs:** Analysis of the Slabs for Moment and Shears, Ultimate Moment of Resistance, Design for shear, Deflection, Arrangement of Reinforcements.**UNIT – III**

Design of RCC Circular Water Tanks.

UNIT – IV

Introduction - Definition and basic forms – Components of a bridge - Classification of bridges – IRC Loading Standards and specifications - Design of Reinforced Concrete Slab Bridge decks

UNIT – V

Design of Steel Gantry Girders.



TEXT BOOKS:

- Advanced RCC by Krishnam Raju, CBS Publishers & distributors, New Delhi.
- Advanced RCC by Varghese, PHI Publications, New Delhi.
- Structural Design and drawing (RCC and steel) by Krishnam Raju, Univ. Press, New Delhi
- R.C.C Structures by Dr. B. C. Punmia, Ashok Kumar Jain, Arun Kumar Jain, Laxmi Publications, New Delhi

REFERENCE BOOKS:

- RCC Designs by Sushil Kumar, standard publishing house.
- Fundamentals of RCC by N.C. Sinha and S.K. Roy, S. Chand Publications, New Delhi.
- N. Krishna Raju, Design of Bridges, Oxford & IBH Publishing Company Pvt. Ltd, New Delhi. Fourth edition 2009.

Session Planner:

S.No	Unit No.	L.No	Topic Details	Date Planned	Date Conducted	Remarks
1	1	1	Retaining wall - Introduction			
2	1	2	Design and Detailing of cantilever type of Retaining walls			
3	1	3	Design and Detailing of cantilever type of Retaining walls			
4	1	4	Design and Detailing of cantilever type of Retaining walls			
5	1	5	Design and Detailing of cantilever type of Retaining walls			
6	1	6	Stability Check			
7	1	7	Principles& Design of Counter fort Retaining walls.			
8	1	8	Principles& Design of Counter fort Retaining walls.			
9	1	9	Principles& Design of Counter fort Retaining walls.			
10	1	10	Principles& Design of Counter fort Retaining walls.			
11	1	11	PPT			
12	1	12	Active learning			
13	1	13	Unit test - 1			



14	2	14	Flat slabs: Direct design method			
15	2	15	Distribution of moments in column strips and middle strip			
16	2	16	Distribution of moments in column strips and middle strip			
17	2	17	moment and shear transfer from slabs to columns			
18	2	18	Shear in Flat slabs			
19	2	19	Check for one way and two way shears			
20	2	20	Ribbed slabs			
21	2	21	Analysis of the Slabs for Moment and Shears			
22	2	22	Ultimate Moment of Resistance			
23	2	23	Design for shear			
24	2	24	Deflection			
25	2	25	Arrangement of Reinforcements.			
26	2	26	PPT			
27	2	27	Active learning			
28	2	28	Unit test - 2			
29	3	29	Water tanks - Introduction			
30	3	30	Design of RCC Circular Water Tanks			
31	3	31	Design of RCC Circular Water Tanks			
32	3	32	Design of RCC Circular Water Tanks			
33	3	33	Design of RCC Circular Water Tanks			
34	3	34	Design of RCC Circular Water Tanks			
35	3	35	Design of RCC Circular Water Tanks.			
36	3	36	PPT			
37	3	37	Active learning			
38	3	38	Unit test - 3			
39	4	39	Bridges: Introduction			
40	4	40	Definition and basic forms			
41	4	41	Components of a bridge			
42	4	42	Classification of bridges			
43	4	43	IRC Loading Standards and specifications			



44	4	44	Design of Reinforced Concrete Slab Bridge decks			
45	4	45	Design of Reinforced Concrete Slab Bridge decks			
46	4	46	Design of Reinforced Concrete Slab Bridge decks			
47	4	47	PPT			
48	4	48	Active learning			
49	4	49	Unit test - 4			
50	5	50	Gantry Girders: Introduction			
51	5	51	Design of Steel Gantry Girders			
52	5	52	Design of Steel Gantry Girders			
53	5	53	Design of Steel Gantry Girders			
54	5	54	Design of Steel Gantry Girders			
55	5	55	Design of Steel Gantry Girders			
56	5	56	Design of Steel Gantry Girders			
57	5	57	Design of Steel Gantry Girders			
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 purposes of constructing retaining wall?
- 2 Differentiate overturning and sliding.
- 3 Recall the 'Ka' formula for sloping back fill.
- 4 Draw the different types of retaining wall.
- 5 Define retaining wall.
- 6 Differentiate cantilever & counterfort retaining wall? (any two)
- 7 What is a shear key?
- 8 List out the stability checks made in retaining wall
- 9 What are the types of retaining wall?
- 10 Draw a typical reinforcement detailing of cantilever retaining wall.
- 11 Define active earth pressure.
- 12 When shear key is provided in retaining wall?

Part – B

1. Design the stem, heel & toe slab of a cantilever retaining wall to retain an earth embankment with a horizontal top 3.6 m above ground level. Density of earth=18 kN/m³.



- Angle of internal friction $\phi=30^\circ$. SBC of soil= 180 kN/m^2 . Coefficient of internal friction between soil and concrete = 0.5. Adopt M20 grade concrete and Fe 415 grade steel.
2. Explain the design procedure for counterfort retaining wall.
 3. Design the stem of a cantilever retaining wall to retain an earth embankment with a horizontal top 4 m above ground level. Density of earth = 19 kN/m^3 . Angle of internal friction $\phi = 30^\circ$. SBC of soil = 160 kN/m^2 . Coefficient of internal friction between soil and concrete = 0.5. Adopt M20 grade concrete and Fe 415 grade steel.
 4. Identify the various stability criteria in retaining wall design with necessary formula.
 5. Design the heel slab of a cantilever retaining wall to retain earth 3.5 m high above ground level, using the following data: The density of earth is = 20 kN/m^3 ; Angle of internal friction is = 25° ; The safe bearing capacity of soil is = 150 kN/m^2 ; The coefficient of friction between soil and concrete is = 0.45; Use M25 grade of concrete and Fe 415 steel.
 6. Write the importance of constructing counterfort in retaining wall?
 7. Classify the components of cantilever retaining wall.
 8. Design the stem of a cantilever retaining wall to retain an earth embankment with a horizontal top 3.5 m above ground level. Density of earth = 18 kN/m^3 . Angle of internal friction $\phi=30^\circ$. SBC of soil = 170 kN/m^2 . Coefficient of internal friction between soil and concrete = 0.5. Adopt M20 grade concrete and Fe 415 grade steel.
 9. Distinguish between cantilever and counterfort retaining wall.

Unit – 2

Part – A

- 1 List the various components in flat slab.
- 2 What is the minimum thickness of flat slab as per IS:456?
- 3 What is column head?
- 4 Outline about Ribbed slab?
- 5 What are the methods of flat slab design as per IS:456?
- 6 What is a drop in flat slab?
- 7 Write any two advantages of flat slab.
- 8 Distinguish between Ribbed slab and Solid slab.
- 9 Define flat slab.
- 10 What purpose of drop is provided in flat slab?
- 11 Differentiate interior and exterior panel.
- 12 Write any two advantages of Ribbed slab.

Part – B

1. Write down the assumptions made in direct design method of flat slab as per IS:456.
2. Design a interior panel of a flat slab floor system for a ware house of size 25m x 25m divided into panels of 5m x 5m using the following data. Live load = 4 kN/m^2 , Column size 400 mm dia, Material = M20 concrete & Fe415 steel.



3. Explain the design procedure for interior panel flat slab.
4. Design an exterior panel of a flat slab floor system for a ware house of size 16m x 16m divided into panels of 4m x 4m using the following data. Live load = 5 kN/m^2 , Column size = 300 mm dia, Material = M20 concrete & Fe415 steel.
5. Design a interior panel of a flat slab floor system for a ware house of size 16m x 16m divided into panels of 4m x 4m using the following data. Live load = 5 kN/m^2 , Column size 400 mm dia, Material = M20 concrete & Fe415 steel.
6. Write a note on (i) column strip (ii) middle strip (iii) Direct design method

Unit – 3

Part – A

- 1 What are the different types of water tanks according to location?
- 2 Define Hoop tension.
- 3 What are the different types of water tanks according to shape?
- 4 What is the minimum grade of concrete and minimum Ast in water tank design?
- 5 Why mostly water tanks are constructed in cylindrical shape?
- 6 Define modular ratio.
- 7 Find the diameter of a circular tank which is having a flexible base for capacity of 2,00,000 liters. The depth of water is to be 4m, including a free board of 200mm.
- 8 Where domes are used?
- 9 What are the different types of water tanks according to location?
- 10 What is the minimum grade of concrete and minimum Ast in dome design?
- 11 What are the forces acting on water tanks?
- 12 Define hoop tension.

Part – B

1. Describe the analysis procedure of ribbed slabs for moment and shear.
2. Design a circular water tank wall with fixed base to store 2,00,000 liters of water. The depth of water is 3m. Free board =300mm. Use M25 Grade concrete and Fe415 steel.
3. Elaborate the different components of counterfort retaining wall.
4. Design a circular water tank with flexible base having 3.5 m high, resting on the ground to store 1 lakh liters of water. Use M25 grade of concrete and Fe 415 steel. Free board = 100mm. Density of water = 10 kN/m^3 .
5. Identify the stability criteria of retaining wall with necessary formula.
6. Design a circular water tank wall with fixed base to store 3,00,000 liters of water. The depth of water is 3m. Free board =200mm. Use M25 Grade concrete and Fe415 steel.
7. Design a circular water tank with hinged base having 3.5 m high, resting on the ground to store 5 lakh liters of water. Use M25 grade of concrete and Fe 415 steel. Free board = 100mm. Density of water = 10 kN/m^3 .
8. Design a circular water tank wall with hinged base to store 200 k liters of water. The depth of water is 3m. Free board =300mm. Use M25 Grade concrete and Fe415 steel.
9. Design a circular dome for an overhead RCC cylindrical water tank to store 500 k liters



of water. The depth of water is 4m. Live load on dome is 1 kN/m². Adopt M25 concrete and Fe415 steel.

10. Design a circular water tank wall with hinged base having 3.5 m high, resting on the ground to store 1 lakh liters of water. Use M25 grade of concrete and Fe415 steel. Free board = 100mm. Density of water = 10 kN/m³.

Unit – 4

Part – A

- 1 What is IRC stands for?
- 2 List the different loading classes as per IRC.
- 3 Recall the formula for effective width of dispersion in a bridge.
- 4 Outline about an abutment.
- 5 Classify the bridge based on materials.
- 6 Recall the bending moment formula for two way bridge deck slab.
- 7 Contrast the formula for minimum thickness of deck slab?
- 8 List the bridges based on function.
- 9 Why masonry bridges are constructed in parabolic shape?
- 10 What is the minimum area of steel incase of RC solid slab bridge structure?
- 11 Classify bridge according to span.
- 12 How effective span of solid slab bridge is calculated?

Part – B

1. Analyze the design dead load & live load moments for R.C Slab with specified data given below: Loading : IRC class AA, Carriage way width : Two lane; Foot paths : 1.0 m on either side, Clear span : 5 m ; Wearing coat : 75 mm, Width of bearing : 300 mm ; Materials : M20 grade concrete and Fe415 steel.
2. Classify the different types of bridges with neat sketches.
3. Analyze the design live load moments for R.C Slab with specified data given below: Loading : IRC class AA, Carriage way width : Two lane ; Foot paths : 1.0 m on either side, Clear span : 5.5 m ; Wearing coat : 75 mm, Width of bearing : 300 mm ; Materials : M20 grade concrete and Fe415 steel.
4. Explain in brief Pigeaud’s method of determining B.M. in slabs, due to a Wheel load.
5. Analyze the design dead load & live load moments for R.C Slab culvert with specified data given below: Loading : IRC class AA, Carriage way width : 7.5m (Two lane); Foot paths : 1.0 m on either side, Clear span : 8 m ; Wearing coat : 80 mm, Width of bearing : 400 mm ; Materials : M25 grade concrete and Fe415 steel.

Unit – 5

Part – A

- 1 What are the essential components of crane system in an industrial building?
- 2 Recall the loads acting on a Gantry girder.
- 3 List any two advantages of Gantry girder.



- 4 Outline about Corbel.
- 5 Why Gantry girder required for an industrial buildings?
- 6 What is meant by surge load in gantry girder?
- 7 Recall the limiting deflection of gantry girder as per IS: 800-2007.
- 8 Draw the different forms of gantry girders.
- 9 Define Gantry girder.
- 10 Recall the importance of Gantry girder.
- 11 Compare plate girder and gantry girder.
- 12 What is the use of Pigeaud's curves?

Part – B

1. Explain the step by step procedure for the design of Gantry girder with necessary diagram and formulas.
2. Evaluate the total bending moment due to DL, LL & Impact of a gantry girder for an industrial building to carry an electric overhead travelling crane with the following data: Crane capacity is 500 kN. Weight of crane excluding crab is 200 kN. Weight of crab is 5 kN. Span of crane between rails is 15 m. Minimum hook approach is 1m. Wheel base is 3.0 m. Span of gantry girder is 7 m. Weight of rail section is 300 N/m. Assume any missing data.
3. Assess the step by step procedure for the design of Gantry girder with necessary diagrams and formulas.
4. Determine the total bending moment due to DL, LL & Impact of a gantry girder for an Industrial building to support overhead travelling crane. Use the following data: span of gantry = 6 m, Crane capacity = 150 kN, Self weight of crane girder (exclude trolley) 160 kN, Self weight of trolley = 40 kN, Minimum hook approach 1.00 m, Distance between wheel centers of trolley 2.00 m, Span of crane = 12 m, Self weight of rail section 250 N/m, Yield strength of steel 250 MPa.
5. Explain the step by step procedure for the design of Gantry girder with necessary diagram and formulas.
6. Determine the total bending moment due to DL, LL & Impact of a gantry girder for an industrial building to carry an electric overhead travelling crane with the following data: Crane capacity is 300 kN. Weight of crane excluding crab is 200 kN. Weight of crab is 5 kN. Span of crane between rails is 18 m. Minimum hook approach is 1.0 m. Wheel base is 3.0 m. Span of gantry girder is 8 m. Weight of rail section is 300 N/m. Assume any missing data.



1970150: IRRIGATION AND HYDRAULIC STRUCTURES**(Professional Elective – IV)****B.Tech. IV Year I Sem.****L T P C****3 0 0 3****Pre-Requisites:** Hydraulics, Hydrology & Water Resources Engineering**Course Objectives:** To study various types of storage works and diversion headwork, their components and design principles for their construction.**Course Outcomes:** At the end of the course, the student will be able to:

- Know types of water retaining structures for multiple purposes and its key parameters considered for planning and designing
- Understand details in any Irrigation System and its requirements
- Know, Analyze and Design of a irrigation system components

UNIT - I

Storage Works-Reservoirs - Types of reservoirs, selection of site for reservoir, zones of storage of a reservoir, reservoir yield, estimation of capacity of reservoir using mass curve- Reservoir Sedimentation - Life of Reservoir, Types of dams, factors affecting the selection of type of dam, factors governing selection of site for a dam.

UNIT - II

Gravity dams: Forces acting on a gravity dam, causes of failure of a gravity dam, elementary profile and practical profile of a gravity dam, limiting height of a low gravity dam, Factors of Safety - Stability Analysis, Foundation for a Gravity Dam, drainage and inspection galleries.

UNIT- III

Earth dams: types of Earth dams, causes of failure of earth dam, criteria for safe design of earth dam, seepage through earth dam-graphical method, measures for control of seepage. Spillways: types of spillways, Design principles of Ogee spillways - Spillway gates. Energy Dissipaters and Stilling Basins Significance of Jump Height Curve and Tail Water Rating Curve - USBR and Indian types of Stilling Basins.

UNIT- IV

Diversion Head works: Types of Diversion head works- weirs and barrages, layout of diversion head work - components. Causes and failure of Weirs and Barrages on permeable foundations, -Silt Ejectors and Silt Excluders

Weirs on Permeable Foundations – Creep Theories - Bligh's, Lane's and Khosla's theories, Determination of uplift pressure- Various Correction Factors – Design principles of weirs on



permeable foundations using Creep theories - exit gradient, U/s and D/s Sheet Piles - Launching Apron.

UNIT- V

Canal Falls - types of falls and their location, Design principles of Notch Fall and Sarada type Fall. Canal regulation works, principles of design of cross and distributary head regulators, types of Canal escapes - types of canal modules, proportionality, sensitivity, setting and flexibility. Cross Drainage works: types, selection of suitable type, various types, design considerations for cross drainage works

TEXT BOOKS:

- Irrigation Engineering and Hydraulic structures by Santhosh kumar Garg, Khanna Publishers.
- Irrigation engineering by K. R. Arora Standard Publishers.
- Irrigation and water power engineering by Punmia & Lal, Laxmi publications Pvt. Ltd., New Delhi

REFERENCE BOOKS:

- Theory and Design of Hydraulic structures by Varshney, Gupta & Gupta
- Irrigation Engineering by R.K. Sharma and T.K. Sharma, S. Chand Publishers 2015.
- Irrigation Theory and Practice by A. M. Micheal Vikas Publishing House 2015.
- Irrigation and water resources engineering by G.L. Asawa, New Age International Publishers.

Session Planner:

S.No	Unit No.	L.No	Topic Details	Date Planned	Date Conducted	Remarks
1	1	1	Storage Works-Reservoirs			
2	1	2	Types of reservoirs, selection of site for reservoir			
3	1	3	Zones of storage of a reservoir, reservoir yield			
4	1	4	Estimation of capacity of reservoir using mass curve			
5	1	5	Reservoir Sedimentation - Life of Reservoir			
6	1	6	Types of dams			
7	1	7	Factors affecting the selection of type of dam			



8	1	8	Factors governing selection of site for a dam.			
9	1	9	PPT			
10	1	10	Active learning			
11	1	11	Unit test - 1			
12	2	12	Gravity dams: Forces acting on a gravity dam			
13	2	13	Causes of failure of a gravity dam			
14	2	14	Elementary profile and practical profile of a gravity dam			
15	2	15	Limiting height of a low gravity dam			
16	2	16	Factors of Safety - Stability Analysis			
17	2	17	Foundation for a Gravity Dam			
18	2	18	Drainage and inspection galleries.			
19	2	19	PPT			
20	2	20	Active learning			
21	2	21	Unit test - 2			
22	3	22	Earth dams: types of Earth dams			
23	3	23	Causes of failure of earth dam			
24	3	24	Criteria for safe design of earth dam			
25	3	25	Seepage through earth dam- graphical method			
26	3	26	Measures for control of seepage			
27	3	27	Spillways: types of spillways			
28	3	28	Design principles of Ogee spillways			
29	3	29	Spillway gates			
30	3	30	Energy Dissipaters and Stilling Basins			
31	3	31	Significance of Jump Height Curve and Tail			
32	3	32	Water Rating Curve			
33	3	33	USBR and Indian types of Stilling Basins.			
34	3	34	PPT			
35	3	35	Active learning			
36	3	36	Unit test - 3			
37	4	37	Diversion Head works: Types of Diversion head work			



38	4	38	Weirs and barrages			
39	4	39	Layout of diversion head work - components			
40	4	40	Causes and failure of Weirs and Barrages on permeable foundations			
41	4	41	Silt Ejectors and Silt Excluders			
42	4	42	Weirs on Permeable Foundations			
43	4	43	Creep Theories - Bligh's, Lane's			
44	4	44	Creep Theories - Khosla's theories			
45	4	45	Determination of uplift pressure			
46	4	46	Various Correction Factors			
47	4	47	Design principles of weirs on permeable foundations using Creep theories			
48	4	48	Exit gradient, U/s and D/s Sheet Piles			
49	4	49	Launching Apron			
50	4	50	PPT			
51	4	51	Active learning			
52	4	52	Unit test - 4			
53	5	53	Canal Falls-Types of falls and their location			
54	5	54	Design principles of Notch Fall and Sarada type Fall			
55	5	55	Canal regulation works, principles of design of cross and distributary head regulators			
56	5	56	Types of Canal escapes - types of canal modules			
57	5	57	Proportionality, sensitivity			
58	5	58	Setting and flexibility			
59	5	59	Cross Drainage works: types			
60	5	60	Selection of suitable type			
61	5	61	Various types of cross drainage works			
62	5	62	Design considerations for cross drainage works			
63	5	63	PPT			
64	5	64	Active learning			
65	5	65	Unit test - 5			



Important Questions:**Unit – 1****Part – A**

- 1 Draw the hydrological cycle?
- 2 What are the types of precipitation?
- 3 Define Readily available soil moisture?
- 4 How can we reduce the water usage?
- 5 Difference between the rainfall and run off?
- 6 What are the factors affecting evaporation?
- 7 How can you measure the infiltration?
- 8 What are the types of infiltration indices?
- 9 Define permanent wilting point?
- 10 Define rainfall double mass curve?

Part – B

- 1 (a) Explain the methods of estimating missing rainfall data at a station in a basin.
(b) Explain step by step procedure you would adopt to prepare the depth- area duration curves for a particular storm for a basin having a number of rain-gauges, most of which are recording.
- 2 Explain the following in brief.
 - (a) Isohyet
 - (b) Average Annual Rainfall
 - (c) Probable maximum precipitation
 - (d) Rain gauge density.
- 3 (a) Define water equivalent of snow and explain how you estimate snow melt?
(b) Discuss the analysis of rainfall data with respect to time, space, frequency and intensity.
- 4 (a) Explain the balanced equation for precipitation and describe the terms. i. Interception and ii. Depression storage.
(b) Describe with the help of neat sketches any three methods of separation of base flow from the hydrograph of runoff (i.e. stream flow hydrograph) indicating the situation under which you advocate them.
- 5 (a) Describe with the help of sketch various forms of soil moisture. Which of these soil moisture is mainly available for utilization by the plants?
(b) Write short notes on:
 - (i) Double-mass curve
 - (ii) Cold and warm fronts
 - (iii) Cyclones and anticyclones.



- 6 (a) Write short notes on:
(i) Pan Co-efficient
(ii) ϕ -index
(iii) Evaporation opportunity.
(b) Evaporation is indirectly a cooling process. Justify the statement. Discuss the factors affecting evaporation.
- 7 a) Bring out the difference between evaporation, transpiration, evapotranspiration and consumptive use.
(b) Discuss the various factors affecting evapotranspiration.
(c) Distinguish between the potential evapotranspiration and the actual evapotranspiration.
- 8 (a) Discuss the various factors affecting evapotranspiration. (b) Write notes on the following:
(i). Permanent Wilting point (ii). Temporary Wilting point
(iii). Readily available soil moisture
- 9 (a) Explain energy budget method of computing lake evaporation. What are its limitations?
(b) What factors are considered while locating a gauge-discharge site?
- 10 (a) Differentiate between: infiltration rate and infiltration capacity.
(b) Write short notes on:
(i) Isochrones
(ii) Time of concentration

Unit – 2

Part – A

- 1 Explain hydrograph analysis?
- 2 What do you mean by base flow?
- 3 What do you understand about flood hydrograph?
- 4 Define return period and exceedence probability?
- 5 Define Unit hydrograph?
- 6 Define S- hydrograph?
- 7 Define Maximum probable flood?
- 8 Define Design flood?
- 9 Define Annual series?
- 10 Define Partial series?

Part – B

- 1 Define unit hydrograph. What are the assumptions underlying the unit hydrograph theory. How do they limit the applicability of unit hydrograph?



- 2 (a) What does the word unit refer to in the unit hydrograph? Explain with sketches what do you understand by the principle of linearity and principle of time invariance in the unit hydrograph theory?
(b) Describe how recession constants of direct runoff and base flow curves are obtained from a semi log arithmetic plot.
- 3 Explain the terms:
 - (i) Annual series
 - (ii). Partial duration series
 - (iii). Recurrence interval
 - (iv). Probable maximum precipitation.
- 4 Describe how unit hydrograph can be used to predict the runoff from a storm. What are the uses of unit hydrograph.
- 5 Describe the method of estimating a T_r -year flood using Gumbel's distribution.
- 6 (a) What are the various components of runoff? Describe how each component is derived in the runoff process.
(b) How is runoff estimated using Strange's tables and Barlow's tables
- 7 State the significance of inflection point on recession side of the hydrograph. Also explain the different factors that effect the shape of the hydrograph.
- 8 (a) Describe the method of deriving unit hydrograph from complex storms.
(b) Describe SCS method in detail.
- 9 Discuss a method to obtain UH from complex storms. What do you understand by the principle of linearity and time invariance in unit hydrograph?
- 10 (a) What do you mean by Antecedent precipitation index? Explain.
(b) List out and explain various physiographic factors affecting runoff.

Unit – 3

Part – A

- 1 Define aquifer?
- 2 What are the different types of aquifers?
- 3 Define porosity?
- 4 Define Specific yield?
- 5 Define specific retention?
- 6 Define Permeability?
- 7 Define transmissibility?
- 8 Define Storage coefficient?
- 9 What are the types of wells?
- 10 Ground water and surface water, Which water is more pure?

Part – B



- 1 Write short notes on:
 - (a) Specific capacity of a well and specific yield of an aquifer
 - (b) Aquifer and aquiclude
 - (c) Open wells and tube wells
 - (d) Water table and artesian aquifers.
- 2 Distinguish between
 - (a) Aquifer and Aquifuge
 - (b) Confined aquifer and water table aquifer
 - (c) Aquiclude and Aquitard
 - (d) Groundwater and Perched groundwater.
- 3 Write notes on the following:
 - i. well losses,
 - ii. Specific capacity of a well,
 - iii. Spherical flow in a well,
 - iv. Interference among wells
- 4 Distinguish between
 - i. Aquifers and aquicludes
 - ii. Non-artesian and artesian wells
 - iii. Perched aquifers and water table aquifer
 - iv. Permeability and transmissibility.
- 5 Differentiate between shallow dug wells and deep dug wells. How the dug well is constructed? Enumerate the methods which are used for determining the yield of dug wells. Discuss briefly any one of these methods.
- 6 (a) Distinguish with sketches if necessary, the difference between unconfined and confined aquifer
(b) Derive a formula for discharge of a well in a homogeneous unconfined aquifer assuming equilibrium flow condition. State the assumptions on which the formula is based.
- 7 (a) Distinguish between:
 - i. Vadose zone and phreatic zone
 - ii. Aquiclude and Aquitard
 - iii. Transmissivity and storativity
- 8 Define and explain the following terms as used in connection with ground water
 - i. Capillary fringe,
 - ii. Specific yield,
 - iii. Pore water, iv. Field capacity
- 9 Write notes on the following:
 - i. Capillary water,
 - ii. Hygroscopic water



iii. Gravitational water

- 10 Define outlet factor, capacity factor, full supply coefficient and root zone depth.

Unit – 4**Part – A**

- 1 Define Irrigation?
- 2 What are the different types of soils?
- 3 What do you understand about full supply coefficient?
- 4 What are the ill effects of irrigation?
- 5 What standards required for Irrigation water?
- 6 Define Duty and Delta?
- 7 What do you know about the water conveyance efficiency?
- 8 What do you understand about vertical distribution of soil moisture?
- 9 Define water logging?
- 10 Define field capacity?

Part – B

- 1 Discuss various methods of irrigation and state the advantages of each method.
- 2 (a) Discuss in brief, various methods of surface irrigation.
(b) Describe the step by step procedure for preparation of land for irrigation
- 3 (a) What is meant by C2-S2 water?. Discuss its usefulness for irrigating fine textured soils.
(b) Write short notes on:
 - i. Applicability of lift irrigation
 - ii. Mixed cropping
 - iii. Il-effects of irrigation
- 4 (a) What is meant by Furrow irrigation and Sprinkler irrigation? Which one is preferred in India and Why.
(b) What is meant by 'Border flooding' How does it differ from 'Check flooding' and 'free flooding'?
- 5 (a) Define Irrigation. What is the necessity of irrigation?
(b) Describe in brief some of the important irrigation projects and multipurpose river valley projects under taken or completed after independence of our country.
- 6 (a) What is meant by flow duty and quantity duty?
(b) Explain as how the following factors effect the duty of a crop.
 - i. soil and sub soil condition
 - ii. Stage of growth
 - iii. Temperature
 - iv. Rainfall



- 7 (a) Define the terms Duty, Delta and base period and also derive the relation between them.
(b) Explain the following terms:
 - i. Field capacity
 - ii. Moisture equivalent
 - iii. Available moisture.
- 8 (a) Define irrigation efficiency. List out different types of irrigation efficiencies. Explain any two of them.
(b) Define Consumptive use of water? List out various methods used for the assessment of consumptive use of water? Explain any one method in detail for the estimation of consumptive use
- 9 (a) Why soil is necessary for plant life. Explain the classification of soils based on geological process of formation.
b) Write down the classification of irrigation water based on sodium absorption ratio and its suitability for irrigation.
- 10 What is meant by duty and delta of canal water? Derive a relation between duty and delta for a given base period.

Unit – 5

Part – A

- 1 What is the difference between the lake and a canal?
- 2 Name the two different types of silt theories?
- 3 What do you mean by initial and final regime of channels?
- 4 What are the merits of Lacey's theory?
- 5 Why do we need to provide side slopes for canals?
- 6 What do you understand about SCS curve?
- 7 What is meant by detention storage and depression storage?
- 8 What do you know about Gumbel's method of flood frequency analysis?
- 9 What is the difference between the silt and scour?
- 10 Which rational formula gives the best results for flood frequency analysis?

Part – B

- 1 (a) Write short notes on the following :
 - i. free boarding in canals
 - ii. Permanent land width
 - iii. Inspection road
 - iv. Berm
- (b) Write down the classification of canals. Explain canal alignment.



- 2 (a) Why is Lacey's conception is superior to that of Kennedy's?
(b) What do you understand by
 - i. regime channels
 - ii. Initial and final regime of channels?
- 3 (a) When do you classify the channel as having attained regime condition?
(b) Describe briefly the observations of Lacey on the regime of river.
- 4 (a) Discuss critically the statement "The banks of an unlined channel are more susceptible to erosion than its bed, and hence the stability of the banks and not of its bed is the governing factor in unlined canal designs".
(b) Explain the following terms in detail.
 - i. Ridge canal
 - ii. Side slope canal
- 5 (a) What is the necessity of drainage below the lining? Discuss the various drainage and pressure release arrangements.
(b) Using Lacey's basic regime equations derive an expression for Lacey's scour depth.
- 6 What is meant by scour? What precautions do you take against it during the design of weirs?
- 7 Explain the mid-section method of computing the discharge in a stream. Show in a neat sketch, the positions of velocity measurements over the cross sectional area of the stream.
- 8 Draw a typical cross section of a barrage founded on pervious foundations and explain its salient features.
- 9 (a) What do you understand by critical gradient. What will happen if the critical gradient is exceeded? What is Khosla's safe exit gradient?
(b) Explain how Khosla's theory is modification over Bligh's theory.
- 10 Distinguish between:
 - i. Overland flow and interflow
 - ii. Influent and effluent streams
 - iii. Detention storage and depression storage
 - iv. Drainage density and drainage divide.



1970151: PIPELINE ENGINEERING**(Professional Elective – IV)****B.Tech. IV Year I Sem.****L T P C****3 0 0 3****Pre-Requisites:** Fluid Mechanics, Hydraulics and Hydraulic machinery**Course Objectives:**

- To familiarize the students with the various elements and stages involved in transportation of water.
- To understand standards and practices in piping design.
- To know various equipment and their operation in pipeline transportation.
- To understand technology in transportation of fluids.

Course Outcome: At the end of the course the student will be able to:

- Get an understanding of the key steps in a pipeline's lifecycle: design, construction, installation, asset management and maintenance.

UNIT - I

Elements of pipeline design: Types of piping systems; transmission lines, In-plant piping systems, Distribution mains, Service lines. Types of Water distribution networks; serial networks, branched networks and looped networks. Network components and Network model. Basic hydraulic principles; continuity and Energy principle.

Pipeline route selection, survey and geotechnical guidelines: Introduction - Preliminary route selection - Key factors for route selection - Engineering survey - Legal survey - Construction / As-built survey - Geotechnical design.

UNIT – II

Frictional Head loss in Pipes: Major and Minor losses, Artificially roughened pipes, moody Diagram. Friction coefficient relationships, Empirical formulae, Simple pipe flow problems Equivalent pipes; pipes in series, parallel, series-parallel; problems. Water Hammer and energy transmission through pipes: gradual and Instantaneous closure

UNIT– III

Reservoirs, Pumps and Valves: Types of Reservoirs, Pumps; introduction, system head-discharge- pump head and head-discharge relationships, characteristic curves, pump combination. Valves: check valves, flow control valves, Pressure Reducing valves, both Flow control and Pressure Reducing Valves.

Network Parameters and Types of analysis: Network parameters, Parameter interrelationships, Necessity of Analysis, common Assumptions, types of analysis, rules for Solvability of Pipe networks.



UNIT – IV

Network Formulation of Equations: States of parameters, Single-Source Networks with known pipe Resistances. Multisource Networks with known pipes resistances. Networks with unknown pipe resistances. Inclusion of Pumps, Check Valves, Flow Control Valves and Pressure Reducing Valves – Problems.

Hardy Cross Method: Methods of balancing heads (Loop Method). Method of Balancing Flows (Node Method). Modified Hardy Cross Method. Convergence Problem. Different software for WDN analysis and design.

UNIT - V

Materials selection and quality management: Elements of design – Materials designation standards - Quality management.

Pipeline construction: Construction – Commissioning.

Pipeline protection, Instrumentation, pigging & Operations: Pipeline coating – Cathodic protection - Cathodic protection calculations for land pipelines – Internal corrosion – Flow meters and their calibration – Sensors – Pigs-Pipeline Operations and maintenance.

TEXT BOOKS:

- Analysis of Water Distribution Networks, P.R. Bhave and R. Gupta, Narosa Publishing House Pvt. Ltd.
- Pipeline Engineering, Henry Liu, Lewis Publishers (CRC Press), 2003.
- Piping and Pipeline Engineering: Design, Construction, Maintenance Integrity and Repair, George A. Antaki, CRC Press, 2003.

REFERENCE BOOKS:

- Piping Calculation Manual, E. Shashi Menon, McGraw-Hill, 2004.
- Pipeline Rules of Thumb Handbook, E. W. McAllister, 7th Edition, 2009.
- Liquid Pipeline Hydraulics, E. Shashi Menon, Mareel Dekker Inc., 2004.



1970152: GROUND WATER HYDROLOGY**(Professional Elective – IV)****B.Tech. IV Year I Sem.****L T P C
3 0 0 3****Pre-Requisites:** Hydraulics & Fluid Mechanics**Course objectives: The objectives of the course are:**

- To explain the concepts of Groundwater Development and Management.
- To demonstrate and derive the basic equations used in Groundwater development and management and the corresponding equations
- To know the investigations, field studies to conduct basic ground water studies.

Course Outcomes: On successful completion of this course, students should be able to:

- Identify different fundamental equations and concepts as applied in the Groundwater studies
- Discuss and derive differential equation governing groundwater flow in three dimensions
- To solve groundwater mathematical equations and analyze pumping tests in steady and non- steady flow cases
- Distinguish and understand the saline water intrusion problem in costal aquifers

UNIT- I**Ground Water Occurrence**

Ground water hydrologic cycle, origin of ground water, rock properties effecting ground water, Vertical distribution of ground water, zone of aeration and zone of saturation, geologic formation as aquifers, types of aquifers, porosity, specific yield and specific retention. Ground Water Movement-Permeability, Darcy's law, storage coefficient, Transmissivity, Differential equation governing ground water flow in three dimensions derivation, ground water flow equation in polar coordinate system, ground water flow contours and their applications.

UNIT- II**Analysis of Pumping Test Data-I**

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

UNIT- III**Analysis of Pumping Test Data-II**

Unsteady flow towards well-Non-Equilibrium equations, Thesis solution, Jacob and Chow's simplifications, Leak aquifers.

UNIT- IV

Surface and sub-surface Investigation

Surface methods of exploration-Electrical resistivity method and Seismic refraction methods. Subsurface methods geophysical logging and resistivity logging. Concept of artificial recharge of ground water, recharge methods, Applications of GIS and RS in artificial recharge of ground water along with case studies.

UNIT- V

Saline water intrusion in aquifer

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

TEXT BOOKS

- Ground water Hydrology by David Keith Todd, John Wiley & Son, New York.
- Ground water by H.M. Raghunath, Wiley Eastern Ltd.
- Groundwater System Planning & Management, R. Willes & W.W.G. Yeh, Prentice Hall.

REFERENCE BOOKS:

- Ground water by Bawvwr, John Wiley & Sons.
- Applied Hydrogeology by C.W. Fetta, CBS Publishers & Distributors.
- Ground Water Assessment, Development and Management by K R Karanth, McGraw Hill Publications.



PROFESSIONAL PRACTICE, LAW AND ETHICS**B.Tech. IV Year I Sem.****L T P C**
2 0 0 2**Course Objective:**

- To make the students understand the types of roles they are expected to play in the society as practitioners of the civil engineering profession
- To develop some ideas of the legal and practical aspects of their profession.

Course Outcome: The students will understand the importance of professional practice, Law and Ethics in their personal lives and professional careers. The students will learn the rights and responsibilities as an employee, team member and a global citizen

UNIT - I

Professional Practice and Ethics: Definition of Ethics, Professional Ethics - Engineering Ethics, Personal Ethics; Code of Ethics - Profession, Professionalism, Professional Responsibility, Conflict of Interest, Gift Vs Bribery, Environmental breaches, Negligence, Deficiencies in state-of-the-art; Vigil Mechanism, Whistle blowing, protected disclosures. Introduction to GST- Various Roles of Various Stake holders

UNIT – II

Law of Contract: Nature of Contract and Essential elements of valid contract, Offer and Acceptance, Consideration, Capacity to contract and Free Consent, Legality of Object. Unlawful and illegal agreements, Contingent Contracts, Performance and discharge of Contracts, Remedies for breach of contract. Contracts-II: Indemnity and guarantee, Contract of Agency, Sale of goods Act -1930: General Principles, Conditions & Warranties, Performance of Contract of Sale.

UNIT - III

Arbitration, Conciliation and ADR (Alternative Dispute Resolution) system: Arbitration – meaning, scope and types – distinction between laws of 1940 and 1996; UNCITRAL model law – Arbitration and expert determination; Extent of judicial intervention; International commercial arbitration; Arbitration agreements – essential and kinds, validity, reference and interim measures by court; Arbitration tribunal – appointment, challenge, jurisdiction of arbitral tribunal, powers, grounds of challenge, procedure and court assistance; Distinction between conciliation, negotiation, mediation and arbitration, confidentiality, resort to judicial proceedings, costs; Dispute Resolution Boards; Lok Adalats.

UNIT - IV

Engagement of Labour and Labour & other construction-related Laws: Role of Labour in Civil Engineering; Methods of engaging labour- on rolls, labour sub-contract, piece rate work; Industrial Disputes Act, 1947; Collective bargaining; Industrial Employment (Standing Orders) Act, 1946; Workmen's Compensation Act, 1923; Building & Other - Construction



Workers (regulation of employment and conditions of service) Act (1996) and Rules (1998); RERA Act 2017, NBC 2017.

UNIT - V

Law relating to Intellectual property: Introduction – meaning of intellectual property, main forms of IP, Copyright, Trademarks, Patents and Designs, Secrets; Law relating to Copyright in India including Historical evolution of Copy Rights Act, 1957, Meaning of copyright – computer programs, Ownership of copyrights and assignment, Criteria of infringement, Piracy in Internet – Remedies and procedures in India; Law relating to Patents under Patents Act, 1970

TEXT BOOKS:

- Professional Ethics: R. Subramanian, Oxford University Press, 2015.
- Ravinder Kaur, Legal Aspects of Business, 4e, Cengage Learning, 2016.

REFERENCES:

- RERA Act, 2017.
- Wadhera (2004), Intellectual Property Rights, Universal Law Publishing Co.
- T. Ramappa (2010), Intellectual Property Rights Law in India, Asia Law House.
- O.P. Malhotra, Law of Industrial Disputes, N.M. Tripathi Publishers.



1980153: SOLID WASTE MANAGEMENT**(Professional Elective – V)****B.Tech. IV Year II Sem.****L T P C**
3 0 0 3**Course Objectives:** The objectives of the course are to

- Define the terms and Understands the necessity of solid waste management
- Explain the strategies for the collection of solid waste
- Describe the solid waste disposal methods
- Categorize Hazardous Waste

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

- Identify the physical and chemical composition of solid wastes
- Analyze the functional elements for solid waste management.
- Understand the techniques and methods used in transformation, conservation, and recovery of materials from solid wastes.
- Identify and design waste disposal systems

UNIT- I

Solid Waste: Definitions, Types of solid wastes, sources of solid wastes, Characteristics, and perspectives; properties of solid wastes, Sampling of Solid wastes, Elements of solid waste management - Integrated solid waste management, Solid Waste Management Rules 2016.

UNIT - II

Engineering Systems for Solid Waste Management: Solid waste generation; on-site handling, storage and processing; collection of solid wastes; Stationary container system and Hauled container systems – Route planning - transfer and transport; processing techniques;

UNIT- III

Engineering Systems for Resource and Energy Recovery: Processing techniques; materials recovery systems; recovery of biological conversion products – Composting, pre and post processing, types of composting, Critical parameters, Problems with composing - recovery of thermal conversion products; Pyrolysis, Gasification, RDF - recovery of energy from conversion products; materials and energy recovery systems.

UNIT- IV

Landfills: Evolution of landfills – Types and Construction of landfills – Design considerations – Life of landfills- Landfill Problems – Lining of landfills – Types of liners – Leachate pollution and control – Monitoring landfills – Landfills reclamation.



UNIT- V

Hazardous waste Management: – Sources and characteristics, Effects on environment, Risk assessment – Disposal of hazardous wastes – Secured landfills, incineration - Monitoring – Biomedical waste disposal, E-waste management, Nuclear Wastes, Industrial waste Management

TEXT BOOKS:

- Tchobanoglous G, Theisen H and Vigil SA ‘Integrated Solid Waste Management, Engineering Principles and Management Issues’ McGraw-Hill, 1993.
- Vesilind PA, Worrell W and Reinhart D, ‘Solid Waste Engineering’ Brooks/Cole Thomson Learning Inc., 2002.

REFERENCE BOOKS:

- Peavy, H.S, Rowe, D.R., and G. Tchobanoglous, ‘Environmental Engineering’, McGraw Hill Inc., New York, 1985.
- Qian X, Koerner RM and Gray DH, ‘Geotechnical Aspects of Landfill Design and Construction’ Prentice Hall, 2002.



1980154: ENVIRONMENTAL IMPACT ASSESSMENT**(Professional Elective – V)****B.Tech. IV Year II Sem.****L T P C**
3 0 0 3**Course Objectives:** The objectives of the course are to

- Define and Classify Environmental Impacts and the terminology
- Understands the environmental Impact assessment procedure
- Explain the EIA methodology
- List and describe environmental audits

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

- Identify the environmental attributes to be considered for the EIA study
- Formulate objectives of the EIA studies
- Identify the methodology to prepare rapid EIA
- Prepare EIA reports and environmental management plans

UNIT- I

Introduction: The Need for EIA, Indian Policies Requiring EIA, The EIA Cycle and Procedures, Screening, Scoping, Baseline Data, Impact Prediction, Assessment of Alternatives, Delineation of Mitigation Measure and EIA Report, Public Hearing, Decision Making, Monitoring the Clearance Conditions, Components of EIA, Roles in the EIA Process. Government of India Ministry of Environment and Forest Notification (2000), List of projects requiring Environmental clearance, Application form, Composition of Expert Committee, Ecological sensitive places, International agreements.

UNIT- II

EIA Methodologies: Environmental attributes-Criteria for the selection of EIA methodology, impact identification, impact measurement, impact interpretation & Evaluation, impact communication, Methods-Adhoc methods, Checklists methods, Matrices methods, Networks methods, Overlays methods. EIA review- Baseline Conditions - Construction Stage Impacts, post project impacts.

UNIT- III

Environmental Management Plan: EMP preparation, Monitoring Environmental Management Plan, Identification of Significant or Unacceptable Impacts Requiring Mitigation, Mitigation Plans and Relief & Rehabilitation, Stipulating the Conditions, Monitoring Methods, Pre- Appraisal and Appraisal.

UNIT- IV

Environmental Legislation and Life cycle Assessment: Environmental laws and protection acts, Constitutional provisions-powers and functions of Central and State



government, The Environment (Protection) Act 1986, The Water Act 1974, The Air act 1981, Wild Life act 1972, Guidelines for control of noise, loss of biodiversity, solid and Hazardous waste management rules.

Life cycle assessment: Life cycle analysis, Methodology, Management, Flow of materials-cost criteria- case studies.

UNIT- V

Case Studies: Preparation of EIA for developmental projects- Factors to be considered in making assessment decisions, Water Resources Project, Pharmaceutical industry, thermal plant, Nuclear fuel complex, Highway project, Sewage treatment plant, Municipal Solid waste processing plant, Air ports.

TEXT BOOKS:

- Anjaneyulu. Y and Manickam. V., Environmental Impact Assessment Methodologies, B.S. Publications, Hyderabad, 2007.
- Barthwal, R. R., Environmental Impact Assessment, New Age International Publishers, 2002.

REFERENCE BOOKS:

- Jain, R.K., Urban, L.V., Stracy, G.S., Environmental Impact Analysis, Van Nostrand Reinhold Co., New York, 1991.
- Rau, J.G. and Wooten, D.C., Environmental Impact Assessment, McGraw Hill Pub. Co., New York, 1996.



1980155: AIR POLLUTION**(Professional Elective – V)****B.Tech. IV Year II Sem.****L T P C**
3 0 0 3**Course Objectives:** The objectives of the course are to

- Understand the Air pollution Concepts
- Identify the source of air pollution
- Know Air pollution Control devices
- Distinguish the Air quality monitoring devices

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

- Identify sampling and analysis techniques for air quality assessment
- Describe the plume behavior for atmospheric stability conditions
- Apply plume dispersion modelling and assess the concentrations
- Design air pollution controlling devices

UNIT- I**Air Pollution:** Definition of Air Pollution - Sources & Classification of Air Pollutants - Effects of air pollution - Global effects – Ambient Air Quality and standards – Monitoring air pollution, Sampling and analysis of Pollutants in ambient air - Stack sampling.**UNIT- II****Meteorology and Air Pollution:** Factors influencing air pollution, Wind rose, Mixing Depths, Lapse rates and dispersion - Atmospheric stability, Plume behaviour, Plume rise and dispersion, Prediction of air quality, Box model - Gaussian model - Dispersion coefficient - Application of tall chimney for Pollutant dispersion.**UNIT- III****Control of Particulate Pollutants:** Properties of particulate pollution - Particle size distribution - Control mechanism - Dust removal equipment – Working principles and operation of settling chambers, cyclones, wet dust scrubbers, fabric filters & ESP.**UNIT- IV****Control of Gaseous Pollutants:** Process and equipment for the removal by chemical methods - Working principles and operation of absorption and adsorption equipment - Combustion and condensation equipment.**UNIT- V****Automobile and Indoor Pollution:** Vehicular pollution – Sources and types of emission – Effect of operating conditions-Alternate fuels and emissions-Emission controls and

standards, Strategies to control automobile pollution– Causes of indoor air pollution-changes in indoor air quality-control and air cleaning systems-indoor air quality.

TEXT BOOKS:

- M.N. Rao and HVN Rao, Air Pollution, Tata McGraw Hill Publishers.
- Noel, D. N., Air Pollution Control Engineering, Tata McGraw Hill Publishers, 1999.

REFERENCE BOOKS:

- Air Pollution Control Engineering by Nevers, , McGraw-Hill, Inc., 2000.
- Fundamentals of Air Pollution by Dr. B.S.N. Raju, Oxford & I.B.H.
- Air Pollution and Health by T. Holgate, Hillel S. Koren, Jonathan M. Samet, Robert L. Maynard publisher Academic Press.



1980156: AIRPORT, RAILWAYS, AND WATERWAYS**(Professional Elective – VI)****B.Tech. IV Year II Sem.****L T P C
3 0 0 3****Course Objectives:** the objectives of the course are to

- Deal with the characteristics of aircrafts related to airport design; runway and taxiway design, runway orientation, length, grading and drainage.
- Introduce component of railway tracks, train resistance, crossing, signaling, high speed tracks and Metro Rail.
- Explain the classes of harbors, features, planning and design of port facilities.

Course Outcomes: At the end of this course, the students will be able to develop:

- An ability to design of runways and taxiways.
- An ability to design the infrastructure for large and small airports
- An ability to design various crossings and signals in Railway Projects.
- An ability plan the harbors and ports projects including the infrastructure required for new ports and harbors.

UNIT – I**Airport Engineering:** Introduction to Air Transportation - Aircraft Characteristics - Factors Affecting Selection of site for Airport – Aprons – Taxiway – Hanger – Geometric design - Computation of Runway Length, Correction for Runway Length, Orientation of Runway, Wind Rose Diagram**UNIT - II****Introduction to Railways:** Role of Indian Railways in national development – Railways for Urban Transportation – LRT, Mono Rail, Metro Rail & MRTS. Permanent Way: Components and their Functions: Rails - Types of Rails, Rail Fastenings, Concept of Gauges, Coning of Wheels, Creeps and kinks Sleepers – Functions, Materials, Density – Functions, Materials, Ballast, Subgrade and Embankments, Ballast less Tracks.**UNIT – III****Geometric Design of Railway Track:** Gradients and Grade Compensation, Super-Elevation, Widening of Gauges in Curves, Transition Curves, Horizontal/Vertical Curves.**UNIT – IV****Track maintenance and Operation:** Points and Crossings - Turnouts, Stations and Yards - Level Crossings. Signaling and Interlocking - Track Circuiting - Track Maintenance.

UNIT – V

Dock & Harbour Engineering: Water Transportation: Ports and Harbours - Types of water transportation, water transportation in India, Ports and harbours: requirements, classification. Harbour works: breakwaters, jetties, fenders, piers, wharves, dolphins, etc., Navigational aids: types, requirements, light house, beacon lights, buoys, Port facilities: general layout, development, planning, facilities, terminals. Docks and repair facilities: design, dry docks, wet docks, slipways, Locks and lock gates: materials, size, Dredging: classification, dredgers, uses of dredged materials.

TEXT BOOKS:

1. Venkataramaiah C(2016), “Transportation Engineering Vol II – Railways, Airports, Docks, Harbors, Bridges and Tunnels”, Universities Press (India) Private Limited, Hyderabad
2. J S Mundrey, Railway Track Engineering (5th Edition) McGraw Hill Education 2017.

REFERENCE BOOKS:

1. Subhash C. Saxena (2008) Airport Engineering, Planning and Design, CBS Publishers and Distributors, New Delhi. (Reprint 2015)
2. R. Srinivasan (2016), Harbour, Dock and Tunnel Engineering 28th Edition, Charotar Publishing House Pvt. Ltd.
3. Saxena SC and Arora S C (2010) A Text Book of Railway Engineering Paperback – 2010, Dhanpat Rai Publications (Reprint 2015)
4. Robert Horonjeff, Francis X. McKelvey, Willian J Sproule, Seth B. Young (2010), Planning & Design of Airports, McGraw-Hill Professional.
5. Transportaion Engineering by R. Srinivasa Kumar, University Press India



1980157: URBAN TRANSPORTATION PLANNING**(Professional Elective – VI)****B.Tech. IV Year II Sem.****L T P C**
3 0 0 3**Pre-requisites:** Transportation Engineering**UNIT I:**

Transport Planning Process: Scope – interdependence of land use and traffic – systems approach to transport planning – Transport surveys – definition of study area – zoning survey - types and methods inventory on transport facilities - inventory of land use and economic activities.

UNIT II:

Trip Generation: Factors governing trip generation and attraction rates – multiple linear regression analysis – category analysis – critical appraisal of techniques.

UNIT III:

Trip Distribution Methods: Presentation of trip distribution data - PA matrix to OD matrix – Growth factor methods - gravity model and its calibration – opportunity model

UNIT IV:

Modal split analysis: Influencing factors – Earlier modal split models: Trip end type and trip interchange type – limitations – Disaggregate mode choice model – Logit model - binary choice situations – multinomial logit model – model calibration

UNIT V:

Route assignment: Description of highway network – route choice behaviour – shortest path algorithm assignment techniques – all nothing assignment – multi path assignment – capacity restrained assignment – diversion curves

TEXT BOOKS:

1. Kadiyali, LR (1987), Traffic Engineering and Transportation Planning, Khanna Publishers, New Delhi.
2. Hutchinson, B.G. (1974). Principles of Urban Transport Systems Planning. McGraw Hill Book Company, New York.

REFERENCE BOOKS:

1. Papacostas, C. S., and Prevedouros, P.D. (2002). Transportation Engineering and Planning. 3rd Edition, Prentice - Hall of India Pvt Ltd.



2. NPTEL videos on Urban Transportation Planning, Dr. V. Tamizh Arasan, IIT Madras
3. Paul.H. Wright (1995), Transportation Engineering – Planning & Design, John Wiley & Sons, New york.
4. John W Dickey (1995), Metropolitan Transportation Planning, Tata McGraw-Hill publishing company Ltd, New Delhi.



1980158: FINITE ELEMENT METHODS FOR CIVIL ENGINEERING**(Professional Elective – VI)****B.Tech. IV Year II Sem.****L T P C**
3 0 0 3**Pre-Requisites:** SA – I & SA – II**Course Objectives:** The subject provides introduction to finite element methods to analyse structural elements**Course Outcomes:** At the end of the course the student will able to Analyse simple structural elements using Finite Element approach**UNIT – I**

Introduction to Finite Element Method – Basic Equations in Elasticity Stress – Strain equation – concept of plane stress – plane strain advantages and disadvantages of FEM. Element shapes – nodes – nodal degree of freedom Displacement function – Natural Coordinates – strain displacement relations.

UNIT – II

Lagrangian – Serendipity elements – Hermite polynomials – regular, Irregular 2 D & 3D – Element – shape functions up to quadratic formulation.

Finite Element Analysis (FEA) of – one dimensional problems – Bar element – Shape functions stiffness matrix – stress – strain relation

UNIT – III

FEA Beam elements – stiffness matrix - shape function– Analysis of continuous beams.

UNIT – IV

FEA Two-dimensional problem – CST – LST element – shape function – stress – strain.

Isoparametric formulation –Concepts of, isoparametric elements for 2D analysis - formulation of CST element.

UNIT-V

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

TEXT BOOKS:

1. A first course in Finite Element Method by Daryl L. Logan, 5th Edition, Cengage Learning India Pvt. Ltd.
2. Introduction to finite Elements in Engineering by Tirupathi R. Chandrupatla, and Ashok D. Belegundu, Prentice Hall of India

REFERENCE BOOKS:

1. Finite Element Aanalysis by P. Seshu, PHI Learning Private Limited



2. Concepts and applications of Finite Element Analysis by Robert D. Cook et al., Wiley India Pvt. Ltd.
3. Applied Finite Element Analysis by G. Ramamurty, I.K. International Publishing House Pvt. Ltd.

